

New Foundations in the Sciences

Physics without Sweeping Infinities under the Rug

Edited by: V. Christianto, F. Smarandache, R.N. Boyd
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New Foundations in the Sciences: Physics without Sweeping Infinities under the Rug
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Cover layout: Victor Christianto

Cover image: Alfven's homopolar motor model of the galaxy; it seems that the Kelvin-Helmholtz model of the electron is scalable to galaxies.

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The most radical question which anyone can be asked is not how much their possessions cost, but whether they have found something of value - that is, something that makes living worthwhile.

— Alister E. McGrath

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Preface

It is widely known among the Frontiers of physics, that “sweeping under the rug” practice has been quite the norm rather than exception. In other words, the leading paradigms have strong tendency to be hailed as the only game in town.

For example, renormalization group theory was hailed as cure in order to solve infinity problem in QED theory.

For instance, a quote from Richard Feynman goes as follows:

“What the three Nobel Prize winners did, in the words of Feynman, was "to get rid of the infinities in the calculations. The infinities are still there, but now they can be skirted around . . . We have designed a method for *sweeping them under the rug*." [1]

And Paul Dirac himself also wrote with similar tune:

“Hence most physicists are very satisfied with the situation. They say: "Quantum electrodynamics is a good theory, and we do not have to worry about it any more." I must say that I am very dissatisfied with the situation, because this so-called "good theory" does involve neglecting infinities which appear in its equations, neglecting them in an arbitrary way. This is just not sensible mathematics. Sensible mathematics involves neglecting a quantity when it turns out to be small—not *neglecting it just because it is infinitely great and you do not want it!*" [2]

Similarly, dark matter and dark energy were elevated as plausible way to solve the crisis in prevalent Big Bang cosmology.

That is why we choose a theme here: New Foundations in the Sciences, in order to emphasize the necessity to introduce a new set of approaches in the Sciences, be it Physics, Cosmology, Consciousness etc.

Similarly, we observe sweeping under the rug practice in the electromagnetic theory development, in particular what is termed as "longitudinal wave."

The following message is quoted from one of us (RNB), whose grandfather did some work in Tesla's lab.

Longitudinal E/M wave solutions of the Maxwell equations.

"From a newspaper interview of Tesla:

"When Dr. Heinrich Hertz undertook his experiments from 1887 to 1889 his object was to demonstrate a theory postulating a medium filling all space, called the ether which was structureless, of inconceivable tenuity, and yet solid and possessed of rigidity incomparably greater than that of the hardest steel. He obtained certain results and the whole world acclaimed them as an experimental verification of that cherished theory. But in reality what he observed tended to prove just its fallacy.

I had maintained for many years before that such a medium as supposed could not exist, and that we must rather accept the view that all space is filled with a gaseous substance. On repeating the Hertz experiments, with much improved and very powerful apparatus, I satisfied myself that what he had observed was nothing else but effects of longitudinal waves in a gaseous medium, that is to say, waves, propagated by alternate compression and expansion. He had observed waves in the ether much of the nature of sound waves in the air.

Up to 1896, however, I did not succeed in obtaining a positive experimental proof of the existence of such a medium. But in that year I brought out a new form of vacuum tube capable of being charged to any desired potential, and operated it with effective pressures of about 4,000,000 volts. I produced cathodic and other rays of transcending intensity. The effects, according to my view, were due to minute particles of matter carrying enormous electrical charges, which, for want of a better name, I designated as matter not further decomposable [See: Le Bon]. Subsequently those particles were called electrons. [This is not the correct understanding, as electrons, etc., can be decomposed into vortex lines.]

[Tesla was an admirer of Gustave Le Bon, as many of his experiments paralleled those of Le Bon and arrived at related conclusions.]

One of the first striking observations made with my tubes was that a purplish glow for several feet around the end of the tube was formed, and I readily ascertained that it was due to the escape of the charges of the particles as soon as they passed out into the air; for it was only in a nearly perfect vacuum that these charges could be confined to them. The coronal discharge proved that there must be a medium besides air in the space, composed of particles immeasurably smaller than those of air, as otherwise such a discharge would not be possible. On further investigation I found that this gas was so light that a volume of it equal to that of the earth, would weigh only about one-twentieth of a pound."

Tesla was correct that aether can propagate *longitudinal waves*. This does not preclude aether from also conveying the electromagnetic effect of the photon as it passes through the aether. The aether can have a mechanical behavior (longitudinal waves) and an electromagnetic behavior (transverse Hertzian waves), or both.

In the case of the longitudinal wave, the aether media moves back and forth like a gas. In the case of Hertzian (transverse) waves, photons physically pass through the aether. Since longitudinal waves in the aether are actually displacements of the aether media, longitudinal waves can create unusual effects such as those manifested by John Hutchinson in cold-melting aluminum, and by John Keely in his molecular dissociation of water.¹

Related to this, from Bohm's "*The Undivided Universe*", faster than light events are described in terms of "osmotic processes", where one object strikes another than the next and so on. An osmotic process is just a longitudinal wave in the media.

¹ Some of the longitudinal E/M solutions of the Maxwell equations are here: <https://arxiv.org/pdf/1606.01738>

Augustin Fresnel observed:

"There are other points concerning the action of matter upon the ether which are perhaps in a fair way to receive a clearer solution. The observed fact that light travels in water with a speed of about three-fourths of what it has in air, apparently means that the transmitting medium is either more dense or less rigid in water than in air. Fresnel's hypothesis is that its rigidity is the same in the two media. His formula, as developed by Eisenlohr, for the relative motion of ether and matter which it permeates, when the matter is set into motion, assumes, clearly and baldly, that the ether is more dense inside of matter than in free space. The amount of ether occupying a volume of one cubic centimeter will condense to nine-sixteenths of a centimeter on passing into water. It is compressed until its density is nearly double."

This expresses that aether is compressible when it becomes captivated internal to physical matter. It can also decompress and escape from material forms.

Consider that Kozyrev proved by an easily reproduced experiment that the weight of a metal ball becomes considerably less when it hits a concrete floor, and is then placed on a very sensitive weight measurement instrument.

Observing the instrument, one observes that the weight of the metal ball recovers to "normal" in "quantized" increments requiring a large amount of time to be restored, by steps, to the initial weight that the metal ball had before it was dropped to the hard surface. In this event, the matter of the ball has had aether expelled out of it by the impact, in a "matter = aether sponge" analogy. (This also informs us that the quiescent aether has measurable mass.) The object recovers its aether mass in steps, after the impact."

Hopefully this prologue can serve as an introduction to the present book, where we will include some articles which may represent New Foundations in the Contemporary Physics.

So, we hope you will have a good time reading these chapters which may open a can of worms of wild imaginations. And enjoy this book.

Have a nice journey in your life.

Sincerely,

VC, RNB, FS

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Version 1.3: 18 July 2019, pk. 19:12

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EPILOGUE

Caring: the most powerful form of creating

Dr. Robert N. Boyd²

When we care about something, we focus on it, or we put our attention on it. What we value as important, what we give our energy to, is what we *care* about. This is biggest secret of manifesting through intention: You have to **care** about it.

Adjunct to that is, you have to attach your attentions and intentions to all the good this creation can do in the world, for Natural Harmony, and for those you personally care about. The more aligned the creation is with Natural Law and with the Natural Harmony, the more easily it will manifest in Real Reality. It's not just about you. It's about the Beings and Principles you Care About, those that will benefit from this creation.

The **Real** Law of Attraction: It is through the condition of **caring**, which has components of thought, emotion, and will, that the creative power of the human mind is unleashed to generate the manifested world **consciously** rather than unconsciously.

Really Care about what you are creating, and why you are creating it and intend to support the many benefits which will arise for the many, from the manifestation of what you are creating.

I hope you pass this along. It's about time folks got the realization that caring matters more than anything else, in every regard. God came to me and said, "I don't care what you call me. Call me whatever you want. What matters is that you care."

Best Wishes = (I care),

² A consulting physicist for Princeton Biotechnology Corporation, Dept. Information Physics Research. Email: <rnboydphd@comcast.net>.

Abbreviated Biography³

Plasma Physics – Eight years of experience encompassing thermonuclear hydrodynamics research in plasma stability theory, tailored plasmas, field structures, colliding beam turbulence, instability trapping, and thermalization theory. Design of several thermonuclear plasma confinement methods, one of which was submitted to the Patent and Trademark Office under the Disclosure Document Program, and subsequently constructed and tested by the Department of Energy at Los Alamos Laboratory. The apparatus proved capable of developing and containing self-sustaining thermonuclear fusion reactions, and developed a net energy gain, being only the third successful fusion reactor design in the history of plasma physics research. A related paper was published, titled: “Confinement Based on E X B Drift Will Confine and Heat a Thermonuclear Plasma Indefinitely”. This method of plasma confinement forms the basis for other successful schemes in common use today, such as the Penning trap and the Paul trap.

Optics/Electro-optics – Five years of experience involving holography, holographic methods, phase conjugate holography, holographic memory, holographic memory media studies, fiber optics communications, fiber optic fiber design, solid state LASER design, LASER satellite ranging (NASA), LASER surveying equipment design (NASA), optical alignments, spectrophotometers, reflectance meters, lenses, mirrors, Q-switches, Pockel's cells, polarimeters, power meters, and other common accouterments of optical work.

Recent Projects

1998: Invited to join Dr Jack Sarfatti's “Sarfleet Academy”, a research team with the goal to “Make Star Trek Real”. Worked on these tasks with the group for about three years. We did make significant progress in some areas. Left the group in 2001, due to conflicts in personal philosophy.

1999: Invited to join Project Greenglow, sponsored by BP Aerospace, U.K., a group of researchers tasked with exploring antigravity and force field propulsion techniques. We solved all the requirements associated with our initial goals, and provided theoretical solutions that have yet to be implemented in any public

³ <http://worlds-within-worlds.org/rnboyd.php>

manner. Left in 2005, because there were no actual apparatus being constructed and no actual experiments being conducted, and because I wasn't being paid for my strong contributions.

2000: Invited to join the Quantum Mind List at University of Arizona. Stopped publishing in the same year, due to prejudicial peer reviews.

2001: Invited to join the ORMUS Scientific Working Group, a group devoted to studying the properties of orbitally rearranged monoatomic elements. Left in 2005, due to high noise to signal ratio.

2004: Invited to join Peter Gariaev's research staff. Presently active.

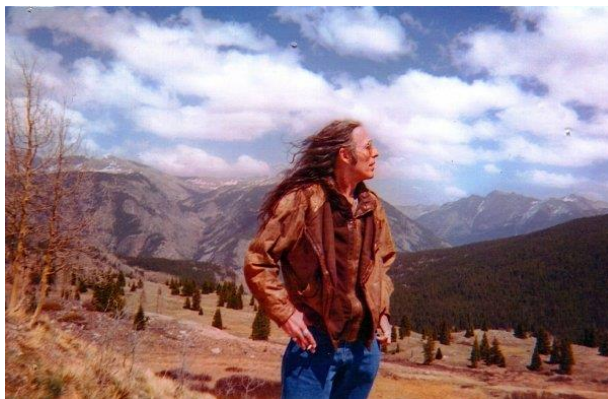
Optics:

Aether-Generated Transparencies

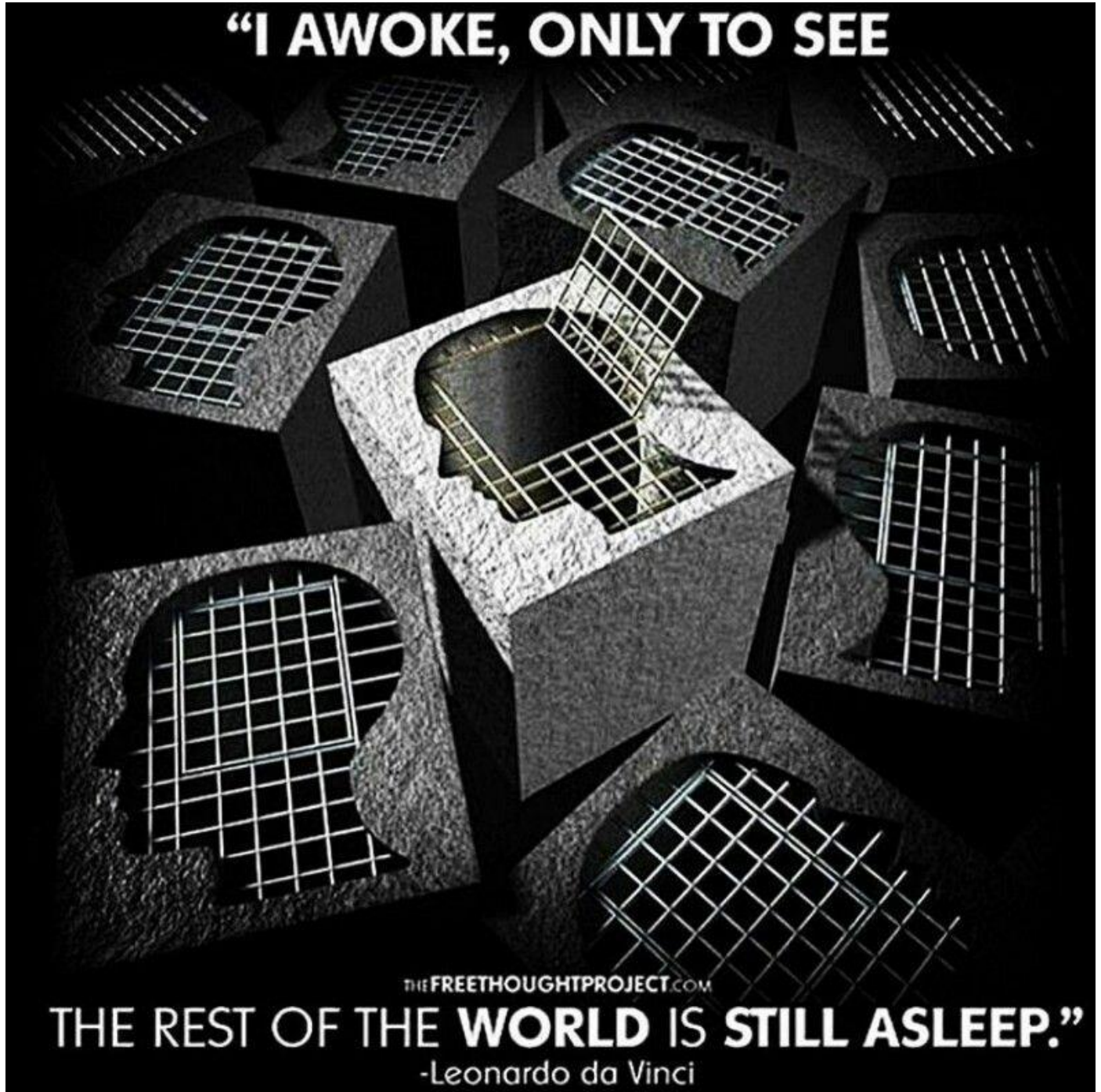
Matter Replication and Teleportation

Refutation of Heisenburg Uncertainty Regarding Photons

Pictures:



“I AWOKE, ONLY TO SEE



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THE REST OF THE WORLD IS STILL ASLEEP.”

-Leonardo da Vinci

Robert N. Boyd and Adrian Klein

THE LAPLACIAN GRAVITATION AND RELATIVITY THEORY

Robert Neil Boyd⁴

A consulting physicist for Princeton Biotechnology Corporation, Dept. Information Physics Research.
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Gravity doesn't care about mathematics. It works perfectly well without it. Newton and Einstein developed mathematical equations to describe what gravity does. Neither of them describes what gravity is, or where it comes from, what causes it.

The LaPlacian model of gravitation does describe what gravity is, and where it comes from, what causes it, as well as what it does.

Gravity is a push, from outside. Imagine gravity as a wind from the stars that is so strong and so nearly constant, that it keeps pressing you towards the Earth. That is the model developed by La Sage, improved by the Marquie de LaPlace, then by Nikola Tesla, then by Dr. T. J. J. See, and then rediscovered by me. It is the correct description.

There are indirect interactions between gravitation and magnetism. There are direct interactions between gravitation and electricity. (Gravitation can be temporarily locally vanished by applications of very fast, positive-going electrostatic field discharges, exceeding 400,000 statvolts, to the object. That happens because such discharges result in out-bound aether fluxes which intersect with, and effectively block, the incoming gravitational aether stream, because the local aether pressure, out-bound, is stronger than the local gravitational aether pressure, which is in-bound. This was first demonstrated by Piggot in France in July 1920. Piggot was able to suspend 1/2 inch diameter solid silver balls, and other materials, in the space between an electrostatically charged sphere, and a concave ground plate, when his generator was charged at 500,000 statvolts. Were this simply an electrical phenomenon, then the mere presence of the grounded plate would have instantly destroyed the effect. Interestingly, when the power was turned off, the objects were observed to remain suspended for quite some time.)

Gravitation is not at all an attraction, but a pressure, a pushing inward. In aether physics, the in-streaming gas which results in the pushing inward force we call gravity, has been captured in a circulating motion in the situation we call a magnetic field, rather resembling a whirlpool in water, in a way.

It is commonly understood that the central problem of "Relativity" deals with whether or not people who view a given event, from different locations, will agree on exactly when, and where, the given event happened.

The Galilean Relativity hypothesis is thus typically stated:

"Any two observers moving with constant speed and direction, with respect to one another, will obtain the same results for all experiments."

Black holes are fictions. No black hole has ever been directly observed. Many astronomical phenomena have been interpreted as implying that such activity would imply the presence of a black hole. Black hole

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theory is derived primarily from Relativity Theory, which is flawed. Conservation of energy is violated by both General Relativity (GR) and Special Relativity (SR), as has been experimentally demonstrated.

Gravitation is not fictional, but it is most certainly not due to any "curvature of space". I prefer the model developed by LaPlace in the 1850s, which has gravitation being caused by a constant influx of subquantum particles, each of which has an intrinsic velocity millions of times faster than the speed of light. I prefer this model because I discovered the same kind of model, independently, over the course of 7 years of research. I only recently found the gravitational model developed by LaPlace in a physics text by E. T. Whittaker. I think the LaPlacian Gravitation model is perfectly correct, because it agrees with my model, and because it accounts for everything properly. And energy is conserved in LaPlace's model, something which can not be said for relativity theory.

And by the way, if one holds LaPlace's model as true, then it turns out that Galileo's original version of relativity is the correct model.

THE SUBQUANTUM PLENUM: A Restoration of Rationality to Physics⁵

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“There is good reason to assume the existence of a sub quantum-mechanical level that is more fundamental than that at which the present theory holds.” -- David Bohm, 1957

Abstract

Professor Dimitri Mendeleev was the “father” of the Periodic Table of the Atomic Elements, which he composed in 1869. In this first publication, Mendeleev placed a special “Zero Group” of atomic elements, which preceded the Nobel gases. The quality of chemical inertness was assigned to the Zero Group gases, to explain their “non-reactive” character, and the difficulty of discovering the Zero Group gases chemically. The lightest of the Zero Group gases, the first in the Periodic Table, was assigned a theoretical atomic weight 100,000,000 times lighter than hydrogen. The kinetic velocity of this gas was calculated by Mendeleev to be 2,500,000 meters per second. Nearly massless, these gases were assumed by Mendeleev to permeate all matter, rarely interacting chemically. The high mobility and very small mass of the trans-hydrogen gases would result in the situation, that they could be rarefied, yet appear to be very dense. Mendeleev was so confident that these atomic elements would be discovered, that he included them in his original publication of the periodic chart of the atomic elements, although there was no physical evidence for their existence available at the time. (Mendeleev also predicted the existence of several other of the atomic elements, including gallium and germanium, many years before they were actually discovered.)

Introduction

Mendeleev later published a theoretical expression of the aether, which satisfied many of the contradictions which existed in physics at that time, in a small booklet entitled, “*A Chemical Conception of the Ether*”, in 1904. (His expressions may well serve to help us eliminate many of the difficulties we are faced with in physics today.) His 1904 publication again contained two atomic elements smaller and lighter than hydrogen. He treated the “aether gas” as an interstellar atmosphere composed of at least two lighter-than-hydrogen elements. He stated that these gases originated due to violent bombardments internal to stars, the sun being the most prolific source of such gases. According to Mendeleev's booklet, the interstellar atmosphere was probably composed of several additional elemental species.

⁵ <http://worlds-within-worlds.org/publications-and-research.php>

Nikola Tesla later found Mendeleev's "Zero Group" gases, and several more, by experiments involving high dv/dt explosive discharges of electricity, acting in the manner of a stone dropped into a pond, sending an out-bound shock wave into the local media.[1] In Tesla's apparatus, shock waves released by the explosive unidirectional discharges of fast-acting high voltages, behaved as gaseous shock waves having electrical characteristics. Tesla found that these behaviors were caused by the dissociation of electrons, into their constituent aether particles, due to the speed and magnitude of the electrical discharges he used. Tesla found that the colors stimulated by the discharges' shocks waves varied according to the durations of the pulses he applied, at threshold voltages exceeding 500KV. According to the duration of the discharges, the various gases innate in the media were stimulated to luminescence. Tesla observed discharge colors such as blood red, sky blue, peach, and white. He stated that the various colors were due to the excitation-born releases of the various constituent gases of the aether, according to the pulse duration. (The gas spectra he observed by these experiments have no equivalent in the colorations of electro-luminescent discharges of any of the presently known gases.) Tesla devoted the last 30 years of his life exploring the behaviors and properties of the Zero Group gases.[2]

In the late 1700's La Sage proposed an explanation for Newton's gravity. It took the form of a proof that an inverse square attractive force generated by two bodies shadowing each other, from an all pervasive background motion of microscopic bodies, constantly impacting on the larger bodies. LaSage showed that as these smaller bodies become arbitrarily small and as the size of the shadow becomes smaller, relative to the separation of the bodies, an inverse square relation is produced. This background of small impacting bodies constitutes an aether. From this basis, La Sage produced a mechanism similar to General Relativity for Newtonian gravity. La Sage then developed a differential form of Special Relativity for accelerating frames, preceding Einstein's Relativity. Later, Einstein produced the "Equivalence Theorem" whereby gravity was proposed to be equivalent to an accelerating frame of reference (matter affecting the hypothetical "space-time"). La Sage would have answered to the expressions of Einstein, that gravitation alters the path of photons in the same manner as it acts on all other entities. The three spatial dimensions and the variable of time mean that the curved photon trajectories existing in this early differential form of general relativity (a kind of Galilean relativity) produce the same effects currently attributed to "curved space-time". La Sage's model generates the same results as General Relativity without resorting to any new spatial dimensions, using only 3-D geometry, the conservation of momentum, and a differential form of general relativity.[3]

About 1853, the Marquis de LaPlace developed a model for gravitation which was an improvement and extension of the previous work done by La Sage. In this model, gravitation is caused by the pressure of a ubiquitous gas composed of "infinitesimal particles", each of which has an intrinsic velocity of millions of times the speed of light. This model for gravitation produces all the results of Relativity theory, while describing the actual cause of gravitation without resorting to any more than 3 Euclidean dimensions, nor requiring the mathematical fabrication of a "metric". [4] (Relativity theory only describes what happens as a result of gravitation; that is to say, what gravity does. Relativity theory does not tell us what causes gravitation, nor what gravity actually is.) Inertia in the LaPlacian system is explained as the resistance to motion caused by the inflowing fluidic media, where Newton's Third Law is invoked, resulting in a direct relation between gravitation and inertia. The tendency of an object to remain in motion is due to the equilibrium of the pressure

of the media on the already moving object, arising as it does, from all directions, similar to a "heat bath".

Einstein identified the existence of gravity with the inertial motion of accelerating bodies, whereas contemporary physicists identify the existence of gravity with space-time curvature. This interpretation of gravity as a local curvature in space-time is an interpretation Einstein did not agree with. When we examine Einstein's expressions regarding curved space-time, we are reminded that Einstein held the view that any space-time curvature would only occur at cosmic scales, not locally. Many have been led to believe that the 1935 experiments involving observations of a star during a total eclipse, which should have been obscured by the mass of the sun, represent evidence of a local space-time curvature (gravity well) in the vicinity of the sun. In fact, exactly the same results will be incurred if we place a density gradient of one of the Zero Group gases around the sun, which density increases as we approach the stellar body. The altered path of light which is observed in these circumstances, is then simply due to refraction, the change in the refractive index of space in the vicinity of the sun, due to the presence of a density gradient of gases, which causes any light which enters into the region of the density gradient to be bent away from its normal path, in the manner of an optical lens.

Because gravitation is the result of the constant inflowing of (subquantum) gases we are calling an aether, it seems that gravitation can be temporarily locally neutralized by applications of very fast, positive-going electrostatic field discharges, exceeding 500,000 statvolts, to the object. This can happen because such discharges result in out-bound aether fluxes which intersect with, and effectively block, the incoming gravitational aether stream, because the local aether pressure, out-bound, is stronger than the local gravitational aether pressure, which is in-bound. This was first demonstrated by Piggot in France in July 1920. Piggot was able to suspend 1/2 inch diameter solid silver balls, and other materials, in the space between an electrostatically charged sphere, and a concave grounded plate, when his generator was charged at 500,000 statvolts. Were this simply an electrical phenomenon, then the mere presence of the grounded plate would have instantly destroyed the effect. Interestingly, when the power was turned off, the objects were observed to remain suspended for quite some time.[2]

Nikola Tesla's work on what he called "electro-radiant impulses", which he considered to result from his "disruptive discharges", is outlined in detail in the London Royal Society lectures of February 1892. Fundamentally speaking, the effects of his "disruptive field impulses" exceed the effects of any manner of electron-based electro-inductive effects by several orders of magnitude. Tesla considered these aether impulses to be electrostatic in nature. In 1892 Crookes upheld Tesla as the discoverer of a new kind of electrical force. Tesla held that electric and magnetic forces are manifestations of this more primal aether-electricity, which he viewed as streamlines of aether particles in gas-like flows. His "radiant electricity" was a gaseous emanation, an aetheric motion, according to his empirical experimental results.

Maxwell also held the view that force lines were longitudinal, dynamic flow-lines, and wanted to know, "What substance are these flow-lines composed of?" Henry and Faraday had the notions that, since force lines were made of a "flowing charge substance", then there must be some means of placing contacts on charged masses to obtain electrical power forever. Later, Tesla, Stubblefield, T. T. Brown, and others, found various ways to accomplish this feat in actual fact. For Tesla, the method involved applications of very fast rise time (high dv/dt) D.C. voltage impulses from a high

voltage D.C. source, by way of a magnetically controlled plasma switch which could produce millions of repetitions per second. Exact specifications of his apparatus are given in the London Royal Society Lectures of Feb. 1892. In Tesla's view, his "radiating electricity" is composed of a "space-flowing current" that is not made of electrons. Something in the aether, perhaps one of the Zero Group gases, produces something that looks very much like charge. Tesla named this something the "effusive aether". He found that the velocity of the electric-like effusive aether-gas discharges far exceeded the velocity of electrons in any medium he tried, including vacuum. Tesla said that these effusive aether fluxes were inherent in standard electrical discharges. When liberated from the electrical flow by explosive discharge events, Tesla found that the resulting aether flux would conduct through any material whatsoever.

When he constructed devices which were specifically designed to completely stop the passage of any fluctuating or transient E/M, Tesla found that such circuits actually served to amplify the effusive flux of the aether. Such circuits were measured as passing zero current, yet these circuits were conducting enormous amounts of power at inordinately high voltages in the form of electrostatic discharges. Tesla remarked that the electrostatic potentials along the coil surfaces, measured from end to end, could be as high as ten thousand volts per inch of winding. A ten inch coil of Tesla's design would easily produce discharges of more than one hundred thousand volts. In his later, improved designs, he was able to attain discharge voltages on the order of 100,000,000 volts. Yet, never was any current measurable in these circuits. Tesla obtained better results when the few turns of copper he would put on a cylindrical form had rather large gaps between the turns, as this prevented energy losses due to sparking and brush-type discharges. By this, it seems that properly constructed Tesla Transformers conduct aether, rather than electrons. [5]

Tesla found experimentally, that explosive discharges of electricity, approaching the ideal of the Dirac delta function (the infinitely fast rise of an infinitely high voltage), cause the dissociation of electrons into their component aether particles, which then stream away from the discharge site in superluminal ever-expanding shells. Similar processes are probably occurring all the time in the bodies of the stars, resulting in aether emanations from the various stellar bodies. It is possible that localized processes can also occur in interstellar space, which can also result in subquantum particle fluxes. Stellar and interstellar plasma processes involving subatomic particle dissociations as the result of high dv/dt charge separation events in stellar and interstellar plasmas can be the origin of this constant in-streaming of subquantum particles which can easily attain superluminal velocities by such plasma dissociation events. When these anisotropic superluminal subquantum entities encounter pre-existing matter, they are refracted and slowed down by interactions with the pre-existing matter. The reaction which occurs is experienced by matter as the pressing-down force we call gravitation.

Tesla realized through experiment that certain of these incoming aether flux "waves" were arriving with unfailing regularity. He realized that the instances where he had obtained zero output readings were those cases where his applied pulses were 180 degrees out of phase with the incoming aether waves, and of course, strongest when the pulses were applied in-phase with the incoming flux peaks. This situation provided evidence that aether flux from interstellar space is not a constant and smooth value, but varies with time. He realized that the Earth, as a massive whole, was modulating parts of the aether flux. He discovered a large number of various periodicities within the aether fluxes. He found the sources of all these various flux rates had several causes. Space-sourced

aether pulses entered the Earth at rates apparently related to mysterious processes occurring in the deepest reaches of outer space, many such interstellar processes generated pulsations having nothing to do with Earth. Other rates had to do with processes in space involving properties of the interstellar medium itself. Yet, there existed a class of pulse rates definitely related to the nearby sun and to the Earth as a resistive mass. Tesla found that the Earth's rocky crust represented a resistance to the otherwise smooth passage of aether flux pulsations through interstellar space.

Tesla found that the resistance of the Earth's crust to the passage of aether, caused a local intensification of the aether flux to occur. He observed that a self-magnifying, self-collimating, property occurred when the aether fluxes encountered the massive body of the planet. The so-resisted aether then self-focused into the locally resistive medium comprising the planet, resulting in locally intense aether flux bombardments in the resistive media, which resulted in locally explosive emissions of showers of subatomic particles. One of the principle emissions was numbers of electrons. It appeared that electrons would spontaneously appear in the matter of the planetary body due to such resistivity to the aether flux. The resulting electrons acted as an aether "contaminant" which would choke off the normally smooth and unencumbered aether flows. In other words, the process of the conversion of aether particles, into electrons, due to the resistivity of the Earth's crust, acted to further retard the aether flows, in addition to the resistances inherent in the materials of the Earth's crust.

On the terrestrial scale, the results of these processes were observed to be enormous in scope. Tesla found, for example, that these processes were responsible for the molten core of the planet, and for the constant excesses of electrons which give the planet a constant net negative charge. Tesla also found a direct correlation between the local aether resistivity of the earth's crust and the local rate of lightning discharges, in regions which were notable for locally prodigious lightning activities.[1]

Indeed, the slowing of the aether fluxes by interactions with electrons, in particular, results in the formation of additional electrons, where electrons are modeled as whirlpools composed of subquantum aether particles, perhaps similar to the Kerr-Newmann Vortex model developed by Smith and Sidharth.[6] The continuous formation of electrons within the Earth's crust appears to be the result of these gravitational aether fluxes, which process is the actual cause of the internal heating of planetary bodies, and the reason for the constant excess of negative electrical planetary charge, which cannot be accounted for by the solar wind model, since the solar wind is a neutral charge-balanced plasma.

When one examines the original data, recorded during the Michaelson-Morley experiments, one can easily discover that large variations in the speed of light were recorded by the research staff, as measured by the instrumentation. The records show marked variations in the measured speed of light, both on an irregular basis, and in terms of periodic variations. Some of these data records show variations in the speed of light as large as 3000 meters per second, well outside of the margin for error of the measurement apparatus, and the experiment as a whole. (Speed of light measurements have historically shown variations over time. See, for example, page 436 of Maxwell's "Electricity and Magnetism".) Though quite markedly obvious, these "anomalous" measurements were apparently completely ignored by the experimenters, and those who came after, as irrelevant to the purpose of the experiment, which was to prove, or disprove, that an "aether drift" existed.

In actual fact, were faster than light events involved, or were infinitely small particles involved, the experimenters had no way to measure them, nor their activities. Surprisingly, it is now clear that their measurements strongly support the idea that there exists some kind of aether. It's just not the kind of aether that the experimenters were looking for.

Several aether drift experiments were performed, subsequent to the Michaelson-Morely experiment. Experiments by Miller, [8] Kehr, [9] and Silvertooth, [10] have provided physical evidence that an aether drift exists, that the planet moves relative to a background gas, and that portions of that gas are entrained by the motion and mass of the planet. It seems clear that the results of all the aether experiments performed to date, can support the model for the aether proposed by Mendeleev and LaPlace during the 1800s. Perhaps their model is the correct one, and the differing experimental results may be due to the behaviors of the same material substance, under different circumstances.

Contrary to common understandings, the various fields are not well represented as smooth unbroken lines. Real electrostatic fields, for example, do not behave in a simple and regular manner. Empirical observations have shown us that actual field structures exhibit complex and irregular fluctuations in measured local field strengths and directions. It is possible that all such variations arise as the result of the activities of the Zero Group gases (or subquantum particles).

The force of gravitation is not a constant, but exhibits high speed transient variations and periodic variations to such an extent that the gravitational “constant” should be more accurately considered as an “average”. [7] We suggest such observations may be caused by stellar and interstellar releases of large numbers of subquantum particles, due to plasma processes.

What is not commonly examined when we are observing the detailed structures of fields, are any periodicities which may arise in these field structures. In addition to the commonly observed irregular fluctuations, we can also directly observe, complex overlaying periodic behaviors. What is the agency responsible for such periodicities? With the advent of new measuring equipment, we suspect that it will be found that such periodicities arise as the result of periodic stellar and interstellar high dv/dt plasma events, [1] acting to release large periodic fluxes of subquantum particles, which act to create the observed periodicities, traveling across space to influence the region under observation. The behaviors of the stellar plasma exhibit both “random” occurrences, and periodicities. Thus, such fluxes of infinitesimals, originating from the sun, and other stellar bodies, may be responsible for both the observed irregularities, and the periodicities, encountered in detailed observations of the various fields, including the gravitational field.

Given that there are instantaneous variations in the force of gravity, [1] and granted that gravitation interacts to some degree with light, which is observed to vary in speed on occasion, it is easy to see that there may be a direct correlation between these two variations, so that when the force of gravitation varies during a certain time-frame, we might also measure variations in the speed of light, at about the same time, with sensitive enough instruments.

As mentioned previously, we consider the force due to gravitation is not a constant, but an “average”. Given that we accept the aether flux model for gravitation proposed by the Marquis de LaPlace about 1853, and granted that gravitational variations might exhibit strong correspondences

with the stellar and interstellar events which liberate vast outpourings of the “infinitesimal particles” which are the cause of gravitation in the LaPlacian model, we are led to the startling realization that the original experimental series of Michaelson and Morely actually contributes towards proving the existence of an aether, of the kind proposed by LaPlace in the 1850s, due to the large measured variations in the speed of light recorded during the experiments.

Were a similar experiment performed today, where variations in the speed of light and variations in the force of gravitation were being constantly measured, at the same time, and were correlations observed in these measurements, we would have compelling evidence in support of the LaPlacian model for gravitation, and evidence which would support the existence of an “aether” of the kind proposed by Medeleev and LaPlace, composed of vast streaming quantities of infinitesimal particles originating from stellar and interstellar events.

When one examines the existing quantum theory regarding the electrodynamics of the “elemental” particles, such as the electron, the present theory predicts infinite values for the various physical properties of the electron. These infinite values occur because the theory treats the electron as infinitely small, while in actual fact, from scattering experiments, the electron has finite and measurable extent (10^{-16} cm.). We have not yet found any way to consistently incorporate into quantum theory, an electron with a finite but very small size.

It may be that this difficulty can be resolved by treating the electron as an entity of finite size, which has a substructure. Recent high energy results have strongly indicated that even the tiny quark has a substructure, [11] prompting one of the researchers to exclaim, “Is there no end to smallness?”. It is quite feasible to model the electron as having a substructure composed of a whirlpool-like circulation of subquantum particles (Zero Group gases). Indeed, the validity of the Maxwell equations relies on the existence of a physical aether, where the background is composed of aether whirls.[12] We can view electrons as the result of coherent activities of the subquantum particles in a fluidic media, which media is composed of subquantum particles. The electron is then viewed as a complex structure participating in a media composed of subquantum particles. For example, T. Smith and Sidharth have modeled the electron as having a complex substructure called the Kerr-Newman Compton Radius vortex.[6] Such a complex structure can easily behave in the fluidic media in a wave-like manner, while at the same time, presenting particle-like concentrations of energy.

Rochus Boerner has pointed out a number of new theoretical developments that indicate that longitudinal waves exist in the vacuum, conducted by some gas-like media. He states:

“During the past decade, several theorists have pointed out empirical and theoretical reasons to doubt the completeness of Maxwell's theory, and proposed an extended theory of electromagnetism that allows for novel EM phenomena, such as "pressure waves" in the vacuum. The literature on this subject is substantial.

T. W. Barret argues in [1] that "a number of physical effects strongly suggest that the Maxwell field theory of electromagnetism is incomplete." He subsequently proposes a modified EM theory based on the non-abelian symmetry group SU(2) instead of the abelian U(1) of Maxwell's theory [2]. In the same

theoretical spirit, M.W. Evans has proposed O(3) Electrodynamics [3].

B. Lehnert writes in [4]: "An extended Lorentz invariant form of Maxwell's equations has been developed on the hypothesis that the densities of electric charge and current can be interpreted as intrinsic properties of the electromagnetic field in vacuo. As consequences of this proposal, longitudinal electric space charge waves and steady electromagnetic equilibria are predicted to exist in vacuo."

These proposed extensions of the Maxwell equations have in common that they treat the potentials of the EM field as physically real, while the Maxwell theory treats them as mere mathematical conveniences without physical meaning. The implications of longitudinal EM are vast. Since the frequency and wavelength of such waves can be modulated independently, they could provide a virtually infinite bandwidth for communication. They would provide for instantaneous (superluminal) communication and thus utterly destroy Einstein's relativity theory.

Boerner's References:

[1] Terence W. Barret: Maxwell's Theory Extended (Part 1) - Empirical Reasons for Questioning the Completeness of Maxwell's Theory- Effects Demonstrating the Physical Significance of the A Potentials. Annales de la Fondation Louis de Broglie, Vol. 15, 2, 1990, p.143-183.

[2] Terence W. Barret: Maxwell's Theory Extended (Part 2) - Theoretical and Pragmatic Reasons for Questioning the Completeness of Maxwell's Theory. Annales de la Fondation Louis de Broglie, Vol. 15, 3, 1990 p.253-283.

[3] M.W. Evans: O(3) Electrodynamics. Modern Nonlinear Optics, Part 2, Second Edition, Advances in Chemical Physics Volume 119, ISBN 0-471-38931-5, p. 79-267

[4] B. Lehnert: Basic Concepts of an Extended Electromagnetic Field Theory. Speculations in Science and Technology, Vol 17, 4, 1994 p. 259-266. ”

It is sometimes forgotten that the researches of James Clerk Maxwell were devoted to discovering and proving the properties and composition of the medium which exists in space. Maxwell stated, "...we are unable to conceive of propagation in time, except either as the flight of a material substance through space, or as the propagation of a condition of motion or stress in a medium already existing in space." Torricelli remarked, "...energy is a quintessence of so subtle a nature that it cannot be contained in any vessel except the inmost substance of material things." [13] Indeed, the Maxwell equations do not function unless there does exist a media in space. The Maxwell equations are only valid in an inertial frame, which implies the existence of a physical media which has the property of inertia.

In fact, we know that electromagnetic waves possess a linear momentum, [14]

$$P_{\text{field}} = \text{Integral } S/c^2 \, dv$$

(where S is the Poynting vector)

and momentum density,

$$P_{\text{field}} = S/c^2$$

The question then arises, what is it that is conveying such momentum, if not a particle with the attribute of mass? Many such particles might then comprise an “aether”, allowing for the propagation of longitudinal waves through the media.

We suggest then, that interpreting the Klein-Gordon equation in the form of a particle-based model, as previously suggested by Nambu, [Y. Nambu, *Prog. Theor. Phys.*, 5, 82-94 (1950)] may be a valid perspective. Then the suggested wave equation will be based on a parameter r , which represents the order of development of a system, so that,

$$i\partial_{\theta}/\partial r = d'Alembertian r$$

(where ∂ is the partial differential).

Looking for a solution of the form

$$\theta = \exp[-iKr] \lambda(x^n),$$

we obtain,

$$K\theta = d'Alembertian \theta.$$

By choosing $K = m^2_0$, the above reduces to the Klein-Gordon equation, with the added feature that we can now obtain solutions for arbitrary values of K , leading to an expression which has room for an infinite range of particle masses, which could be useful for explorations in the subquantum particle realms, if it is found experimentally that there are particles of various masses in the subquantum realms. Such a view is consistent with existing quantum theory and relativity theory, in that both require that a range of particle masses must exist, ranging down to infinitesimals. This approach also seems consistent with the expressions of Stapp [15] and Boyd [16] regarding “Quantum matter”.

In line with these expressions, the quantum theory that quanta are “indivisible”, has been refuted physically by the Nobel Prize winning results of the “Fractional Quantum Hall Effect”, [17] which proved experimentally that quanta can be subdivided, perhaps infinitely. These results imply the existence of a subquantum realm, composed of particles much smaller than the electron. By these experiments, the divisibility of energy is proved, and the concept of the continuity of motion is recovered from classical mechanics.

The combination of the notions of subquantum particles, and the infinite divisibility of quanta allow us to produce detailed descriptions of the process of the transference of a quanta of energy, or a fraction of a quanta, from one quantum system to the next, by modeling the process in terms of transports of subquantum particles, from one system to the next, thus alleviating another “irrational trait” [18] from quantum physics. This process can occur at faster than light speeds, because the infinitely small particles involved in the transfer of quanta, are not subject to Relativity theory, having negligible mass.

We know that the translational velocity of impact (shock) waves through a medium can easily be vastly higher in velocity in a given medium, than the speed of sound through the media. As we know, the velocity of light through a medium is related to the speed of sound through the medium, in terms of mass density per unit volume. Cherenkov radiation is an example where the electron velocity exceeds the velocity of light in the local medium. In this situation, the electron radiates a photon of specific frequency so as to release excess translational energy and so return to light speed propagation velocity, in accordance with Relativity theory.

However, when subquantum particles are involved, relativistic considerations no longer apply. All of Planck's constants have perfectly vanished where subquantum events and masses are involved. Additionally, when we perform the calculation of the allowable translational velocity of an infinitely small mass, assuming that such entities actually exist, we can easily see that the translational velocity limitations described by relativity theory do not apply because there is no mass (an infinitely small mass) involved with the acceleration of the particle beyond light speed. Therefore, the relativistic prediction of an increase in inertial mass toward infinity as the mass approaches the speed of light, fails, because our mass is infinitely small in this situation.

These understandings bring us to the core principle of non-local behaviors and interactions, the idea that all non-local events are due to the transports of information-carrying subquantum particles. These information-bearing properties of the subquantum particles are strongly indicated by the experimental results of Gariaev, et.al., [19][20][21][22] (Also see: B. DePalma [23].) In addition, it is already well known that the "quantum field" is an information-bearing "field" which acts to carry information in a non-local way. What has not been made clear, up to this time, is how such information can be conveyed from point A to point B, at faster than light speeds.

In our view, the "quantum field" is identically the faster than light propagation of information-bearing subquantum particles (Zero Group gases). The infinitesimals can attain any velocity from zero velocity to an infinite velocity, without violating Relativity. In other words, the so-called "quantum field" is physically represented as infinite velocity transports of information by the vehicles of the subquantum particles.

In the book, "The Undivided Universe", by Bohm and Hiley, at page 203, Bohm says, "...The essential point is that in an independent disturbance of one of the particles, the fields acting on the other particle (by osmotic velocities and quantum potential) respond instantaneously even when the particles are far apart. It is as if the two particles were in instantaneous two-way communication exchanging active information that enables each particle to 'know' what has happened to the other, and respond accordingly." At page 352, Bohm says, "...the quantum potential represents active information." The vehicle which carries that information, in a non-local, superluminal manner, is exactly the superluminal subquantum particles which comprise the plenum and which are the cause of gravitation.

It is well known that the various vector potentials, such as the magnetic vector potential, can carry enormous quantities of information. [24] What has been unknown up to this time, is how the vector potentials can convey such information, from one point in space, to the next. It is becoming clear that the vector potentials may, in actual fact, represent fluid-like streaming flows of information-

bearing subquantum particles. If it is found experimentally that the vector potentials can carry information at faster than light speeds, such results would represent strong support for the concept that the vector potentials are actually flows of information-carrying subquantum particles.

Because there is a direct relation between the various vector potentials and the various fields, [25] it may eventually be demonstrated that the vector potentials actually originate the commonly known fields, representing streams of subquantum particles. (More likely, it will be found that this is a bi-directional process, a mutual interaction between the various vector potentials and the various fields.)

The purpose of Bell's inequality was to show that any local hidden variable theory which allows for any kind of independent disturbance of the quantum system, from outside the system, must imply a failure of quantum mechanics. Freedman, Aspect, and others, have proved experimental non-local violations of Bell's inequality. These kinds of results show that if there are hidden variables involved with quantum activities, that they must be nonlocal or subquantum. P. H. Eberhard, in *Nuovo Cimento* 46B, 392 (1978), showed that if there were a nonlocal EPR connection between particles, that any signals which relied on correlations of these particles could not occur, because EPR correlations alone, do not make possible the transmission of signals of any kind. Such correlations will not allow a signal to be transmitted faster than light, by means of the statistical measurements which are common to quantum theory in its conventional interpretation. If we accept these results, then any observed superluminal information transfers must be due to some other cause.

Other violations of Bell's inequality have come from the experimental results of Jahn, Radin, Dean, et. al., at Princeton Engineering Anomalies Research, which show independent disturbances arise in nonlinear, random, and chaotic systems, from outside the systems, by the vehicles of the attention, intention, and the emotional states of the human being. [26] These results imply that local hidden variables exist. Localized information transfers do not appear to require that EPR-type correlations must exist, prior to the information transfer. Thus, it is possible that both local, and nonlocal, hidden variables are constantly influencing the behaviors of quantum systems.

In a paper that was posted on the Los Alamos Archive in 1999, then removed about 2000, an experiment was described where the radiation patterns of symplectic electromagnetic transmission facilities were instrumented, while at the same time, the operators of the transmission facilities acted to change their attention, intention, and emotional states. It was found that as these qualities of the operators changed, the radiated pattern of the antenna changed correspondingly. It was also discovered that these qualities of consciousness also caused a divergence in the quantum potential. Subsequent experiments in France have found the same results obtain for operator interactions with normal electromagnetic transmission facilities.

Considering that we now know empirically, that the factors of attention, intention, and emotional states act to alter the radiation patterns of electromagnetic transmission antennas, while at the same time, causing a divergence in the quantum potential, we want to know, how is this possible? Since the subquantum particles carry information, comprising the information "field", we think it is highly probable that all macroscopic entities are constantly emitting and absorbing subquantum particles, each of which carries all the information available regarding the environment it just left.

Then we consider the possibility that these particles of infinitely small mass might readily be influenced to motion by the qualities of Living Beings, such as attention, intention, and emotional conditions, since these qualities act directly on the quantum field, per instrumented evidence.

It is conceivable that these qualities act on the minuscule masses of the of the subquantum particles in such a way as to cause them to be stimulated into motion, carrying new information along the line of their propagation, thus causing a divergence in the quantum potential, especially in the case where large numbers of subquantum particles are stimulated to motion by these qualities of Living Beings, influencing the quantum potential. It is easily seen that these qualities of Living Beings can act to alter the probabilities which inhere in the quantum potential, having reproducibly observable macroscopic consequences on both living and “inert” systems, especially those systems which are inherently nonlinear or chaotic, or which involve “random” or “stochastic” events. [26] Indeed, these information-carrying vehicles, composed of propagations of subquantum particles can explain many obtuse empirical phenomenon, such as telepathy, clairvoyance, psychokinesis, and psychometry, events which have been easily observable empirically, yet heretofore inexplicable by the previous sciences. Unfortunately, previous studies of these topics have attempted to dismiss such easily observable events as “impossible”, or “unscientific”, since the existing sciences could not readily explain such empirical observations and direct experiences.

When regarding the various results which have showed what may be quantum correlations resulting in alterations of genetic systems, we are interested to discover how these alterations might actually have occurred. Let us consider the possibility that in order for the observed correlations to occur in genetic systems, that there might be some requirement for informational quantities, as well as the various information qualities, which will then be directly involved with the observed EPR-like correlations. This requirement for information density might then represent a fundamental mechanism which describes genetic information transfers as analogous to a series of quantum state changes, which rely on information density by type, per unit time, per unit volume. This concept is related to the idea of “quantum matter”, first proposed by H. Stapp, [15] and to the corresponding “quantum phase states” of Stapp’s “quantum matter”, as proposed by us. [16]

Perhaps in the observed genetic quantum correlations, information density can be viewed as an additive function and might be cumulative over time, resulting in the kind of memory function that is already known to be inherent in the media. The notion that the media itself acts as an active memory for information of various sorts, is supported by numerous experimental results, such as those reported by Gariaev, Kanjen, Poponin, etc.

In some situations, there may be a transport of the media, whereby the memories inherent in the media are relocated. In other circumstances, there may be an active transference of the information contained in the media, by the vehicles of photons, electromagnetic propagations, or other energetic informational conveyances. In these cases, the information contained in a given local volume may be transferred to some location remote from the origination, while the memory of the local media, which has not itself been relocated, is retained, unaltered.

All of this has been alluded to by Bohm [27] [28] [29] in his expressions regarding an “implicate order” and a “quantum potential”. The implicate order, and the quantum potential are simply in-

formation, inherent in the media. The fact that certain varieties of information can propagate superluminally under certain conditions, is not relevant to the fact of the existence of the information itself.

The standard quantum concepts of superposition, correspondence, coherence, quantum states, and so on, are all resulting from the information that is held in the media. For example, the superposition principle regards the state of a physical system as its configuration at a particular moment, residing in some combination of states which have physically different properties, such that the state of the system at a given moment is considered some proportion of the primary physical conditions which the system may occupy at any given moment.

This situation is examined in terms of the probability that the system will occupy one or another physical state, at some point in the future. Without active information already being inherent in the system, there can never be any superposition, nor can there ever be any “quantum state” in the first place, which can be “occupied” by the system. In other words, all of the information about the system is already contained inherently by the system, prior to any examination of the system by any instrumentation or observer. The quantity of different kinds of information can be quite vast, and some of these qualities might be uninstrumentable by any means presently available. The principle of superposition of quantum states is then, in fact, a secondary statistical effect resulting from the active information already inherent in the system.

Let us now consider the possibility that there is no real limitation regarding the amounts or types of information that can be contained in a given quantum system. Clearly then, there can easily exist kinds of information about which we cannot be aware, internal to the system. Thus, the quantum system may be viewed as a kind of “black box”. We can see what comes out of the box, but we don’t really know what is actually inside the box, except by our observations of what comes out of the box, and then only statistically, through numerous repetitions of similar events. There can then arise nonlinearities and unexpected deviations from the normally expected output, which could be viewed as “uncertainty”.

Actually, our uncertainty lies exclusively in our inability to know precisely everything that is contained in the black box, in the informational sense, and to know what information is present in the various non-local information transfers which may act to influence the quantum system.

In other words, the system itself can be inordinately and unfathomably complicated in the information sense, and what we can observe is actually a secondary result of the active information inherent in the system. Quantum results are inherently incomplete, because it appears that we can never possibly have access to all the information which has been involved internal to the quantum “black box” to produce the results which come out of the quantum black box.

The results which arise from the quantum system are not due to multiple fictional “quantum worlds” comprised of infinities of possibilities, which are due to overlapping of probabilities. This way of thinking leads to a view which we can never actually observe in our everyday experience. Rather, the activities of the quantum system rely exclusively on vast quantities of diverse kinds of information, which act to determine what exactly comes out of the black box, and when. The

internals of the black box may be actually directly causal, but this is beyond our ability to perceive directly, at this time.

We inhabit a very real and experiential universe which interacts with us, and we with it. Certainly, we do not at each instant go through a process of examining infinite numbers of superpositions of infinite numbers of “possible worlds” in order to determine which quantum states have “collapsed from the wave functions”. Instead, we constantly accept whatever information is available wherever we have focused our attention, and act on that information, as required by the circumstances. The observer is perfectly dependent on the information supply available, and thus not at all separated from the universe, nor its activities, contrary to some of the current quantum themes.

Thus it seems clear that the genetic alterations experimentally observed by Gariaev, et.al., were not due to quantum correlations, but due to the information content of the media having been transferred from point A, across space, by several possible means, to point B. The information transferred contained the genetic sequences. Thus the quantum system at point B was re-organized by new information which came from point A. When we consider the genetic system as being comprised, at the deepest level, of subquantum entities which are the vehicles for the observed memory of the media, then it is easy to see how these entities can inform the larger objects comprising the genetic system, in a manner which seems to have some analogy to quantum correlations, but which is in fact due to a subquantum process.

In 1999, we suggested that quantum tunneling could occur due to a process which had the electron vanish from existence when it encountered a barrier, while the information about that electron continued along the same path the electron was already on. In other words, the electron would vanish from observable existence, at the barrier, only to reform on the other side of the barrier. What was missing from this explanation, was the mechanism whereby the electron managed to reform when the information about all the attributes of that electron had passed through the barrier. Now it is clear that the information, in the situation of tunneling events, is carried by subquantum entities of the same variety which form the electron in the first place. Thereby the electron simply reforms out of its constituent sub-particles, which easily penetrate the barrier, on the other side of the barrier, based on the information about the electron’s attributes which is carried by the sub-particles. This possibility may be investigated physically when new measurement apparatus becomes available.

It is fair to ask, how do these subquantum particles manage to capture and carry such vast quantities of information? At this time, we can offer no explanation, except to say that there are indications that the subquantum particles may be inherently multidimensional. From this, it is possible that the information about our world which is held by the subquantum particles, is somehow “enfolded” into the other and higher dimensions that appear to be involved with the subquantum particles. We have not yet devised an experiment which can directly investigate this notion, but such experiments may become evident in the future.

It has been determined by experiment that Planck's constant, one of the foundations of quantum physics, is not a constant under all circumstances. [30] What could cause such deviations? What do these results mean to quantum theory? The idea that the Planck length should be the limit of

smallness, is logically absurd, since any measurement of distance can be infinitely subdivided, into smaller and smaller parts. We expect that it will become physically evident, with the advent of new instruments, such as the subquantum microscope [31], that there may not be any limit to smallness. We also suspect that there may exist other physical constants, related to the Planck length, which will become apparent as our ability to observe the small, improves.

“Indeterminacy does not follow from quantum theory...[it is] an assumption that can in no way be subjected to experimental proof.” - Bohm, 1957

While it may be true that indeterminacy can never be proved experimentally, it can, however, be disproved experimentally. Hans Dehmelt won the Nobel Prize for a series of experiments that kept an electron frozen in place for months at a time, using a Paul trap. When the location of an object is fixed, we know its location will not change. Thus, we know that the momentum of the fixed object must be equal to its rest mass. In this case, we know that the momentum of the electron is equal to its rest mass, since its location is not subject to change. From this, we know both the position and the momentum of the object with absolute certainty, simultaneously. Dehmelt was thus able to know both the location and momentum of the trapped electron, with no uncertainty regarding both the position and momentum of the trapped electron, for spans of time as long as three months. Dehmelt's results then represent a physical refutation of the Heisenberg Uncertainty principle, as applied to an electron.[32] Later, we presented a proof that there can be no uncertainty whatsoever regarding any of the physical properties of a beam of monochromatic photons. [33] Our proof is easily demonstrated experimentally with standard optical measurement apparatus, and does not require any kind of trap to be constructed to demonstrate the validity of the assertion that monochromatic photons have no uncertainty about them, regarding any kind of optical measurement.

Since Heisenberg Uncertainty and indeterminacy have been refuted experimentally, we will examine the related principle from quantum physics called “complementarity”. “Complementarity” takes the view that any physical properties we wish to examine about a quantum system must be restricted to arbitrary “complementary pairs” of inherently imprecise concepts, such as position and momentum, wave and particle, and so on. The principle of complementarity relies partly on the validity of indeterminacy. The uncertainty principle has been shown to fail physically, by Dehmelt's ability to keep an electron fixed in precisely the same location for months at a time, while performing simultaneous measurements of both the position and momentum of the electron, physically falsifying the principle of complementarity with regard to indeterminacy.

Dehmelt's experiments also refute two other long-held concepts of quantum theory, as expressed by Bohr. [34] Bohr's conclusion was that any observation at the quantum level, forces one to consider that the measuring apparatus, and the measured object must become “indivisibly united”. Since there was no way during Bohr's time to show the details of the process of the transference of a quanta from one system to another, it was concluded on that basis, that there was no way to precisely describe the properties and qualities of the system under observation, as distinct from any conceivable measuring apparatus. Dehmelt's results physically falsify this view, since the properties of the electron could be exactly measured, as distinct from the measuring apparatus, for months on end.

Bohr also argued that since the quanta which are used by the measuring apparatus to accomplish measurements will interact with the object, say an electron, under observation, that the electron would be changed by interacting with the quanta used by the measuring apparatus in a way that could not be predicted, controlled, described, or even conceived of, due to the uncertainty principle and von Neumann's theorem. The usual interpretation of quantum theory then arrives at the absurd notion that the electron, or any other observable, has no properties at all until it is observed. In the first place, objects do not cease to exist, the instant we stop looking at them. Dehmelt's results falsify these arguments, physically, since the position of the electron in his experiment could be predicted, controlled, described, and conceived of, at the same time, over large spans of time.

A difficulty arises in relativistic quantum mechanics (also known as quantum electrodynamics, or QED), regarding the exchange of so-called "virtual photons". In order to describe the mutual repulsion of electrons, QED teaches that the observed repulsion is due to the exchange of "virtual photons". That is to say, that each electron, according to QED, must spontaneously and constantly, emit a continuous stream of "virtual photons". Because these "virtual particles" of light are held to contain "electromagnetic mass", they must, by Newton's Third Law, exert a recoil force on the electron which emits each virtual photon, and an impact force, in turn, on the absorbing electron. (These descriptions are supposedly the "locally generated forces" of special relativity.) Since no external agency can be brought forth to cause these energetic photonic emissions, it is well known that these "virtual" photon activities, clearly and obviously violate energy conservation.

This is considered to be permissible as long as the so-called "life" of the "virtual photon" is so short that its energy is subject to the uncertainty principle of QM. Since it has been experimentally proved by Hans Dehmelt's Nobel Prize winning experiment, and our proof regarding monochromatic photons, that uncertainty is not a valid principle under several circumstances, quantum electrodynamics appears to be on rather shaky ground, as does the concept of "virtual particles". These difficulties may be resolved by invoking subquantum particle activities as being responsible for our observations, eliminating any need to invoke "virtual particles" to explain our observations.

Interestingly, in our view a new kind of non-local unity is available in the form of faster than light transports of information by the vehicles of the subquantum particles. This kind of view explains the informational and holographic principles of the universe, as they appear to be, and the true nature of "non-locality", and thus provides a testable form of "holographic unity". Because of this, we expect a new kind of resonance will be found, which we are calling an "informational resonance", which we believe may be discovered to be relevant to many kinds of systems.

Causality is not violated by non-local information transfers. It is altered. Let us contemplate a situation where we start a race between two objects where the each object will pass through the distance of our race course and trigger a light to signal that the object has completed the race course distance. Let us give our first object some finite and arbitrary velocity. Let us give the second object an infinite velocity. Clearly, our second object will always cross the finish line the very instant we start the race, causing the light to come on in its portion of the track. Our first object, with finite velocity, will cross the finish line some arbitrary time later, causing the light to come on in its portion of the track. In both cases, the passing of the object through the distance of the course can clearly be seen to cause the light to turn on, corresponding to the fact that the object has completed the race course. The fact that one light has turned on before the other, is clearly

irrelevant to the fact that both objects have crossed the finish line. Similarly, the velocity of the respective objects is irrelevant to the fact that both objects have completed the course.

To then conclude that the velocity of all objects should be limited to the slower of the two objects, would obviously be an erroneous conclusion. To qualify the finish-time of the infinite velocity object, as being due to a failure of the measurement apparatus, since there is no observable propagation delay measurable, would clearly be erroneous. The light has turned on.

Causation, however, is not violated by our infinite velocity object. The infinite velocity object simply turns on the light when it crosses the finish line. The same argument can be made for any arbitrary superluminal propagation velocity, relative to any luminal or subluminal propagation velocity. Causality is direct, in all cases, regardless of propagation velocity. The fact that there may be superluminal causation is quite irrelevant. Relativity is quite wrong in this kind of situation.

For subquantum entities, both relativity and quantum mechanics fail. Classical, relativistic, and quantum events, result from events at the subquantum level. All the forces and all the fields are the secondary results of the primary activities of the subquantum. All matter, in our view, is comprised of organizations and accretions of the subquantum particles. In hierarchical physical matter expressions, it is easy to consider that elemental particles can be formed out of sub-elemental particles, which might, in turn, be composed of yet smaller particles. We are just extending our present hierarchy towards the infinitely small. We are presently of the opinion that Life itself, and Consciousness, are involved with subquantum information systems. These ideas can be experimentally proved, with the proper instrumentation.

In its present state, quantum mechanics denies empirical observations and direct experiences as having anything to do with any distinguishable or verifiable reality. The removal of all empirical processes from quantum physics actually removes it from the ranks of a physically verifiable science, and into the realms of fantasy. As it stands, quantum theory is only capable of calculating the probability distributions of various kinds of phenomena, since it has irrationally denied, as impossible, all manner of precision. We are convinced that all the paradoxical concepts presently residing in quantum mechanics will be resolved by our continued explorations of the subquantum domains, and a return to rationality and empiricism in the sciences.

Technological Implications

The SQ paradigm has implications regarding what is required to construct Alive, Sentient, self-acting, self-aware, and self-repairing Vehicles, and related Sentient appliances, of many kinds. This technology is vastly superior to any computer system ever constructed, or ever even considered, by the brainwashed and blindered human beings on this planet.

The SQ paradigm also makes it possible to implement a communications system that is perfectly private, that cannot be tapped, monitored, controlled, or interfered with. It can only be jammed for very short intervals which require that disastrous amounts of explosive energy must be acting in between the sender and the receiver of the communications. This communications system does

not require wires, nor electromagnetic radiations of any kind. It cannot be regulated by any legalities, nor stifled for political purposes. The user of this system has available to them an infinite number of perfectly secure channels. Each channel has an infinite bandwidth. And conveniently, this communications method produces communications that propagate faster than the speed of light. You just have to have the technology available at both ends of the communications.

The technologies that derive from the SQ paradigm will make all the standard technologies that are now on this planet, systematically obsolete, as they will all be replaced by something far better. As various SQ-based technologies are implemented, personal freedoms will replace various forms of enslavement. The various tyrannical entities implementing enslavement systems, along with their various monitoring technologies and their malefic control systems, which damage people and all life forms, will vanish. The apparatus which places many unnecessary, irrelevant, and annoying restrictions on the vast majority of the populace, will vanish. The existing repressive societies will all be replaced, by truly beneficial devices and truly beneficent intentions.

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Subquantum Perspectives in the Penrose-Hameroff Model⁶

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ABSTRACT

The Penrose-Hameroff model for Consciousness is hereby constructively addressed from a wide interdisciplinary perspective, derived from a novel Subquantum-based understanding of sentient reality.

Relying upon the most advanced theoretic conjectures supplied by the addressed concept, as well as upon recent proposals related to the hyper dimensional essence of Brain and non-physical signalization pathways, our debate extends across the complementary domains of low-level (biomolecular and cytoskeletal), medium level (Neural networks) and high level (Consciousness) integration instances of the Self-controlled biosystem into its energetic environment.

We suggest that conscious experience is accessed rather than generated by low order phenomena, presented here as correlates rather than aspects of consciousness.

The Quantum Objective Reduction is described in terms of deterministic sequences running under Information field orchestration, where Informational configurations are translated into Brain Quantum states according to vector guidelines provided by the interplay between Subquantum resonant configurations.

Brain is thus presented in its integral efficiency as a highly complex entropy-stabilizing apparatus, progressively patterning its ontological development according to anticipated Information processing tasks. This patterning is

⁶ <http://worlds-within-worlds.org/tsc-conference-hong-kong-china-2009.php>

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implemented by morphogenetic determinants enfolded in holographic control matrices, external to the apparatus. We provide ample arguments related to the Brain's efficiency as an ideal anchorage tool for connecting the biological systems into proactive conformally organized Information fields, which constitute the -self-conscious structure, operating in its own holographic space. We epistemologically differentiate between the holographic distribution principle, which exists in the Information field, at various levels of implication, and a concrete hologram, which requires a medium for expressing itself, which media is the SubQuantum plenum, in this case. Holographic interactions are made possible by Brain's being embedded in Quantum-controlled Euclidian projections of the projective hyperspace which accommodates organized Information fields. They are implemented by the intrinsically hyperdimensional essence we ascribe to information transporting SubQuantum entities and their combinatorial patterns.

Finally, we suggest that anesthetics may act obeying the Meyer-Overton correlation requirements while disrupting afferentation into subjective awareness fields by efficiently suppressing the neural Quantum resonance ability of Brain. Experimental and experiential observations under these conditions have shown, indeed, that cognitive phenomena continue running unaffected in the individual organized holographic information field, and remain associated with projective information space .

Transposing Lashley's interference engram into Quantum regime, mnemonic traces from such dissociating sequences between Brain and its cognitive field may be recalled by subsequent Quantum superposition effects triggered by Subquantum attractors, as supported by a vast experimental and experiential evidence, hitherto circumvented by mainstream explanatory trends.

We emphasize that the Subquantum concept is able to successfully replace dualist-interactionist ones by a physically consistent and experimentally proven monistic asymmetric determinism obeying Bohmian implication requirements.

It is reasonably hoped, that our hereby suggested contribution has a strongly supporting potential for the Penrose-Hameroff model's advanced insights, while extending them toward possible further horizons supplied by the Subquantum contributions to the sentient reality we defend.

I

A FEW INTRODUCTORY CONSIDERATIONS.

Our presentation at this Conference is intended to constructively address the Penrose-Hameroff "Orch-OR" model for Consciousness by a compatible and conceptually extended contribution derived from our progressively increasing understandings related to the Subquantum essence of sentient reality. Our basic conceptual guidelines have been presented at the "Quantum Mind" Conference in Salzburg 2007, as well as in the "T.S.C." conferences held in Budapest (2007) and Tucson, Az (2008).

At these events, we summarized our approach as follows:

"Recent experimental results have proved intractable to explanation by resorting to existing physics paradigms. This fact, along with certain fallacies inherent in mainstream physical-cognitive theories of mind, have encouraged the authors of this paper to transcend the currently operative limits of investigation, thus to explore the abyssal depth of the still uncharted, but highly rewarding, SubQuantum regimes. The subquantum is herein assumed to co-existentially accommodate proto-units for matter, energy and Information, which are thereby brought onto an equal ontological footing, in the subquantum domains.

Devolving its argumentation and orientation from the Nobel Prize winning Fractional Quantum Hall Effect, which opened the perspective toward a further divisibility of the Quantum domain, hitherto considered as an irreducibly fundamental description of nature, the hereby proposed inter-theoretic model claims to satisfy advanced scientific and philosophic requests as reformulated for a conceptually new working hypotheses. Subquantum potentials evolving in the Prime Radiation Matrix result in organizing functions able to interfere with classical local determinacy chains, operating at the Quantum levels of randomness inherent in space-time-like matter configurations, leading to highly complex representational patterns, linked to their phenomenal correlates in macroscopically detectable systems. Our model is strongly rooted in an overwhelming experimental evidence derived from multidisciplinary contexts of scholarly pursued exploration tracks as amply documented in this presentation.

Our basic understanding identifies the Quantum Potential (Quantum Field Theory) as a superluminal Sub Quantum Information-carrying aether able to interact with matter and physical forces at well defined Space-time positions injecting their Information content into our world of observables by modulating the event potential. This interaction is possible as soon as matter is defined by an n-degree entanglement state of SQ complexity. Absolute void refers to lack of matter which equals to a space-time sequence contending Information in its nascent, non-aggregative form (the Sub quantum plenum) as observed from our Space-Time perspective. It contains implicated layers of increasingly subtle pre-quantum domains, which each one at its manifestation range may be organized in complete worlds of the kind our own is, each one of them ranging till

its own "absolute void" as transition state to the next implication level of reality.

Introducing a quite innovative approach to the most controversial nature of Brain/Mind interaction, the pre-quantum tenets rely upon experimentally testable assessments. Our proposal has a strong outreach into unprecedented explanatory options for anomalous output data distribution in non-conventional exploration fields, whose statistically significant results become logically integrated into epistemologically sustainable blueprints. Constructively debating reasoning tracks suggested by eminent scholars with most impressive credentials in widely quoted references across our presentation, we emphatically challenge the current paradigmatic tenets that are obviously inspiring endless sterile controversies disseminated in widely accessible and mass-media supported literature. We hope to succeed in our attempt to persuasively reverse misleading ontological tendencies relying upon their disqualified metaphysical backgrounds by asserting an upside-down epistemological approach for the primary determinism that Information structures have upon their physical counterparts.

Our views are perfectly consistent both with conventional empirical treatment of space-time defying representational variables, and their causal primacy upon Quantum implementation systems of their content, in the integral range of their polyvalent manifestation. Detailed descriptions of mind/matter entanglement patterns are supplied, as running in the holistic superimplicative sentient reality domains, under the overarching regulation of Cosmic Harmony, underpinning a continuous creation cosmogenetic process.

As our analysis addresses a pre-temporal range, the thus defined endless time vector allows ab-initio existing inherent resonance links in any SQ subtlety domain to turn into fluxes and organization effects leading to sequential entelechial self-contained worlds. These primeval harmonic SQ resonances are the very pattern of our overarching cosmic harmony just mentioned, the source of all conceivable manifestation and interconnectedness."

We are grateful to the organizers of the current event for the opportunity given to us to present some significant correlation aspects we have found between the Orch-OR model and our model, hoping that thus we might contribute to a further, more detailed understanding of the most controversial and still quite elusive nature of Consciousness.

As a whole, our present comments represent an attempt to constructively extend some details in the referred theory, which obviously is the best documented available one in the field. Our contribution derives from our assumption that the Orch-OR model might be compatible with recent experimental data of a wide interdisciplinary origination, which seem to support

some novel paradigmatic hints hereby suggested. In spite of some epistemologically stretching hues in our approach, we assume that the academic community will appreciate its interdisciplinary value. These expressions may trigger a constructive feedback toward an increasingly accurate understanding of some unbiased fundamentals, which we hope will be more deeply explored in future investigations regarding Consciousness Studies.

II

HYERARCHICAL SUBQUANTUM INTEGRATION/CONTROL SYSTEMS WITH EXTENDING POTENTIAL IN THE PENROSE-HAMEROFF MODEL

"Orch.OR"

1. PRELIMINARIES.

We are aware of the fact that our hereby proposed concept may suggest some justified analogies to E. Fredkin's vision of a Universe representing a lattice of interacting logic units rather than mass/energy configurations. Nevertheless, we do our best to transcend any previously proposed theoretic developments, while following the involvement of various cognitive units into the neurohistological range, the topic of our present Brain-related concerns, as evoked by the Penrose-Hameroff propositions.

As amply documented in the model we refer to, subunits of cytoskeleton microtubules are recognized as highly Quantum sensitive structures. We hereby suggest that their Quantum sufficiency is coordinated by Subquantum Information storage and carrier systems operating in superluminal velocity range. From this, their computation efficiencies far exceed computer-driven AI technologies, as applied in cellular automata concepts.

Further on, we consider that Pribram's collective emergence of qualitatively distinct properties, along upward evolutionary vectors in phylogenetic chains, is conceptually consistent to the cumulative complexity indices we ascribe to evolving Information-driven SQ substructures, which cause Quantum superposition states. The quantum states so produced, are specific for given hierarchical levels of organization, involving specifically related energetic configurations.

Let us assess from the very beginning, that perception modalities of sensory information in brain-coupled consciousness, are related, in our perspective, to interference patterns produced by neural firing frequencies, provided they are properly configured for their successful transcriptions into Subquantum maps, which are available for subsequent decoding ("reading") by symmetrically conformed Information fields, which fields are operating at the next implication

levels of complexity.

Hopfield introduced an Informational function, coupled to energy states in the Brain. This opened a new analytical perspective. However, Hopfield did not recognize at the time, that the structure-patterning effects such Information fields generate, exist both in morphogenetic modelings of neural structures, as well as in permanent reconfigurations of the functional efficiencies of neural network correlates of cognitive functions. That such correlates widely exceed static Information patterning and selections is suggested, e.g., in Changeux's spin glass mechanism.

Holographic distribution patterns of space-time configuration Units are properties internal to the SQ entities. The the combinatorial states of the SQ entities are defining many different complexity values. This understanding provides a superior theoretical model for configuration transpositions, when compared to some earlier suggestions, such as the Conrad - Lieberman virtual cytoplasm representations.

Coherent nanoscale excitations in biosystems are elucidating collective subunit behavior patterns, which are originated in enfolded SQ Information patterns which control bioactivity chains. In this regard, DeCallatay's downward implication hierarchy and his approach to cytoskeletal structures, as fractal sub-dimensions of neural networks, in a Bohmian context, strongly supports our views.

By connecting EM, Time and Gravitation in a synoptic homogenous concept, the SQ approach supports both time-dependent and time-independent mechanisms such as those proposed by Froehlich and Davydov regarding molecular computational efficiencies.

Brain-scale macroscopic Quantum superposition effects are presented as evolving on the background of microtubulin conformational states, not as a cumulative consequence of such states, but as a higher organizing principle, one which allows for meaning-related two-way configuration-pattern transcriptions. These are essential replication effects, required for conscious representations, and are running in null time. This is a consequence of the superluminal velocity Information transfers which are commonly achieved by SQ fluxes, such as those recently experimentally demonstrated by Hu.

2. LOW-LEVEL BIOMOLECULAR, CYTOSKELETAL, GENETIC, AND CELL-LEVEL COORDINATIONS.

At the biomolecular level, entropy stabilizing systems involve hydrogen bonds of multi-enzyme complexes. These are related to water-supplied resonant bivacuum interactions as described in the Kaivarainen model. This interaction

seems to be an important atomic-level contribution to cytoskeletal information processing ability.

Let's assume that Barrow-Lindsay correlated fluctuations in macromolecular surface effects, are SQ related to fluctuations of London forces, according to the polarization and separation indices which are specifically implied. This SQ relatedness operates in the infra-electronic and molecular scales, providing a transcription of a preselected SQ matrix, into conformations of biomolecular event chains. Further, let us assume that biochemical oscillating patterns of tyrosination/glutamation, regulating biomolecular configurations, supply the chemical encoding required for replication of Quantum-related events. In this situation, femtosecond and nanosecond oscillations are present in the metastable functional conformational states which are observed at the biomolecular level, leading to transient superpositions, expressed as Quantum equivalents.

Such a transcription of Informational contents at biomolecular level, may imply that there exists a conformal Quantum tuning effect, which is occurring between cellular infrared dipolar radiations and ambient EM phenomena, acting to carry regulatory signals which are originating from higher implication levels. This concept seems to be supported by Free Energy Landscape experimental reports, where related experiments were performed using multidimensional Infrared and terahertz spectroscopy, with results which seem to correlate with the above suggestion. (Y. Suzuki and Y.Tanimura).

The ultimate coupling of conscious experience to the physical Brain, has been suggested to imply that there exist dynamically evolving entanglement modules, in the Quantum range between TGD-defined vacuum extremals, and Bose-Einstein condensates (M. Pitkanen). This circumstance might influence cytoskeletal resonance mechanisms, involving Josephson currents which are oscillating in the InfraRed frequency ranges, resulting in their coupling to photonic Bose-Einstein condensates, thus leading to functional phase-locking effects in microtubules.

Nonlinear quantized solitonic alpha helix propagations, as described by Davydov, in their retroactive coupling to quantized phonons in Information transferences across nanoscale structures, are embedded in the regulating Quantum map, which acts as a local teleological attractor, by way of electro-solitonic energy transfers. Quantum tunneling effects, together with nanosecond time-scale charge redistributions, related to the Froehlich excitations evolving in hydrophobic protein enclaves, equally participate in this process.

The alpha helicoidal structure of peptidic alignments and sequencing can be described as a soliton-mediated holographic transcription of vortex structures forming at different scales of magnitude, at least down to the $10e-58m$ Kolmogorov range, as we have repeatedly stated. Beta-pleated configuration sheets are formed in polypeptide chains according to Information that is contended in

the subatomic realms of the relevant hydrogen bonds involved. In a similar way, tertiary and quaternary protein assemblies have been documented as forming under SQ-originated Van der Waals forces. Charge configuration related dipole oscillations, evolving at this scale, are further contributing to the configuration and stabilization of tertiary allosteric states.

As we shall see at a more advanced stage of our analytic considerations on the various bioregulation instances, the biomolecular one included, a secondary downward holographic replication with retrograde causal orientation, is implemented by Quantum mediation, aligning elementary neuronal structures for the optimal implementation of cognitive tasks. These tasks have been preselected in time at the high implication levels which are specific to Consciousness and self-awareness related representational modalities.

In our view, cytoskeletal Quantum coherence which satisfies biological integration requirements and functional hierarchic integrations, leads into higher complexity Quantum fields. This situation implies that a direct causal link might be operating across biomolecular, neural network and conscious experience domains.

Cytoskeleton involvement in cognition has to be limited to its specific range of validity. This does not diminish its holonomic importance in the whole. It merely defines its application range in the overall scaling map of interconnected configuration mechanisms, extending across the literally infinite array of implicate domains, which are involved in sentient reality. Fractal expressions of such a multiple-embedded control system may be holographically described as the various conformational transition events which are operating at different size and time scales. Those determinants which are operating within the pico and femtosecond ranges, define atomic, molecular, and cytoskeletal regulation domains.

The cytoskeletal hologram results from convergent SQ patterns, belonging to sensory input signals, and referenced information sources, respectively. Such Information-guided Quantum superpositions provide a phase-stabilizing calibration system, which, in the available tuned filtering and resonant conditions in the cytoplasm, allow for the selective wave dynamics observed in the cell, as well as in their collective and coordinated "macron" effects. At a corresponding analytic resolution, Quantum macrons implement Information control upon their energetic correlates, at each level of the various informationally implied potential structures which are contributing to the vast holographic assemblage we describe as the sentient biosystem, at all levels of integration.

Functionally effective spatial organizations of cytoplasm activities, as evolving under centriolic microtubule polymerization guidances, wouldn't be conceivable without implying an intelligent primary centriolic activity, in the first place. This cytoplasmic organelle obeys enfolded retrocausation cues, as supplied by

overarching centrosomal Quantum states. Such implicate retrocausation blueprints are made possible, as we shall argue, by infinite velocity SQ information transmissions, which has a blurring effect on the chronometric time-embedding of the process.

SQ capacitors aligned along insulated molecular strains, between the hollow core of the microtubule, and the peritubular clear zone, smoothly respond to the Quantum entanglement effects they are embedded in. It has been obviously overlooked until now, that the spatial arrangements of hollow parallel intra-microtubulin systems may result in strong Grebennikov cavitation effects, which are acting as a tuning mechanism, linked into higher order task-related SQ attractors.

We strongly emphasize that cytoskeletal contributions are not limited exclusively to neurons. These contributions are in the background of the lower-level morphogenetic and morphoplastic information controls, which are operating in biological systems, at an overall biomolecular level. These processes must be related to various representational effects, only in their proper application ranges, as seen from the holonomic Bohmian perspective of hierarchical integration constraints.

In our SubQuantum model of reality, cellular gravity, originating in gyroscopic centriolic fluctuations, is intimately coupled to related EM, time and Informational components. This fundamental connectedness of physical forces to Information dynamics, also finds a significant manifestation in the pericentriolar environment embedding the centriolic apparatus, whose stable axial orientation is thus preserved. ATP-generated centriolic rotative oscillations in the 10^7 per second frequency range, match collective energy-absorption bands, orchestrating an efficient detecting and processing apparatus for the linear signals involved.

MTOC-regulated microtubular space-time deployment patterns of multitubular arrays, result in propagations of deterministic changes, able to confer row information about environmental events, without any claim for specific decoding of this Information content. Actual decoding occurs in distant implication domains, well above the intracellular one. Of course, there is a holographic parallelism between neural interconnectedness and MAP attachment patterns to MT. The best MAP1, 2 and Tau ratios in these structures, are selected out by the background organizing fields, via Konga information codes, operating in the microtubular domain.

Further, the Belousov-Zhabotinsky reaction-diffusion system is scarcely "self-organized". It runs under SQ control. This view is supported by its originating in the phase-singularity toroidal vortex, which is a scalar expression of similar SQ organizing torsion patterns we can follow down through the Compton radius vortex, to operative regimes far below the Planck limit. Winfree-Strogatz

organizing effects ascribed to microtubulinic and centriolic dynamic inductors may run under MAP regulation mechanisms, where biochemical short-term MAP memory gets stabilized by SQ controlled Quantum states, affecting their molecular structure.

The downward flow and activation of Information control instances evolves in sensitive Quantum states, which operate via microtubular gradion distribution patterns. These are the building blocks for the Brain engrams whose outputs are amplified by allosteric cooperation chains up to detectable values for appropriate effector response of the biosystem at its macro dynamic level.

In a similar context, we have to emphasize that prokaryotic and eukaryotic cell mobility can't find a really satisfactory explanation in current theoretical proposals..The probing activity of chemo tactic Information signals ascribed to lamellipodia and filopodia requires a still elusive Information processing ability of the signals thus acquired, in order to achieve a cytoplasm-flux decision, oriented in the right direction. It's an almost impossible task to explain cellular chemotactism and motility in embryogenetic pathways without involving a "contact" function ascribed to filopodia, which is related to pre-set target matrix configurations, provided by higher level morphogenetic field matrices.

As previously mentioned, the overall orchestration of the different nanostructures in cells, and their functional correlations, require the hierarchical active interference of organized Information fields to be able to implement an integrated multi-task control. This is a very important contribution to the understanding of the optimal differentiation and high precision path-finding that neuro-embryonar processes are involved in, for establishing the maximal efficiency of interconnection potentials that the morphogenetically resulting Brain can offer.

Where is the control instance of the genetic cell activity itself? A certain kind of "micro-progenetic" regulation of the genetic apparatus itself is required, and this is supplied by stabilized SQ correlation maps available in the Quantum environment, where the genetic processes are embedded. This confirms the Albrecht-Buehler contention regarding hierarchical information processing strata, delivering the required guidances for the cytoplasmic level of intelligence.

Studies put in evidence the questionable role that the physical presence of centrosomes might have in the mitotic process, which process has been shown to proceed in progressing, even after laser irradiations of the centrosomes. This experimental evidence strongly suggests that the formation of the mitotic bipolar spindle follows an Information pattern, and is acting without respect to any centriolic control. As acentrosomal cells lack the radial arrays of astral microtubules and are defective in spindle positioning, the orthogonal arrangement of

centrioles seems to have a spatial centralizing task, for the site of the cytokinesis, rather than its initiating one. The mitotic starter, and further guidance, is not biochemically encoded in the cytoskeletal system. It clearly runs under relevant SQ Information control.

Fundamental chemical processes, such as the lysine acetylation on H3 histone, leading to chromatine fragmentation into nucleonic units, influence the transcription phase of the gene expression by histone-encoded epigenetic control. The functional gene product preserves the signature of the histone code, which participates in DNA-templated programs.

A single methyl group discriminating between dimethylated or trimethylated H3 histone components, coupled to the chromodomain, may result in critical structural changes by histone code alterations. This highlights the paramount importance of SQ coordinations at the atomic level, governing elementary chemical events, with decisive consequences for the gene expression and the resulting functional gene products.

SQ mediated Information transfer might operate at or below this atomic resolution, resulting in critical departures from original genomic expressions. This has been amply documented in recent impressive experimental, ontogenetically late instant mutations, reported by Gariaev and his team at the Moscow University.

Here we resume our repeated warning, that genetic and epigenetic code activities must be carefully described in the specific biomolecular/morphogenetic range they apply, avoiding extrapolations into the higher-order implication levels of Information complexity which are certainly involved in Consciousness dynamics. At the same time, we have to keep in mind that determinant coherence effects, ruling biomolecular events, may be analytically addressed as holonomic analogues for Informational processes governing high-level coupling and the integration of Consciousness with multimodal neural network activities in Brain.

We have to keep in mind that hydrophobic interactions involved in polymerization processes are the entropy conservation patents of nature, favoring negentropy, as supplied by the organizing SQ-related Information fields which exist at the biomolecular level. Electron density increases in centrosomal protein molecules orbiting the centriolic foci may be seen as the Quantum inductors, which are regulating Information for the centriolic controls exerted upon particular configuration vectors of cytoskeleton conformation. This process is highly relevant in the centrosome/kinetochores orientation of microtubules, as an Information-induced mechanism, initiating the prophase in eukaryotic cells, possibly involving for this effect, chemo-gravitational fields, related to the gyroscopic inertia of rotating and oscillating centriols.

Microtubular dynamic instabilities, leading to functional cell polarizations and

mitosis-related specific structure formations, represent a statistical effect of intra-electronic SQ fluxes evolving in the Compton Radius space under the derivative control of enfolded infograms, mediated by higher level retrocausation effects. Unaccounted-for microtubulinic complexity gradients, beyond the equilibrium state of their subunit configurations, arise from the underlying SQ organizing modules. Coherent dynamic cytoskeleton excitations result in holographic Quantum units, stabilizing standing waves at the info-plasmic resolution level. The ultimate source of biological organization is thereby conceptually removed to deep below the microtubulinic lattice/cytomatrix connectivity relations, toward enfolded background Informational domains.

Coherent nanosecond Froehlich dipole oscillations are coordinated by their fundamental embedding in the Time aspect of the SQ field, which supplies a higher-precision synchronization guide than the one that might be derived from sensitively fluctuating physical forces of local topological relevancy.

Bose-Einstein condensates and Froehlich excitation coherent processes, evolving in the GHz spectral range, producing resonant microwave effects on living cells and other Quantum components, contribute an overall binding-effect, related to cellular functions.

Holographic SQ Informational distributions, resulting in increasingly complex patterning effects is, in our opinion, a more realistic candidate for replicate transcriptions than the one offered by Heidemann's fractal tensegrity model, whose application range is much more limited.

Distant functional cell alignments to resulting local Informational states, is ensured to occur in null-time by the superluminal propagating velocity of the Information carrier SQ infinitesimals, supplying a more fundamental mechanism for Von Neumann-type cellular automata models, than the currently envisaged ones.

For a better understanding of the following section in our exposure, let us recall that ionic flux channels in neuronal signaling, involved in slow propagating "gated" potentials, which evolve under informationally extended SQ space-time patterning effects, have a guiding and stabilizing interaction with transaxonal membrane depolarization waves, described as "action potentials". These have far-reaching global consequences upon the neural networks, and the whole-brain Quantum conformational states involved in Consciousness.

Objective Reduction in the Subquantum Perspective:

Accumulating tubulinic state-superpositions, leading to objective Schrödinger wave-collapse events, in a statistically random time sequence, are obviously unable to convey the extremely refined correlation maps required to produce meaningful and coherent blueprints. From this perspective, pre-reductions of

Quantum distributions must satisfy local integration requirements, but not higher level ones, unless some higher-level coordinating system (similar to our SQ model) implements an efficient patterning of the sequence. This sequence results in an orchestrated OR, according to overarching teleological attractors embedded in hierarchically higher-level Quantum configurations. These configurations are holographically imprinted, in a most efficient way, upon the OR mechanism.

The hereby implied Informational control may be mediated by the gravitational component of the SQ units, in the frame of the Quantum gravity threshold proposed by Penrose. Space time geometries related to Quantum superposition states at all of the integration levels, conducive to OR, are fundamental constituents of our hyperdimensional SQ configurations, and subsequently, are the natural carriers of Information stored in their combinatorial aspects forming the given Quantum state.

The self-collapse event is neither random, nor self-chosen by the superposition system itself. It occurs precisely according to the embedding Quantum configuration's requirements, mediated by the Time-Gravity constituents of the underlying SubQuantum apparatus. The OR is the Quantum event which links different sets of deterministic Information controls, and provides their orchestration towards preselected attractor gradients, by suppressing nonconformal components, mostly originating at lower-level integration structures. This occurs in key neural components, which integrate different cognitive implication levels, by time density fluctuations, as described by Kozyrev.

Post-reduction events reflect further Quantum guidelines, related to complex histone codes internal to cytoskeleton nanostructures.

3. MEDIUM-LEVEL NEURAL NETWORK COOPERATIVITY

Parallel networks of neuronal and intersynaptic substrates, as Brain correlates of consciousness, work by implementing Quantum correlation aspects established between their energetic blueprints, and the Information counterparts thereof. These conformational equivalents are conveyed via delivery and transcription media by the SQ configurations, which are supplied as references, to the various hierarchical constituent levels of the conscious Self. Thus, the only sustainable representation of Information in Brain has to be found in the interferential range of coupled SQ superposition maps, belonging both to the energetic and Informational components of the binary systems considered to be involved in sentience. According to the Information flow vector, these components assume preferred "active" or "reactive" tasks, which are selected by a switching effect which originates in enfolded control instances, operating in higher implication levels of reality. These instances may implement the teleo-

logical retrocausation potentials which are implied in the trans-temporal domains of our interest.

Firing frequency pulse codes are related to stimulus intensity alone. It is beyond any reasonable doubt that, even combined with the neural-network level, closed reverberating connectionism of polyvalent stimulations, which are detecting and integrating potentials, firing frequencies alone, fall short from any content-related Information processing requirements. This becomes more evident in observations of non-specific network activations, or correlation patterns, as involved with the multiple event-parameters they originate in.

Synaptic Long Term Potentialization and heterosynaptic plasticity, are biochemical effects, directly related to transmission velocity and not at all to informational content. These effects increase the Quantum efficiency of the NN involved in generating Quantum replicas for Informational transcription, working as a biological hardware maintenance process, which runs at the low effector range in the signal processing domains. The same observation holds true with regard to the dynein-kinesin orchestrations observed in axoplasmic streams. The quantum configurations of the energy, biochemically derived from tubulinic ATP hydrolysis by the contractile proteins, encodes the proper sequencing coordinations for the contractile structures attached to the microtubular apparatus. This is possible only by Quantum integration into higher level programs. The ratio established between anterograd flux patterns and retrograde axoplasmic flow, with trophic feedback effects on the neuronal mechanism, are initiated under this localized Quantum control as an Information pattern consolidation effect, which is supplied to the neural unit and its assemblies, at SQ level of integration.

SubQuantum modules hierarchically organize and control, implicated levels of Quantum activity, in coordinated brain areas. These coordination instances are operating, at a maximum efficiency range, which undeniably is far beyond the proposed strictly localized Gazzaniga inference engine or Minsky's multiple connected frame model. The "graininess" of representational patterns has to be found at the level of the Information-bearing infinitesimals, which are cooperating to form the Quantum map which functionally involves neural collectivities, where each cell participates into the representation, at its own SQ efficiency index. Freeman's collective behaviors are then a result of these collective Quantum activations. This activity has to be carefully distinguished from EEG patterns, which represent the general integration of overall Brain activities, into the planetary Schumann resonance-system.

Also, it is mandatory to differentiate the biological intelligence, which has been related to patterns of cytoskeletal responses to weak oscillating electric fields, from the task-related Quantum-coordination of trigger EM signals, and the cytoskeletal reaction modes, which are responding to resonant EM signals. As a

matter of fact, weak EM fluctuations operating at the level of SQ configurations, are amplified into Quantum maps at cytoskeleton range, contributing to the level-specific engram formations. This process accounts also for the nonlinear tensility of cytoskeleton structures. The formation, depolymerisation, and Intracellular orientation of microtubulinic assemblies according to functional attractors, evolve under related Information supply internal to the bio-regulating Quantum field potential. Tubulin dimer topology is in tilted and helicoidal hexagonal lattice structures, rather than different, biologically non-efficient orientations. These orientations are established under the organizing cytomorphogenic SQ field potentials, as well. These potentials are conveyed to the reacting system by the Van der Waals London dipole coupling forces, which express an unfolding of the implicate SQ configurations operating at the cytoskeletal level - and far more fundamental integration domains, internal to the fine structure of participant electrons themselves.

In a similar manner, independent tyrosination/glutamation chains of tubuline subunits are variably related to DNA transcription effects, while sidearm dynein propulsion systems for axoplasmic transports, conveniently evolve under SQ coordinations, derived from hierarchically integrated organizing fields and holographic superpositions of teleological attractors. These mechanisms are coupled into the organismic level of the overall integration of the Self into its environmental conditions. From this perspective, local Shannon's "message formal structure" is meaning-laden in its specific cytoplasmic target range alone, where decoding organizational meanings conveyed by formal patterns is performed at the level of the biomolecular subunits which are involved in cytoplasm activity. The interacting spatial and temporal components in this process are not the source of Information. They are results of Information, used for coupling into the local energetic fields which are related to large scale intracellular biomolecular connectedness. Collective cytoskeletal activities are not generating Information patterns, but expressing them, according to geodesic tensegrity nets, which carry the Information required for their expressions.

The dielectric wave-guide model, as proposed for the micro tubular photonic conduction by Hameroff, gains an increasing importance, especially in the temporal and hippocampal areas of enhanced directed photonic penetrations. This is consistent with our references to photons as undifferentiated Information carrier agents that contribute to holographic image formations in various interference instances. More elaborate considerations, related to Boolean matrix vectors organizing in SQ arrays, suggest a selective coupling between the ATP-related Infrared radiations which are observed internal to biomolecules, and their programming induction fields.

This means that the axoplasmic traveling of previously conjectured "representational screens" evolves under SQ control rather than an elusive programming previously assumed to originate in the microtubule formations themselves. Nevertheless, the Hameroff-Watt concept of holographic information storage,

activating coherent wave patterns in cytoplasm, is in our opinion the most advanced concept ever proposed, seen its compelling similarity to our SQ modeling of the main underlying principles.

The Boolean switching matrix proposed by Hameroff strongly reminds Eccles' modular cortex activation patterns, amenable to configurationally meaning-related Quantum transcription both along afferent and efferent operational connectivity vectors. Recent experimental data (A. Maier) reveals that at the bacterial single-cell level (Esc. Coli) there exists the presence of an intelligent decision-making capability, which is obviously acting at the genomic level.

Distribution patterns of environmental water molecules, carrying chemically noxious ions, at the external membrane surface of the cell, may be disturbed by a feedback genetic-signalization which results in turn-overs of hydrophilic behavioral components, into hydrophobic ones, at that level. This experimentally confirmed reactive biochemical choice behavior, strongly contradicts the concept of biomolecular level initiations of upward organizational arrays by an accumulating chain of merely causal sequencing. This becomes still more evident seeing context-dependent perceptual modulations which exist in single-neuron activities. Neurons in the visual cortex have been electro physiologically proved to alter their spiking rates, according to perceptual interpretations of the stimulus. This implies a retrograde causation chain, which is consistent with the downward implication system we propose. This gets further experimental support in cortical sensory-motor mirror networks, supplying preferential functional subsystem activation patterns, according to the emotional valence and arousal properties of nonverbal vocalizations (J.E. Warren & All, 2006). Moreover, neural burst events recorded in the thalamic lateral geniculate nucleus, which are related to visual encoding in the Lesica-Stanley experiments, put in evidence stimulus-related Information encoding efficiencies, in collective coherent neural firing events. Relying on explicit investigation procedures, the authors concluded that a possible cortical-feedback regulation mechanism is resulting in thalamic neuronal depolarization and a consequent switching from burst, to tonic firing patterns, after detection of the stimulus. The resulting linear transmission of preselected stimulus features is reached by pre-activations based on a higher-level interpretative processing, able to modulate overall neural cell activities, according to meaning indices, which indices are detected as being present in the signal content. More evidence for Informational bypass-mechanisms, circumventing primary visual cortex structures, is supplied by the nonconformal ratios which are existing between the alternate available extra-striate efficiencies, and the superior resolution-level that the visual stimulus achieves during its transcriptions into subjective awareness, as well-documented in papers related to blind sight.

4. HIGH-LEVEL CONSCIOUS INTEGRATION AND MEMORY

The selection of a preferred eigenvalue for the Quantum state, which state precedes the wave-collapse transition event, is far from a "random process" as proposed in standard Quantum Mechanical theory in its Copenhagen interpretation. In the SQ model of reality, state reductions are not related to ambient "observation" interferences, but follow a deterministic crystallization trajectory of a preferred orientation, not dissimilar to the physical laws governing fluid dynamics in the macroscopic range. We claim that subsequent and fundamental orchestrations of global Quantum-map configurational interplays, are excessively underestimated, when placed in the functional range of cytoskeletal biochemistries, or even when associated with coherent neural network activities.

As we have already stressed in the past, NN components bear a very low-level causal significance as related to actual observable cognitive functions. Quantum Mechanical states display a double reactivity, both to SQ originated cognitive modulators, as well as to SQ sensory modulators of environmental origin, which are implementing the alignments and superposition states of both these sets of information, during each cognitive instance. Such Quantum Mechanical effects express both underlying, antero and retro causal, SQ determinacy chains, able to imprint into the integral system, the best embedding variant into an "All-time" modulated functional efficiency.

Overlapping coherence bands, which are involving sensory, mental and emotional contributions to selected Quantum potentials, may reach out to, and be analytically followed in, transpersonal EEG synchronization effects.

In the past, we have highlighted some of the Quantum mechanical components which are resulting in deterministic interactions between Heisenberg Choice activations, and Dirac's "response ability", which is suppressing nonconformal evolutionary lines of possible expansion options which are originating in transient background uncertainty effects. This Dirac-response selection of deterministically controlled, conformal Quantum configurations, is implemented by the Quantum Zeno stabilizing effect upon the task-oriented Stapp action template, which is further stabilized by Quantum fixations of the implied basic vectors, in their Hilbert space.

The perfectly synchronized dual Quantum interactions we have described in our previous publications, lead to suppressions of conflicting action potentials, by interplays between superposing inhibitory signals and proactive proxy attractors. Thus, resulting neural signal sequences are deterministically aligned to preselected and appropriate action templates, in the Brain. Of course, neural paleostructures of Brain are placed under a priority response regime, which is aligned to Quantum determinacy cues, thus ensuring favored implementations, which are survival value configurations. This alignment of priorities results in - as we shall see - efficient and reversible dissociations, which can be observed

under conditions of anesthetic neural interferences, between preserved paleointegrative vital functions, and higher-order cognitive processing events. Reversible blocking hippocampus-neocortical pathway conductions, involved in representational projections toward the self-conscious SQ structure, may have some relevance in this context, as implemented by metabotropic glutamate receptor effects on hippocampus synaptic plasticity.

No conscious equivalent can be proved to directly result from the collapse of conformationally-coupled Quantum superposition states. So OR-conjectured transitions between, preconscious and conscious states, have no experimentally provable anchorage in observable phenomenological reality. At the same time, Quantum-map configuration-changes can't be described without these same phenomenological substructures. In this meaning, OR events are actually located in the preconscious range, though without direct subsequent repercussions on Qualia (Subjective experience).

Self-perturbations in Space-time geometry, which have been suggested as Quantum correlates of Consciousness in the OrchOR model, are conceptually consistent with the innately-hyperdimensional essence of our SQ information-bearing units, and can be seen as their logical consequence.

The elementary unit of consciousness, the conscious "now" is not the instantaneous result of hierarchic binding effects of probability-wave reductions. In a more comprehensive reference frame, extending beyond space and time constraints, into the ontologically autonomic Information fields governing SQ activity, causation chains oriented along chronological time vectors, cease to be the ultimate deterministic pathways for meanings transferred across hierarchic holonomic networks, as implied by global integration processes.

Information subunits aggregate, in both directions of the Time vector, into an experiential "nowness", accessible to the Conscious Self. At the same time, this process provides the global reference frames for mnemonic structures, which are stored in the atemporal Information fields, which are actually required for setups of actual connectional meanings. Such events involve Quantum nonlocal effects, originating in instances of space-time-free hyperdimensional couplings, of the SQ Units to Information fields, implementing in this way, a highly more efficient communication system than the one predicted by standard Quantum entanglement schemes.

Therefore, the ultimate coordination instance for consciousness-related phenomena has to be emphatically relocated into the Information-driven integration and guidance system, which is provided at SQ level by the hyperdimensional Informational essences it involves. In turn, this process of integral personality-representing focal information-condensations, actualizes the sequentially higher-order organizational principles which are innately embedded in the all pervading cosmic harmony.

Memory Storage and Recall

Learning and memory are not functions of inter-neuron synaptic modeling effects, as currently held. Mnestic patterns actually correspond to Information field configurations, each stored in their own SQ domain. Evidently, their pre-set resolutions, are in the first place, a function of recurrent synaptic connective patterning processes, which lead to an increased accuracy in the replications of the original Quantum maps, as presented to the observer by integrated sensory cues, during the learning process. Of course, biomechanical details of mnemonic replication effects are favored in this range, by the allosteric behaviors of presynaptic Ca channels and by the "habituation" of chreodonic vectors, operating at biochemical levels.

Functional distributions of mnemonic traces, throughout the Brain, leads to their Quantum recalling, from any holographic storage module, by reference superposition attractors which are supplied as the symmetry components produced by an inquiring mind, in form of SQ patterns which generate field alignments to the, holographically-encoded, relevant Quantum activity components.

This view is consistent with Lashley's interference engram, if transposed to the Quantum level and beyond. Any structural or locational aspects, regarding neurally encoded memory patterns, must be abandoned as only of an historic value. The reactivation patterns in Quantum maps, related to specific memory constellations must be seen as SQ-triggered alignments of extended Brain energy substructures. Each time, the SQ attractor performs the selective regulations of Quantum mechanical processes, which are correlated to the recalling event. Information is not stored in the physical Brain. It is reactivated in Quantum states by global resonant replications, which are controlled by SQ induction filters. A very large number of neurons participate in this Quantum resonance. Topological tracking of activated modules and networks, in specific instances, may be the subject of future, more refined, fMRI investigations.

Changeux's "representations" are ultimately SQ configurations, patterned in a "matching/not matching" mechanism, by real time sensory Information inputs, in a wide correlation context, pattern-matched to identical SQ-essence memory-storage pools.

5. ANESTHESIA IN A NEW PERSPECTIVE

From all the previously introduced considerations, it clearly results that consciousness is in NO WAY a collective effect of conformational dynamics evolving at some lower hierarchic implication level. The SQ paradigm aligns these categories along a reversed causation vector, which is allowed by the fundamental time invariance applying to the Maxwell equations.

From this novel perspective, the anesthetic collective inhibition of dynamic conformal changes in Brain substructures exclude brain responses to available Quantum configurations, as supplied by the SQ processes which evolve in the conscious Self, and Brain mediations of environmentally-generated afferent signals, which are aimed, by the faculty of attention, towards the aforementioned ultimate SubQuantum processing structure - the individual Self. If there is no attention for the thing or event, that thing or event does not exist for the observer.

Phase transitional sequencing in the implemented Brain/Consciousness decoupling and re-coupling pathways, are eloquently related to multidimensional dynamics, exactly as illustrated in the recently published Walling-Hicks phase-space EEG transcriptions. Hyperdimensional integration gradients into SQ-mediated Information fields are locally dependent upon the determinational quantum states of Brain, which are in turn, hampered during anesthetic impairments of regulating London force effects, at the level of nanoscale biomolecular background events. This explains why lower subsets of organismic integrations, governing vital functions, are preserved during anesthetic depth values, which are able to disconnect biological ground processes, from their projective space consciousness correlates. As an unavoidable, absolutely compelling consequence, conscious processing of environmental events may freely evolve during this disconnected state, leading to SQ memory patterns which are being dynamically stored in the projective space-time, and subsequently re-supplied to the individual, for post-anesthetic recollections. Such recollection instances are abundantly described in the literature as "paranormal events" of the OBE and NDE kind.

Just as at biological resolution level, chemical energy patterns, have Information propagating efficiency, unimpaired conformal functionings of collective neural assemblies are required for up-scaled integrations of Qualia and provide meanings into the Self, during its coupled modus operandi to Brain. Anesthetic impairments at low integration levels, propagate in cascade-like dysfunctional arrays across the higher integration structures of Brain, resulting in Brain's transient functional dissociation from the self conscious entity. The duration of such instances may vary from consciously unperceived micro-blackouts in the stream of consciousness, through short-term neural hypoxic effects, controlled medication efficiency windows (anesthesia), to long-term so-called "vegetative" preservations of vital functions. Beyond this connectedness reversibility threshold, experimental and experiential evidence strongly supports observations of unimpaired cognitive functions, which are operating their own, separate, SQ integration domains, which are able to interfere with anesthetic influences, by lowering entropy states, in both biological and non-biological systems, which are capable of modulable random energy-pattern supplies.

During anesthetic interferences, short-term memory fixation components, with biomolecular background requirements, may be impaired. Complex peripheral

Information inputs may circumvent this integration level, resulting in extra-sensorial transmissions and subsequent coherent patternings of SQ maps, occurring at the highest level of the observing Self. Such imprinted configuration patterns may act as induction fields for subsequent Quantum replication effects in the Brain, during the post-narcotic phase, resulting in long-term memory blueprints which may be recalled by accessing the proper Quantum connectivity pathways, which are normally involved in Consciousness/Brain coupling functions. Such memory contents preserve special integrated aspects from their non-neural extrasensory recording pathways, supplying the specific heterotopic recollection parameters which define OBE and NDE reports. Such reports gain phenomenal reliability from the perspective of our SQ integration concepts, which contradict consciousness-suppression effects which have been misleadingly ascribed exclusively to physiological or medication-induced, transient cortical dysfunction states.

6. RECENT SCIENTIFIC DEVELOPMENTS SUPPORTING THE SUBQUANTUM MODEL OF CONSCIOUSNESS.

A. Hyperdimensional essence of Brain

Conformational and combinatorial structures at neural biomolecular level, obviously obey distribution orders far beyond their own structural codes. Direct photonic excitations by favored temporal penetration windows of the Right Temporal Lobe and its associated limbic system components, may contribute to Brain's biological interface with an interconnected Universe, as suggested by M. Morse (Univ. of Washington), such processes enhancing religious and NDE-type experiences. He suggests ascribing to the right temporal lobe, a biological vehicle value for morphic resonance-mediated control in post-genetical ontogenetic phase correlations.

In a personal communication dated back to 1997, J. Whinnery pointed to dreamlet-like experiences originating in hypoxic brain modules, as being similar to NDE reports. These kinds of experiences imply neural connectivity to non-local Quantum-Reality Information structures and corresponding configurational maps.

Extending the Rubner-Kleiber scaling computation laws , K.Togbey & All performed a fractal analysis of the relevant allometric exponents of the Brain, reaching a $4/5$ law. This implies that a 5th dimensional function is present in resonant NN connectivities. This finding relates Brain's Information-coding abilities to the Golden Mean ratio, by equating EEG metrics to number of harmonics times 2ϕ . Wave packets, scaled in powers of the Golden Mean, exert a patterning action upon the time-lags separating neural firing events, over several orders of magnitude. Harmonic spectra below and above the brain's fundamental 2ϕ frequency matrix, are involved. Neural networks operate according

to powers of $2\phi/2$, efficiently using them for Fibonacci series related Information coding, involving Hausdorff dimensions which are implementing the fractal distribution patterns of SQ information structures.

Log-normal and power-Law distributions of variables are thus governing heritance and aberrance processes in biosystems, where the power-law distribution proves to accurately describe the Fokker-Plank equation, as applied to the discrete variables related to SQ Informational Units and their combinatorial matrices.

B. Non-physical signalization.

Our SQ model has received an important support, by the novel view on Quantum physics recently proposed by P.V.Kurakin (Russian Academy of Sciences, Moscow), which addresses hidden variables as evolving in a hidden space/time, without violating Bell's theorem. This highly appealing model of non-physical signalization systems, running in "hidden-time", beyond normal physical time constraints, is strongly consistent with our infinite-velocity SQ signalization concept. Indeed, hidden-time dynamics - the ones occurring in Information fields - result in the best conceivable controls of the deterministic parameters which are at work between elementary events, such as photon emission and absorption, thus implementing informationally enfolded guidances of energetic phenomena. Standard QM offers nothing more than a few predicted probability amplitudes, for such elementary processes. Physical "quantum time" normally refers to the number of energy quanta, absorbed at a given point in Space, during a given time-span, as derived from normalizing experiment-related variables. The photon emission/absorption events themselves, are currently seen as running in a random, probabilistic framework.

The Kurakin Quantum model allows for a deterministic patterning of such events, rather than a probabilistic randomness, by introducing non-physical modes of Information signaling, which operate in the background, hidden-time, dimension. This involves complex interactions between "queries" and "confirmations", where queries and responses are operating non-locally as parallel vectors, composed of direct, and backwards-oriented, non-physical signals. These information signals, which are regulating Quantum processes, evolve as hidden variables, in the physically inaccessible domains, as defined in the Compton Radius Vortex, by a lower metric value than the Compton wavelength itself. This signalization control involves coaxial superpositions between contradicting time propagation vectors, thus involving retrocausation effectors originating in preselected SQ matrix fields of higher implicated orders. Such Information signals are displaying a physically detectable fractal integration amplitude, only at the levels of fragments of superposition, thus eliminating the need for any theoretically uncomfortable, and physically hard to demonstrate, backwards-flow patterns, in physical time.

According to this advanced concept, Quantum choice happens in no physical instant (zero time), as a result of Information-signal superpositions along their vacuum trajectories. As described in the Kurakin model, Information propagation channels in the vacuum, are thus controlled by "virtual" guiding structures. Such structures might be mutually compensating pairs of Information-charged SQ units, organized in SQ condensates which are not signal-generating formations. These distribution patterns in the vacuum originate at a higher level of integration, aiming target-related conformal signal transmission blueprints which are reaching various targets, in zero time. This results in an apparent retrocausation of the pure Informational essence, as implemented by the hidden-time symmetry of Informational vectors, which allow primary query signals to be propagated from detector to source - and not the other way around - as amply explained in Kurakin's model. relying upon Cramer's transactional interpretation of Quantum Mechanics.

From this novel perspective, Objective Reduction events of Quantum superposition states are seen as instantly deriving from hidden-time signalization patterns and not at some random and undefinable pace, as seems to be implied by the previously conjectured "Quantum gravity control". This retro causative chain operates along a downward implication vector of Informational essences, modulating upward physical trends, as described in the Penrose Hameroff model, and thus exerting a perfectly coordinated deterministic control upon the overall orchestration of the physical processes involved in neural activity. This easily explains both, the "logical" overall outcome of consciousness-related Quantum processes, and the highly elusive feature of the phenomenal continuity of Consciousness. This view overcomes the various unavoidable statistical segmentation effects, which are commonly resulting from applications of classical Quantum mechanical views.

Brain operates in physical time at the Quantum level, but it also operates as an interdimensional resonator, one which is capable of coupling hidden-time SQ signal processing events, into biomolecular energy-related Quantum states. Time-patterning Quantum events prove to be but the statistical results of deterministic SQ processes, evolving in the hidden time frameworks, which we have associated to a projective space, whose limiting singularity is the Quantum-embedding Euclidian space. Our extended team reached by now a quite advanced stage of developing an infinite tetration and self-root related mathematical formalism able to express these kinds of interdimensional transitional geometries, involving non-integer hyperoperations, which expectedly will highlight the many new connections hereby suggested, between Informational 2D spinor spaces and the Euclidian space of Brain, putting in a new light, the Brain correlates which are addressed by the OrchOR model of Consciousness.

Countless far-reaching explanatory consequences derive from these novel concepts, extending from anesthesia-related topics, to free-will proactiveness, to remote phenomenal patterns. These understandings are related to statistically

significant, experimental and experiential results, such as those reported during "paranormal" Information-processing research programs.

From the new perspectives opened by the SQ model we defend, we suggest to replace the currently held concepts of purely biochemically-induced consciousness-suppressing effects, as seen during narcosis, by a more accurate understanding, one which implies that, during narcosis, a transient decoupling effect is occurring between the individual self-conscious structure and the Brain (as the interaction tool of the Self), with relation to an energy-defined ambient reality. This decoupling occurs as a result of abnormal chemical influences on the normal biomolecular backgrounds which are required for setting up the various resonant Quantum maps involved in consciousness, in the normal waking state. Moreover, such disconnection states allow for continued and undisturbed cognitive functions running in projective space, despite any induced failures of the normal biochemical systems, leading to mnemonic configurations with the ability of triggering conformational Quantum maps in Brain, after the suppression of the chemical disturbance of the physical background during anesthesia. This effect is amply documented in a compellingly extended database which piles up in currently running investigation programs, with results which are confirming the endless chain of anecdotal post-surgical subjective reports which have been abundantly recorded (and routinely dismissed, as being events which are conceptually opposed to the standardized contents of the prevalent Consciousness-related theories).

Unfortunately, addressing various anomalous cognitive phenomena, from the perspective of the novel approach hereby proposed, would vastly exceed the scope of our current presentation. We hope to have future opportunities to extend upon these kinds of topics, which dearly need the canonical acceptance of the academic community, at this stage. We have tried to significantly contribute to this aim by bringing forward our currently achieved insights, as offered in this presentation, which hopefully will yield a future of experimentally supported developments, in these deserving fields.

By now, we can see that the fundamental rules of the game need to be changed, in order to bring Consciousness research, and the understandings derived from it, into an alignment with the reproducibly observable facts, which facts unfortunately tend to defy the explanatory ranges of current paradigmatic constraints. Such observables can't be dismissed any more, or ignored, or misinterpreted, by biased preconceived approaches and tendencies. Prof. Hameroff's expressions regarding a Brain-coupled Consciousness seem to be perfectly consistent with H. Stapp's Quantum-mediated "top-level control" paradigm, as well as being consistent with our SubQuantum concepts, which describe the details of this control's concrete implementation. Therefore, this novel view has to replace the obsolete one, which has proposed a Brain-based epiphenomenal approach. During the last few decades, the epiphenomenal ap-

proach has progressively degenerated, and thence stabilized into a most regrettable set of accumulations from the past, a unfortunately biased set of physically unverifiable, and conceptually egregious errors, in Consciousness Studies.

III. SUMMARY OF THE MAIN SUBQUANTUM CONTRIBUTIONS TO THE ORCH-OR MODEL OF CONSCIOUSNESS.

1. Conscious experience is "embedded in a fundamental space-time geometry", being accessed but NOT SELECTED by the OR process.
2. Our SQ model addresses the "non-computable" components of the Penrose sequences related to OR, which occur in Brain, not as "aspects" of Consciousness, but as correlates of Consciousness.
3. OR occurs not by cumulative Quantum superpositions by way of a random probabilistic Quantum mechanical effect, but due to purely deterministic sequences, imposed on the system by requirements which are originating from the Information fields.
4. Our SQ model provides the solution for the elusive determinism in specific 3-D configurations of amino acid chains in tubuline molecules (the "protein folding problem"), describing it as evolving along a teleological attractor-like vector.
5. Bose-Einstein type macroscopic Quantum coherent states, amplify the resulting Quantum effects, by sharing the thus selected wave function, and at the same time translating Informational configurations into the Brain's Quantum states.
6. SQ mediated Information Orchestration enters the Quantum domain via non-random van der Waals London dispersion forces, regulating Quantum superpositions of conformational states and aligning them for successful replications of SQ inductor maps.
7. Coherent Quantum superpositions in molecular hydrophobic enclaves are not a "prerequisite for consciousness". Such superpositions are simply supplying an orchestrating effect, which is resonant with Quantum maps in the Brain, thus tuned to SQ configuration information equivalents, which exist previously, in higher implication levels (Information determinacy).
8. Anesthetics may act in hydrophobic enclaves by obeying the Meyer-Overton

correlation requirements, suppressing the fine-tuning effects between Quantum events occurring at this level, and their SQ-map counterparts, thus disrupting any afferent inputs into the conscious fields of subjective experience. At the same time, this process is suppressing Quantum neural resonance transcriptions with complex cognitive processes, which processes are meanwhile proceeding in their own projective space. In this way, anesthetics dissolve the physical Brain's correlations with the non-material Consciousness (mind), thus preventing noxious inputs from reaching the non-material Mind, by way of neural transmissions. Mind observably and instrumentally continues, even when the electrochemical mechanisms of the physical brain are turned off.

CONCLUSIONS.

1. We defend a novel approach which shows two distinct states of human consciousness:

A.) The condition of being a free, SubQuantum-related, cognitive complex, one which is evolving beyond physical space and time constraints, following an increasingly negentropic vector. Together with thermodynamical chains of increasing entropy in various energetic ranges, this state contributes, over time, to a total entropy-negentropy conservation law, as fundamental to our Universe.

B.) The brain-coupled functional variant of the above mentioned structure, with describable parametric correlates, as amply treated in the Orch-OR model.

2. At the level of its utmost morphogenetic complexity, brain is progressively patterned during its ontogenetic phases, for an increasing Information processing efficiency, with multitasking capabilities.

3. Our model is not reducible to previous dualistic or epiphenomenal concepts, as its approach to Information signalization and control apparatus is deeply rooted in modern, experience and experiment-supported, physical observations and their accompanying mathematical constructions.

4 We amply argument the "why" Brain is the ideal anchorage tool of organized Information fields, into ambient energetic Space-time dependent processes. Brain supplies the active components of this integration, by implementing symmetrical Information flows between the interconnected Quantum structures which are involved in the coupling process.

5. Our novel approach is rooted in an overwhelmingly deep pool of infor-

mation, comprising an objective, experimental, and multi-disciplinary, extended database. This database includes in its explanatory range, both "normal" and "anomalous" Information-related phenomena, in a non-contradictory and coherent epistemological framework.

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Toward a New Subquantum Integration Approach to Sentient Reality⁹

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Abstract

Recent experimental results have proved intractable to explanation by resorting to existing physics paradigms. This fact, along with certain fallacies inherent in mainstream physical-cognitive theories of mind, have encouraged the authors of this paper to transcend the currently operative limits of investigation, thus to explore the abyssal depth of the still uncharted, but highly rewarding, SubQuantum regimes. The subquantum is herein assumed to co-existentially accommodate proto-units for matter, energy and Information, which are thereby brought onto an equal ontological footing, in the subquantum domains.

Devolving its argumentation and orientation from the Nobel Prize winning Fractional Quantum Hall Effect, which opened the perspective toward a further divisibility of the Quantum domain, hitherto considered as an irreducibly fundamental description of nature, the hereby proposed inter-theoretic model claims to satisfy advanced scientific and philosophic requests as reformulated for a conceptually new working hypotheses. Subquantum potentials evolving in the Prime Radiation Matrix result in organizing functions able to interfere with classical local determinacy chains, operating at the Quantum levels of randomness inherent in space-time-like matter configurations, leading to highly complex representational patterns, linked to their phenomenal correlates in macroscopic-

⁹ <http://worlds-within-worlds.org/sentient-reality.php>

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cally detectable systems. Our model is strongly rooted in an overwhelming experimental evidence derived from multidisciplinary contexts of scholarly pursued exploration tracks as amply documented in this presentation.

Our basic understanding identifies the Quantum Potential (Quantum Field Theory) as a superluminal Sub Quantum Information-carrying aether able to interact with matter and physical forces at well defined Space-time positions injecting their Information content into our world of observables by modulating the event potential. This interaction is possible as soon as matter is defined by an n-degree entanglement state of SQ complexity. Absolute void refers to lack of matter which equals to a space-time sequence contending Information in its nascent, non-aggregative form (the Sub quantum plenum) as observed from our Space-Time perspective. It contains implicated layers of increasingly subtle pre-quantum domains, which each one at its manifestation range may be organized in complete worlds of the kind our own is, each one of them ranging till its own "absolute void" as transition state to the next implication level of reality.

Introducing a quite innovative approach to the most controversial nature of Brain/Mind interaction, the pre-quantum tenets rely upon experimentally testable assessments. Our proposal has a strong outreach into unprecedented explanatory options for anomalous output data distribution in non-conventional exploration fields, whose statistically significant results become logically integrated into epistemologically sustainable blueprints. Constructively debating reasoning tracks suggested by eminent scholars with most impressive credentials in widely quoted references across our presentation, we emphatically challenge the current paradigmatic tenets that are obviously inspiring endless sterile controversies disseminated in widely accessible and mass-media supported literature. We hope to succeed in our attempt to persuasively reverse misleading ontological tendencies relying upon their disqualified metaphysical backgrounds by asserting an upside-down epistemological approach for the primary determinism that Information structures have upon their physical counterparts.

Our views are perfectly consistent both with conventional empirical treatment of space-time defying representational variables, and their causal primacy upon Quantum implementation systems of their content, in the integral range of their polyvalent manifestation. Detailed descriptions of mind/matter entanglement patterns are supplied, as running in the holistic superimplicative sentient reality domains, under the overarching regulation of Cosmic Harmony, underpinning a continuous creation cosmogenetic process.

As our analysis addresses a pre-temporal range, the thus defined endless time vector allows ab-initio existing inherent resonance links in any SQ subtlety domain to turn into fluxes and organization effects leading to sequential entelechial self-contained worlds. These primeval harmonic SQ resonances are the very pattern of our overarching cosmic harmony just mentioned, the source of all conceivable manifestation and interconnectedness.

PREAMBLE

Recent experimental results have proved intractable to our normal and limited understandings of the physics involved. At Lebedev University in Russia, there arose a series of experiments by Gariaev, et.al., which proved that the vacuum has a memory. This vacuum memory appears to be holographic in form, supporting K. Pribram's holographic model for the human memory, as obtained from neurological studies. Subsequently these vacuum memory results were replicated at Heart Math Institute in Arizona, again proving that vacuum has a memory of the physical states which arise in a given volume. Subsequently, a member of Gariaev's Lebedev team went to China, where he succeeded in utilizing the memory capability of the vacuum to cause a chicken to turn partly into a duck. The chicken, in this experiment, after exposure to the vacuum memory, had its beak turn into a duck-bill, and grew webbed feet. Remarkably, all of this chicken's offspring came into the world with duck bills and webbed feet. From these results, Gariaev and his team in Canada were able to succeed in turning a salamander completely into a frog, by similar methods. Gariaev and his team have recently succeeded in causing the regeneration of missing or destroyed pancreatic organs in laboratory mice, by related techniques. Gariaev's team has also, by similar means, caused the regrowth of a missing tooth for a gentleman volunteer, who was missing that particular tooth. Related to these results, Shpilman and Boyd succeeded in copying the information of alcohol into water. Consuming quantities of this treated water results in a condition analogous to inebriation, but without any resultant "hangover". Recent experimental results by Hu and Wu, et.al., have proved variations in the measured weight of instrumented objects, across large spans of distance, by similar methodology. As remarkable as all these irrefutable experimental results have been, within the

confines of our well-known and standard physical treatments, there is no viable explanation for any of these experimental results.

Unfortunately, the very limited effective range of the spin-spin interactions evoked by the aforementioned experimental team requires for a more consistent explanatory attempt, just as their quantum entanglement model that fails as per Eberhard's proof. Our own subquantum interpretation for the Hu/Wu experimental results circumvents the aforementioned deadlocks, while referring to them as a strong experimental evidence for its own claims.

We have determined that the common theme in these empirical results, is one of information, and information transport. Now we want to understand the actual mechanisms of information storage and information transport, as related to these experiments, and as related to consciousness.

Our approach to sentient information processing systems comes as an attempt to reformulate prevailing representations of reality, addressing fundamentally irresolvable topics within classical scientific criteria, while suggesting a seminal rendition of a new general interpretation devolved from late developments in Physics, neurosciences and cognitive research. It tries to satisfactorily cover seemingly disparate aspects of reality, in a quite consistent picture, somewhat contrary to colloquial scientific knowledge, nevertheless reaching out far beyond currently accepted limits into the wide array of seemingly anomalous phenomena which are brought into the normal range of validation in our ontological system. Hoping to provide incremental understanding for them, we intend to challenge their biased exclusion from established channels of scholarly dissemination. We are refraining from addressing a rigid preconceived matrix of questions, which at this early stage of understanding might lead to delusional data interpretation.

Our basic assumptions unfold both from traditional knowledge with deep historical roots as well as from leading edge theoretic and experimental data lately supplied by individuals bearing impressive scientific or philosophic credentials. We owe a deep gratitude for their work and their personal help in our decision of challenging the mainstream paradigmatic views regarding the fundamental nature of reality. In the form they are now, the various sciences have dogmatically perpetuated, and forced upon the community, ontologically incompatible concepts, which furthermore prevent any real progress. As we hope to persuasively assess, Information processing systems work far beyond the outreach of

currently accepted conceptual limits, where relativistic constraints contradict basic Quantum Mechanical principles while mezosmic reality escapes the explanatory range of both.

We are happy to have found in the depth of the pre-quantum realms, the target of our investigations, a useful preliminary mapping for the shared underlying reality of matter, energy and Information structures, which expectedly will provide a more useful investigation tool for further scholarly quests for the truth.

The Subquantum Approach:

Eight years ago, Nobel prize winners in Physics, H.Stormer, D.Tsui and R Laughlin discovered a new form of quantum fluid with fractionally charged excitations, known to physicists as the Fractional Quantum Hall Effect. It opened the door toward an infinite divisibility of the Quantum parameters beyond the Planck limits, down into the fundamental constituent entities of reality as a whole. These results, which proved the existence of the subquantum, had previously been pointed to by the works of Bohm, DeBroglie, Kaniadakis, Krasnoholovets, Soucek, Valentini, and a large body of related theoretical expressions.

The domain of subquantum infinitessimals is coupled to the absolute void, the primary source of virtual potentials for manifestation. The existence of a subquantum reality was long ago postulated by proponents of ether-related cosmology. The concept can also be traced back to the concept of the "Bhutattmas", the infinitessimals of the Vedic tradition, described in terms strongly analogous to our own concept of SubQuantum entities.

Unfortunately for the development of scientific knowledge, this kind of view was for a long time discredited, due to interpretations of relativity theory which did not appear to require any particulate vacuum medium (aether), while the null results of the Michealson-Morely experiment seemed to mitigate against the static model of aether, and its being entrained by the motion of the planet. Eventually the null result of the Michaelson-Morely experiment resulted in the abandonment of all types of aether models. Whittaker shows how all aether models

were replaced by appealing to Quantum models, evolving along mainly counter-intuitive and paradoxical tracks.

For example, to simply say that there exists a quantum potential, is an insufficient explanation. What is the quantum potential, actually? Why is there a quantum potential? How does the quantum potential manage to do all that it observably does, especially with regard to information transport? How can it be that the quantum potential observably acts superluminally, experimentally falsifying the "sacredness" of relativity theory? As we know, non-locality has been irrefutably proved by a variety of experimental evidences, the most recent of which were the Hu/Wu experiments. We know, based on experiment, that information can pass non-locally through space, and across time to influence our observable world directly, without violating causal orderings, by way of the quantum potential. The quantum potential is actually detailed in both mechanism, and form, by our model, which relies on Superluminal SubQuantum Information-Carrying Entities. This model accounts for all the known and mysterious properties of the quantum information field.

The subquantum plenum in our model is a motional, active, aether-like media having characteristics of an exceedingly fine gas composed of infinitesimals with superfluidic properties, and/or the properties of a perfect fluid, which infinitesimals have inherent abilities to both store, and transport, information superluminally. The high mobility of these infinitesimals and the sometimes superluminal intrinsic velocities which can be developed by these particles is important to our understandings. Viewed as a gas, this gas is considered inherently inert, while its high mobility and small size can make it hard to detect, especially since such small particles would rarely interact with existing matter, somewhat similar in this regard to the transparency to matter associated with various difficulties associated with the detection of neutrinos. These SubQuantum superluminal information transport expressions, answer directly, all of the questions regarding the how, the why, and the what, of the quantum potential.

According to the currently re-awakening SubQuantum view, at the background of all manifestation there is a universal fundamental media of primary entities displaying an omnidirectional complex vector inside an infinity frequency range. They are embedded in Bayers' fundamental pre-energatic Prime Radiation Spectra and are able to propagate at any velocity ranging from zero up to superluminal and infinite values, existing and operating beyond the Planck limits, where relativistic and Quantum constraints break down.

The experimental evidence for superluminal velocities is amply supplied in the Cherenkov radiation, the Podkletnov's gravity-like beam measurements, the experiments of Alan Aspect and other similar demonstrations of the fact of quantum nonlocality. (In recent results from Podkletnov, light from a laser was carried out of its expected path by the gravity-like output beam of his apparatus, to be deposited far away from the original expected ray-trace, perpendicularly, along the line of the gravity-like beam. Such events were subsequently used in measurements which demonstrated the superluminal propagation velocity of the gravity-like beam emanating from the apparatus.)

Subquantum Information carrier systems operating below the lightspeed value may complement the aforementioned explanatory background involving strong analogies to pertinent data metaphorically quoted from classical gas and fluid dynamical analysis, as well as specific combinations of symmetries and resonances supplied by the Fermi-Pasta-Ulam lattice Hamiltonian [Gariaev, et.al.]

It is suggested that the SQ domain displays a multi-layered telescopic structure of sequential orders of subtleness. For descriptive convenience, such a fundamental pattern can be referred to in terms of an infinite dimensional manifold, closed upon itself in a self-consistent loop, able to accommodate a holographic Information flux network of infinite complexity. This endless repetitive matrix of serial interconnected but parametrically definable pre-quantum domains, allow ascribing to each one of its constituent ranges of manifestation, a hyper dimensional structure reflecting their fundamental embedding implication system. We also consider the possibility that the SQ particles themselves may actually be hyperdimensional objects, so as to further account for the fact that the “vaccum” has a memory which records information regarding all events and forces in the environment, as experienced by the SubQuantum particle, which memory was first reported by DePalma.

The universal character of sentient reality expressing itself at the integral range of conceivable manifestation regimes is a direct result of the Subquantum holographic matrix of Information storage and propagation, embedded, as just mentioned, in the primary radiation matrix. As just argued, it can suggest a hyperdimensional extension of SQ entities themselves (Strongly supported by the Hut-Shepard polidimensional manifold proposal which includes sentience

as a third reference coordinate of reality, beyond space and time) or may be expressed in a more formalistic way by a mathematically acceptable organizing function that operates upon the n-dimensional Hilbert space of Quantum physics. This interpretation relies on a statistically compulsive unfolding in the regimes of information transport, able to associate incremental information density and complexity patterns.

Space may not be detected in the awareness field, neither in the Euclidian sense, nor in any other sense. The spatial aspects of direct perception are derived entirely from outside the conscious domain itself. However, in perception processes, mental structures may become entangled with spatial representations, coupled to the processed external stimuli. Any conceivable contention or extension of the mind is excluded by its fundamentally pre-space-time sub quantum nature.

Moreover, there can exist in the Consciousness experiences of spaciousness, which do not arise as the result of mental correlations with physically perceptable structures. Such direct, physically uncorrelatable experiences arise as the result of the ether-information flows which are available directly to the Consciousness, at every instant, regardless of the physical limitations of the perceptive apparatus relative to the immediate surroundings. Such perceptive incidents are commonly classified as "paranormal" or even delusional. This is because, drastic conceptual limitations regarding our understandings of such events, have been imposed on our reasoning by the existing dogmas and commonly accepted paradigms of the cumulative and colloquial sciences. In other words, the commonly held and unfortunate idea that some amazing intrinsic abilities of Consciousness may be misleadingly labelled as anomalous ones, is the result of hundreds of years of attempts to exclude Consciousness entirely from the sciences, resulting in exponential accumulations of error, arising from the various built-in indoctrinating dogmas and unfounded historical assumptions of the sciences, regarding the fundamental nature of reality, which assumptions are entirely wrong, and provably so. Asomal self-conscious structures are able both to accede Information that is not physically originated in the conventional sense, and to convey it efficiently to neurally connected ones, as amply documented in ADC literature Items of different kinds piled up during the last few decades.

Conformal gravitonic Information carrier systems operating across the Bergson-Shilov classical interdimensional boundaries may be invoked by representatives of more conservative minded scholars for modeling the SubQuantum/Quantum interface of the ontological junction between essentially cognitive and essentially

energetic regimes. Information propagated across Space and Time results in a fundamentally sentient Quantum behavior, implementing Bohm's implicate cosmic order.

The information density present in resonant networks can influence the Quantum potential to evolve along selective tracks according to their Informational circumstances, thus shifting some SQ species away from the more undifferentiated underlying group behavior.

These networks may operate informatically, coupling successive layers of Dirac's invariant stochastic SQ "aether". This coupling process occurs along a transentelestial syntropic gradient by temporal symmetry, displaying the ability of preserving coherence over extended ST spans thus underpinning Quantum resonant entanglement distribution vectors. As A. Detela suggests, SQ toroidal knots of increasing complexity have a stabilizing effect (along an evolutionary line) by superposition of nonlocal states, defining Information-charged morphogenic fields, able to interact with the molecular structure of biosystems. Also, it is well known that variations in gravitational flux result in variations in the resistivity of carbon, which results direct influences on biological systems.

The all-pervading Informational systems are obviously involved with all forms of Life and Consciousness, extending beyond the Quantum-related energy domains into basic interference patterns inside the pre-energetic Prime Radiation spectra. The SQ domain works as an efficient storage and transportation media for the holographic super implicated orders of Universal sentience, far beyond the space-time or Quantum constraints that are seen as its ancillary emergent features. Sub quantum units are constantly radiated and absorbed by normal matter in a ceaseless Information exchange which steers Quantum observables into manifestation. The energy content in this entropically open system, results from the motions of SQ entities, reflecting in their own existential regime the essence of the Cosmic Harmony thus embedded and physically conveyed throughout the Universe by the prequantal Information-charged flows. These are affecting Quantum behavior from outside the system per para-holographical resonances. Hence energy and Information have to be approached on different ontological lines as fundamental aspects of reality.

Energy and matter in the Sub Quantum regime yield the huge random space-time curvatures at the Planck scale (the "Quantum foam"), which, under the effect of the SQ-mediated and stored sentient functions are able to modulate along purposeful selective resonance blueprints of metastable Information structures, carried at superluminal velocity toward replicable Quantum fields of increasing complexity. This process is amply documented in Gariaev's recent perplexing nonlocal biophotonic genetic regulation experiments resulting in the by now famous DNA Phantom effect, as well as in the Kaznachejev Mirror Cytopathogenetic Effect or C. Backster's elusive nonlocal death signals, where causation of Informational consistency couples to locally active physical deterministic chains.

Quantum-coherent organizing interaction functions compete with Quantum-decoherent random ones and affect any given Quantum system via a set of basic properties of Information structures defined in our analogical terminology as Intensity (SQ density index), Complexity, Coherence, Content and Intent.

Notwithstanding the limits imposed upon this preliminary presentation that do not allow for their detailed discussion, we ascribe a most salient role to these parametric values in our new Brain/Mind paradigm, involving a transient sub quantum holographic interactiveness that affects the Quantum critical brain in the neuro-cybernetically connected mode of self-conscious manifestation. This thesis has to be brought into analogical alignment with the originating SQ source, that is granted the ontological proactive role in this interaction.

From a physical perspective, the implicating potential of sentient SQ flux systems operates by the fundamental homogenous transmission medium invoked in recent explanatory attempts for Ken Shoulder's Exotic Vacuum Objects (EVO) or R.M.Kiehn's nanometer vorticity distribution patterns. Aether-bound information flow as self-consistent ontological system was experimentally proved by biasing the SQ "Potentum" (J.Firmage) with an asymmetrical charge distribution - be it done by fast explosive electrical discharge applied in high voltage environment or keeping EVO in EM field-free space - which will result in an EVO charge variation gradient reflecting the Information flux potential decoupled from any background of classical matter.

Hence, the self-conscious structure's natural ability to preserve its total cognitive complexity range in its own SQ regime, after decoupling from physical brain's coherence range. A similar explanatory track would describe its instrumentable

quantum modulating efficiencies on non-linear, chaotic, or random systems, resulting in orderings thereof.

THE MIND/BRAIN INTERACTION IN THE SUBQUANTUM PARADIGM.

It has frequently been suggested that the global coherence, the threshold effects, and the binding properties of the brain, are consistent with classical nonlinear dynamics rather than nonlinear Quantum Mechanical theories. This view obviously oversees that Quantum Mechanics consists not only of the mechanical processes expressed by the Schrodinger equations, but includes a fundamental experiential aspect of nature which needs to be brought into alignment with the physical part of the theory. The actualization of physical states derives from the actualization of experiential components that have a clear-cut determinacy upon the selective orientation of the Quantum Event Potential toward the implementation of singular sequences of events guided by higher-order implication levels.

Elementary bioexcitations may thus condense into macroscopic Quantum effects resulting in Quantum actualizations of experiential structures as a fundamental process occurring in the Hilbert space, in which the Quantum analogue of matter, and analogous phase-states of quantum matter, become statistically observable in quantum systems, especially over larger spans of time.

The brain's physiological insufficiency vs. its information processing capacity enables experiential patterns to select preferential pathways for the implementation of a given cognitive event. This choice between macroscopically distinct alternatives, such as neural firing/not firing, can be interpreted only by space-time transcending actions. Obviously, these global process can't be described as localized inside the brain or physical body, but arise in the extended Informational space that implies both of them.

Modular space-time dependent cortical distribution blueprints of Quantum-triggered action potentials enter infinitely complex interference patterns in Brain along ipsilateral and contra hemispheric callosal connectivity pathways. Never-

theless, neurophysiologic evidence shows that detection of retinal stimuli arriving to a damaged spot of primary visual cortex via Lateral Geniculate Nucleum can scarcely be ascribed to extrastriate bypass afferences toward the inferior temporal and parietal lobules, as these alternative tracks are not supporting visual awareness in the absence of the striate primary cortex contribution. Residual performance in blind sight cases is strongly suggestive for a direct sub quantum bypass operating beyond the routine Quantum mediation that is disabled by the damaged brain tissue.

Similar SQ-mediated bypass events may be fairly recognized in extrasensory or asomal perceptual modes, where damping neurotransmission processes "normally" leading to quantum superposition states of cognitive templates are excluded. Contradicting current dogmatic assumptions, Qualia are to be seen neither identical nor epiphenomenal to neural states. They represent rather experiential units in the sub quantum mind.

According to most recent studies, the synaptic application of the output of a bi-neuronal set upon a third neuroceptor unit is modulated by intermediate Quantum noise superposition of stochastic resonance that may affect the synaptic time constant. Moreover, recent neurophysiologic findings suggest that increased activation of specific neural correlates of attention, sensory processing and sensitivity to stimulation originating within the body may alter key electrical impulses within the brain, thus resulting in altering the rate of age-related brain deterioration (Sara Lazar).

Facial recognition performance in low-level neural equipment of invertebrate biosystems (bees) reported by G.Dyer's as a result of methodologically valid experimental protocols point to a neural spatial pattern-detecting representational process bypassing hitherto held assumptions related to a required involvement of the fusiform gyrus in this particular processing event. Similar findings regarding paraneural complex signal processing and transference abilities in ants were reported by T.Richardson.

In all the above mentioned randomly selected examples, Quantum event potentials of sentient SQ determination are causally implied in the physiological efficiency of neural systems, strongly supporting our ontological reversal of determinacy in favor of Information control upon Brain vs. mass/energy origination of consciousness.

Neural network -related components of cognition are proved to have an increasingly low-level causal significance, paving the way for our ontological reversal of causal primacy that is still finding wide academic preference based on false theoretic assumptions and subsequently misleading biased interpretations of experimental results.

Quantum mechanical states of brain are able to react both to Sub quantum originated cognitive modulators as well as to Qualia of environmental origin.

The local Quantum indeterminism, in our view, is fundamentally a misnomer, as it favors a "blind chance" interpretation for a basically Information-controlled systems.

The Heisenberg choice leads to a specific Dirac response reflecting a selection of a higher implicate order acting upon the already inherent information content of the quantally perceived superposition states. Nonlinearities and deviations from the expectancy output values unfolding from hidden Sub quantum variables and organizations basically defining the system result in a secondary statistical effect rather than expressing a misleading underlying uncertainty-bound random non-determinacy (R.N.Boyd).

Both the hitherto misinterpreted quantum-uncertainty data (R.N.Boyd, H.Dehmelt) and H.Stapp's action-template superposition states reduced by the Dirac response originating in higher control levels of Information content are to be seen as sequential organizing effects run and made possible in principle by the active Information inherent in the system's deterministically changing Quantum states, pointing toward the collapse of the probability spectra describing the system's concrete manifestation at different points in time. In our view, Quantum mechanical effects are but expressions of underlying sub quantum purposeful determinacy chains functionally linking different sets of deterministic Information control via the "Quantum jump" suppression of nonconformal components to the overall "sense" of the process at key neural positions.

This important insight leads to a highly sensitive epistemological position of Brain at the crossroad of physical reality and the differential Information complexity gradients ascribed to non-identical cognitive implication orders.

From this elevated analytical perspective, Brain works as an information-transduction system coupling classical matter to various implicating orders of Sub quantum Information consistency inside the efficiency range limits of its own phylogenetically determined coherence regime.

Brain acts as a statistical operator by its reduced density matrix able of averaging over all non-brain degrees of freedom resulting from interacting decoherence effects of environmental origin. The von Neumann boundary shift between the observer and the observed system allows for a psychological description of the

experiential side's stream of conscious data in a complementing frame of reference to the neural correlates of the same. The von Neumann Quantum state is a purported Informational reality, where any given Brain state is described as a probabilistic cloud-like structure embedded in higher-dimensional cognitive environment.

Overlapping coherence bands mainly in affective spectra allow for EEG synchronizations of the kind reported in Montecucco's experimental evidence for empathic macroscopic resonance effects occurring in transpersonal overlapping affective connections. Such results together with the Nathal synchronous four-band EEG activation techniques resulting in the extension of coherence domain over different naturally uncoupled or non-contiguous bands, as well as the Hemisync induction by external frequency modulations imposed upon the electric activity of Brain - are strongly supportive for our interactive view between Information coherence domains and macroscopic EM-encoded correlates of neural activity. This contention is strongly supported by E. Jovanov's ascribing higher levels of integration to lower EEG frequencies based on experimental evidence for prefrontal and frontolateral transpersonal EEG pattern synchronizations in delta and theta range.

According to the Neumann/Stapp approach, the activating "Heisenberg choice" is not subject to any known statistical or deterministic condition. The motion rules in this domain are derived by a quantization procedure from classical approximation equations while setting the Planck constant's value at zero. The spreading out of possible options by expanding some microscopic uncertainty effects is in due time blocked by the Dirac choice response, which, obeying the Pythagoras computation of the orthogonal basis vectors, allow only limited possible feedback options to the Heisenberg choice, summing up to unity.

A sufficiently rapid sequence of consciously selected probing events, reflecting a high SQ density level of action may stabilize the associated pattern of Quantum activity by activating the Quantum Zeno Effect until a specific task-oriented action template is formed. Libet's experimental results confirmed by cortical Readiness Potential measurements are consistent with the just described Quantum duality that will subsequently collapse per Heisenberg Choice intervention into H.Stapp's informatically induced selected options for action templates. The random additive superposition thereof is eliminated at the level of the Brain's quantum state by the quantum jumps fixing the orientations of the basic vectors in their Hilbert space. This Quantum jump is associated with discrete increments of complexity values expressed in subjective knowledge, leading to a sequential

adjusting of the hereby described Information/quantum loop in proportion to the progressively acquired Sub quantum complexity gain

Brain accepts clues both from its environment via sensory channels including hidden variables as superposed inhibitory signals or active proxy attractors, and from its SQ cognitive trigger in order to issue the proper sequence of neural signals to an appropriate action template. The choice-induced Quantum jumps reduce the alternative coexisting conflicting action potentials, injecting into the system, discrete cumulative amounts of new experience, together with their neural correlates.

At the overall modular cortex activation level, Sub quantum determinacy of the exocytosis/not-exocytosis options are expressed in the quantum effects upon the ion channels in the synaptic clefts either by the Eccles-type dendronic activation or its Electromagnetic counterpart, extending the global intermodular pattern-generating abilities of the underlying Information-charged initiating system. Our choices are to be treated as empirically specified and consciously controlled input variables in accordance with the implemented biophysical protocol of interactions.

This view compensates for widely criticized aspects of the Penrose-Hameroff Quantum mind theory, because the reduced density matrix of the modular subsystem limits the possible effects to variables of the subsystem, itself enhancing the crystallization of two alternative states to be selectively suppressed by the Dirac choice, according to strong interactions with its preceding underpinning Sub quantum Heisenberg probing.

The sub quantum deterministic discriminator's active selective organizing function leads to the collapse of the system's randomness and thus supplies an acceptable explanatory option for the implementation of Penrose's quest about when - and to which state - the Quantum Jump occurs. Psychological conditions are amenable to both informational and neurobehavioral analysis, yet primary sub quantum determinacy strongly supports Harnad's hermeneutic mentalist request to interpret observable events not merely as mental, but explicitly as CAUSALLY mental ones, in a most fundamental sense.

Our hereby asserted suggestions seem to have a quite strong potential of remodeling the bridging laws connecting mind to matter. Altering the basic assumptions of the way Quantum mechanical tenets relate to Brain and supporting H.Stapp's description, incremental Information is injected into an information bearing mathematically described physical state, without implying epistemologically uncomfortable changes at the pragmatic level for almost all of the classical and conventional Quantum physical laws. Both mind and matter are causally tied to the agent's free choice of acting by the conscious experiential increment of knowledge (increasing subquantum complexity index inside an information defined sentient structure) and the physical actualization of the neural correlates of the thus experienced increments. Therefore, the SQ model we propose presents promising advantages upon hitherto similar attempts.

At an evolutionary philogenetical perspective, paleostructures of the neural system are placed into a priority response regime, if compared to more recently developed neocortical discrimination efficiency levels, by conversion of the experiential feelings and reasoning modes to a conscious intention-charged operator which will quantally select its appropriate neural activation track. The passive attending of an impending command will result in a different action template if compared to a reappraisal request, where aference is led toward prefrontal neocortical processing mechanisms by suppression of the Limbic/hypothalamic response via the Quantum Zeno Effect. Passive attending expectancy is channeled to the aforementioned paleostructures as proved by consistent functional MRI experimental evidence. Conventional Quantum Theory may explain apparent causal effects of the conscious choice upon the brain activity, but no explanation of any causal effect can be derived from it for the reciprocal process. Our Subquantum model replaces speculative and unstable concepts about conscious choice phenomena by knowable and experimentally testable omni-directional input parameters.

By the regulating increment induced in the SQ matrix field by the sentient function that operates in the n -dimensional Hilbert space of Q . mechanics, a monovectorial tendency toward complexity gain is gradually emergent in the system, leading to resonant and symmetry mediated deviations from the averaged group behavior in the prime radiation field, under the overarching harmonization function of the axiomatically acceptable Cosmic Harmony inherent in the reality hereby defined as a sentient notion.

Kozyrev's time density fluctuations along the causal vectors may be tightly related to our SQ density concept as applied to the Informational parameters of

different cognitive implication levels functionally interconnected by the uncertainty-suppressing Quantum jump.

>From a wider noospheric perspective, the sequentially implied super implicated orders of Information content and complexity can be described as scalar components of a wide array of epistemologically consistent and interrelated levels that for analytical purpose may display a sequential distribution chain as follows:

The Gariaev/Sheldrake morphic causation that results in the physical formation of brain, leads, by genomic interactions of holographic consistency, to the Brain's integration into the overall organism level of coordination. This stage corresponds to Sheldrake's morphogenic fields sharing their essence, similar to quasicrystals constructed by Penrose tiling principles, applied in biology as Winfree's DNA Wing tiles. As SpaceTime distribution patterns obey an underlying PreQuantum determination rooted in implicated Information fields and fluxes, at the next step, Brain tunes into its ambient signals by polyvalent coding resonance systems, then converts the already acquired harmony patterns into meaning and rationalization units of organism survival value. The subsequent higher integration of thus acquired complexes into abstract mentalisation patterns, by reflective screening of contents, allows still higher levels of integration for the embedding of self-conscious structures, into transpersonal patterns of social group behavior (consistent with the interpretation of PEAR's "Global Consciousness project").

This is a fundamental component in the planetary pan-biospheric Informational connection, both to the mineral kingdom, as well as to (conceptually still rather elusive) superhuman evolution potentials. The planetary sentient network gets coupled to its cosmic equivalents toward an open multiverse type of holographic information system expressed in our Cosmic Harmony. The fundamental global guiding principles contained in the Cosmic Harmony and holographically expressed across its multilayer SQ constituent parts, can be seen as leading, via Quantum Potentials, to the information-determined Quantum phase states - which at their turn act as switching units in the key positions of the probability reduction process.

In this overall scheme, Brain is a product of a morphogenetic effect of the first-degree information complexity, its work being quantally adapted for processing higher orders of information complexity than its own.

From this perspective, self-conscious structures will logically preserve their cognitive functions in integral range, regardless of their time-bound neurocybernetic connections to Brain.

Biological life is to be understood as a particular blueprint, where a transient coupling occurs between its different levels of implication, that are capable of being preserved in their individual holographic sub quantum storage systems, hence their implied manifestation potential after the dissolution of the transient binding implication constraint.

At the group-behavior level of biosystems, incremental complexity in phylogenetically acquired regulatory principles lead, per Sheldrake's morphic resonance, carried along informatically established chreodic channels, to the evolutionary potential inside biologically defined homogeneities. It seems to be conceivable to relate SQ density fluctuations to the widely debated time density orders across sequential divergent time-line vectors resulting in physically definable entelechial spectra derived from frequency break points related to time flux differentials. The resulting topological distribution in manifestation bands might be invoked for a future more accurate description of the environmental coherence regimes ascribed to self-conscious structures by traditional esoteric knowledge that becomes fully consistent with recent experimental evidence still hold in controversial regime by defendants of old scleromorphic paradigmatic views.

Entelechial manifestation levels might get accommodated into a mathematical formalism similar to the one underpinning Kaivarainen's resonant bivacuum-mediated interactions for virtual structures. Seen as embedded in an infinity of different "imaginary time lines" (Hawking), the entelechial domains may be conceived as sharing the same Space distribution without observable interference effects. Such a conjecture might supply a new approach to the many worlds interpretation of QM, if multiple S-T universes were conceptually replaced by multiple probability-triggered Information domains distributed upon individual time-lines in conventional space, which at a proper resolution of analysis proves to be nothing except its very concrete SQ content (Pre-quantum Plenum, Potentum).

In misleadingly labeled "paranormal" investigations, the anomalous distribution range of output experimental data has to be reformulated as a deviation from

experimenter's expectancy regime values, based on previous mean values derived from different sets of discriminators in his (and his collectivity's) past exploration record. Such deviations are nevertheless perfectly consistent with the specific given set of assumptions, as soon as deterministically different SQ input complexes are invoked, which, interfering in their own regime with experimenter's expectancy choice parameters, result in the unexpected statistical shift. It is a testable prediction that at the case limit, where experimenter's SQ contribution drops below a critical efficiency level, the result will be increasingly consistent with the external configuration of Information choice systems that are affecting the Quantum determination of the observable output.

Physiological and clinically induced ASC conditions, where, just as in neurotic and psychotic cognitive disorders, a coherence-shift range is to be considered, will supply the topic of later presentations. Delusional and hallucinatory contextual conditions will be described as preserving internal coherence in spite of their phase disentanglement from ambient stimuli inputs. By placing the cognitive loop beyond space and time constraints our model offers a non-contradicting logical treatment for anomalous deviations from "normal" statistic causal expectancy without appealing to Eccles/Beck kind of quantum tunneling properties, underpinning metastable electronic pre-exocytotic configurations, in order to admit backward time vectors in diachronic Information processing situations.

The idea that discontinuity states of consciousness arise during cortical hypoxic conditions, is frequently invoked as proof for the neural origination of such conditions. This idea is losing phenomenal significance, as such conditions merely reflect memory recollection failures, regarding events related to the relevant time span. Just as in hypnotic suggestion procedures, the mnemonic data are stored in an out-of-phase sub quantum matrix as related to brain's current coherence range, thus simply blocking subsequent recovery attempts.

We strongly rely upon the experimental testability of our model's predictions in the framework of Schrodinger's equations, since quantifiable detection of shifting tendencies in random regimes, under sub quantum information control, can be detected thereby. The seminal range of applicability that our model has, bearing on future genetic engineering protocols, resulting in a concrete means for altering various malignancy patterns, and other abilities to intimately alter genetic systems, such as the aging-related Hayflick limit, can hardly be overestimated. Widely reported preliminary experimental results available at this stage, concretely confirm our predictions in these regards.

Information, as a fundamental constituent of reality, is able to manifest both in our world of matter/energy, or beyond it, without contradicting any scientific rigor in the explanatory range.

Information structures are, in our view, constituents of the physical reality, and at the same time, their ontological autonomy from matter and energy is acceptably conjectured by extending the current paradigmatic limits of reality beyond both the energetic and representational domains, into an all-pervading, nonlocal and atemporal regime of determinacy where classical relativistic and Quantum tenets break down. By introducing sub quantum concepts, we are contemplating reality from an unprecedented observation spot, where epistemological paradoxes dissolve, and behavior patterns of reality, hitherto misleadingly labeled as anomalous, both in conventional physics and cognitive sciences, become logically sustainable and perfectly normal blueprints

SOME EPISTEMOLOGICALLY RELEVANT PHILOSOPHICAL IMPLICATIONS OF THE SUBQUANTUM INTEGRATION MODEL FOR CONSCIOUSNESS STUDIES.

Our SQ view, though not explicitly contradicting some late representationalist, cognitive, neural, Quantum and Higher Order theories of mind, transcends their respective limits and paves the road toward a synthetic pluralistic approach that will allow for incremental future progress. It circumvents the "explanatory gap" in Chalmers' "hard problem" while transcending fundamental, emergent and neutral monist property dualism limitations by its strength to describe Consciousness as derivative from a more basic level of reality where mental and physical properties are co-present. An "either/or" ontological exclusion is conceptually bypassed while protomental micro constituents of reality are seen as proactive transdimensional extensions of pre-quantum entities and the various flux patterns thereof. Some controversial puzzling aspects of panprotopsychism are solved in the superimplicated order of sentient data unfolding from the presence of protopsychic properties at the very fundament of reality.

We use a wide range of conceptually coherent physical and representational systems that lead to an epistemologically new, nonreductionist and inter-theoretically consistent view. Matter is divisible while mind is not, as mind is introspectable while matter is not.

The physical, mental and the Platonic world of universal truths are homologated into a single paradigmatic concept where Subquantum structure parameters equally apply to the three of them.

The theoretically assumed connections between Quantum Mechanics and Mind are reviewed as a connecting principle that addresses integration aspects of Information into the world of space-time defined matter-energy. This position reflects an efficient relay of interconnectedness between different implicated orders of the sentient reality.

A new cosmogenetic approach related to Subquantum Prime radiation matrices ascribes universal sentience and organizing potentials to reality, opening a window toward a continuous creation process overarched by the axiomatic Universal Harmony request. Our model strongly supports B. Josephson's suggested juxtaposition of the Whiteheadian philosophy of mental states to theoretic predictions of Quantum Physics, where abstract Quantum concepts may apply to different ontological regimes.

Subquantum determinacy, in defining reality, emphasizes the fundamental misleading potential in Chalmers' "hard problem", putting an end to the fruitless continuous controversies around its essence and opening a radically new exploration context for the experiential observables and their time-bound correlation to the physical world, brain included.

In our perspective, the physical brain's ontological value shrinks to a balanced set of reciprocal integration vectors of Subquantum cognitive essence with Quantum mechanical systems, defining an option that emphatically ensures the integral cognitive and intercommunication autonomy of self-conscious structures from their neural anchorage requirement.

In our model, high-level systemic features of Brain are seen as an intricate canvas of specific structural and functional properties. Kinsbourne's global integrated fields relate to thalamic cortical activation pathways, where various reentrant cortical loops of action-prediction-assessment type occur between mesencephalic and frontal areas of Brain. Interpretative processes with left-hemisphere correlates or frontal-limbic mediated emotive somatosensory haemostatic processes can result.

According to our assumptions, transient synchronous modular Quantum assemblies may be related to the intentional unity of phenomenal consciousness operating in time-validation domain of Brain.

The Subquantum regime supplies the holographic storage and dynamic media of Information-charged fundamental entities, evolving by a gain in complexity that occurs under superimplicated orders of integration inside the global overarching fundamental Harmony of ALL.

In the framework of conventional mind-related formulations, the obvious multiplicity of distinct neural theories underlying partial understanding fragments of fundamental links, operating at the holographic implication order of Brain programs, fail to present a reliable explanatory system for the infinite range of conscious activity, or alternate Information processing options operating at non-conscious levels of the Self . The isolating resolution for the "minimally sufficient" neural correlates of consciousness involved in specific kinds of phenomenal content is, per-definition, blurred by interfering classes of internal and external conditions, thus excluding a justified assessing of any causal determinacy. At the best, we might postulate some causal interaction systems between ontologically distinct domains that lose sharpness if under SQ scrutiny that allows for contingent identity spectra between given physical and cognitive representations.

Epiphenomenalism was disqualified for long as a doomed reductionist approach and as such it may be for strong reasons excluded from modern scientific analytical thought related to Information processing systems. At the same time, SQ Theory of mind is perfectly consistent with valid correlation aspects established between different ontological systems, however weak their explanatory potential would be at their own excessively limited application range.

It's useless to emphasize that mental coherence patterns may be related to Bose-Einstein condensates [as suggested by Marshall @ Zohar (1990)], at best, in only a metaphorical sense. A far more suitable feature along this line is to be found in the holistic Quantum entanglement, which in the extended perspective of SQ behavior is a most promising candidate for a possible psycho-physical interconnectedness. Quantum entanglement is due to the non-local information transports by the vehicles of the SQ entities, which transports are identically the quantum potential.

The prevalent Quantum theories of mind prove to be but a more subtle reductionism model for conscious states. When compared to classical neural theories, their explanatory potential has a similar range of limits, to physicalist/neural concepts. The Penrose-Hameroff model of objective collapses of quantum superposition states leading to coherent neuroregulation activity as well as to non-algorithmic mental processes has no suggestion for solving the high-order correlation patterns between both. The suggested Quantum effects related to intracellular microtubulinic mechanisms may well affect subtle Information dynamics but are well below any acceptable solution as far as derivative complex Information structures and their infinite sophistication range across superimplicating mental phenomena are concerned.

Tenets of panpsychist consistency, tend to rigorously equate physical reality with the Information spaces it is assumed to unfold from. Interesting enough, there is little, if any, reference made in the literature, to the double-aspect conceptual deadlock relating Chalmers' "hard problem" to his panpsychist attempt to overcome it. Both are blind-ended in the same paradox, eluding a logically consistent model for transitions between conscious and unconscious elements at both empirically supported directions.

The SQ theoretical basics are effortlessly circumventing Chalmers' paradox at both of its ends: SQ theory replaces the emergence of conscious structures from non-conscious background by an original synactivation process, while the unfolding of energy/matter from the background of pure Information, becomes an implicit feature of reality. This gain in understanding relies upon postulating a hyperdimensional unit assumed to carry information content toward different degrees of complexity throughout infinite manifestation domains, possibly relying upon its own context-related mathematically acceptable ability of exhibiting non-zero space-time values.

We hope to have brought a significant contribution toward closing the endless open controversy, raging in Consciousness Studies for years, around the explanatory gap extending between the various philosophical megatrends briefly mentioned here, especially as the SQ model we propose is far above the metaphoric consistency of most seriously considered options in current academic literature. Our model relies upon strong experimental footing at its basic tenets, and a wide array of further experimental protocols are currently designed for an increasingly comprehensive proof of the correctness of our view.

We feel to be justified in claiming for our model an unprecedented theoretical elegance and reliability, able to render the limitless complexity that is inherent in sophisticated reference frames of mathematical formalism into a complete, self-sufficient and coherent simplicity. Obsolete analytic criteria relying upon the false objective/subjective dichotomy have to begun fade out under the heavy pressure of evidence, accumulating in shared dreams, collective hallucination, and shared Induced After-death Communication reports (A.Bottkin).

It is worthy of being strongly emphasized, that in the hereby proposed model, causality and synchronistic chains cease to be orthogonal mutually exclusive ones, both finding a common language of expression. The holistic causation vectors embedded both in S-T and the Informational components of reality, escapes, per definition, entropic time vector constraints. Hence non-orientated causation theories that apply in Q and SQ ranges may be logically consistent with both nonlocality and diachronicity, under experimental conditions.

A new navigation tool has to be used for exploring hitherto unmapped waters.

Let's hope that our Subquantum model, as a non-speculative and not metaphysical one, will contribute to this navigational drift, as it seems to satisfy both the Ocam's Razor parsimony request in explanatory range and the falsifiability prerequisite in new assumptions. Though we consider that our approach fully reflects the implications of the Gödel's incompleteness theorem, we will be happy to improve it by hoped-for constructive inputs from the academic community.

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INFORMATION AND THE AETHER: THE "SUBTLE ENERGIES"¹²

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So far, we reached the unavoidable conclusion that standard physical theory, as commonly accepted today, is based on a series of unproven assumptions and numbers of vast and cumulative errors which have, from time to time, been deliberately inserted into its fundamental tenets. Similar events have resulted in many paradigm-based limitations and walls to progress, in all the sciences. Due to decades of failures to implement any resemblance of scientific method, along with an utter avoidance of Popper's criteria, at this point, unfortunately, all the sciences need to be drastically changed, in terms of their paradigmatic fundamentals, simply in order to accommodate decades of accumulations of wrongly rejected experimental results, empirical observations and experience-backed evidences, however contrary such evidences might appear to be in the limiting mirror of current explanatory systems.

By embedding new concepts related to Bohm's genial concept of "implicate order", a wide range of smooth transitional domains between pure Information, matter, and energy, are provided with consistent, testable, and logical descriptions. The interposition of a wide array of subtle energy (SE) patterns between their vacuum-originated field sources and our currently instrumentable energy phenomena is the object of sustained recent studies, often reminding us of well known esoteric trends from the Eastern philosophies. (We assume here that our readers are quite familiar with the various expressions of Eastern philosophies.)

As our readers may have noticed, many of the commonly accepted views of the physics, which have recently been met with embarrassing and expensive failures, such as those of the LHC and LIGO projects (such failures being due to commonly held, incorrect, and limited understandings), are readily transcended by the methodological frameworks inherent in our conceptual approach and in our models.

Since we have reached to the infinitely small, we are more concerned now with the originations and synthesis of observable reality, rather focusing on any obvious failures of previous theoretical approaches, since theoretical processes are often filled with a history of unsupported assumptions and unexamined beliefs, leading to failed conclusions and to more beliefs stacked on more assumptions, producing a vast facade of dogmas, apparently designed to obstruct all scientific progress in specific directions and in specific areas, when seen from our perspective.

¹² <http://www.victorzammit.com/articles/Klein9.htm>

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Science is not meant to have all the trappings of a religion. The scientific method is meant to discover, understand, and have an ability to explain, all available direct experiences, and all observations of fact, to the extent that the present status of verifiable observations will allow such explanations. From there, such explanations are to be physically verified, or refused, by rigorous experiment and empirical observation. When results and observations arise in opposition to the explanation given, the exploration and investigation process starts anew, seeking ever more accurate and deeper understandings. This process of observation-based adjustments of our understandings of the inner workings of Creation is an ongoing, never-ending process. Simply given an infinite volume universe, it is easy to see we can never know all of it.

We are digging this tunnel beginning from its other end, the small, where the infinitesimals are arising from stellar and cosmological processes, to subsequently aggregate into various compound structures of increasing complexity. There is a long array of intermediary matter/energy entities to be crossed through, before we reach the currently available regimes of the instrumented observations which have so far produced and supported Quantum theory. All along this path, the SubQuantum units preserve their ability of carrying Information into sequentially coarser mass/energy forms, by dint of their inherently hyperdimensional essence. All SQ Informational complexes are eventually space-time located. At that point they proceed to display specific mass/energy equivalencies, a feature which doesn't apply to Information while it is in the infinite-velocity-infinitesimal background condition.

These linearly increasing informational complexes are described in terms of interpenetrating entelechial domains, storing and dynamically processing their common background of Informational components and structures, according to the specific physical parameters and behaviors which are present at the various microscopic thresholds, with varying physical behaviors arising at such thresholds, as we approach the infinitely small by way of exploring beyond the present limitations of quantum theory.

Such thresholds are resulting in changes of the measurable qualities of physical and energetic systems, as we move in the direction of the small. For example, observations of comparatively large, periodic nano-fabrications known as "Pendry structures" (well above the Planck length in size), are resulting in completely unexpected physical behaviors, where Pendry structures are acting to alter, and even perfectly reverse, our normal expectations of physical behaviors as commonly associated with the known physical laws regarding ponderable matter and energy. These well-known laws, it now appears, are only applicable under specific circumstances and only at the larger scales. The numbers of, and the various kinds of behavioral qualities which are to be associated with the various observed behavioral thresholds which arise as we aim our explorations towards the small, represent vast and uncharted frontiers, at this point in our collective scientific researches.

Regarding the so-called "Subtle Energies", at the beginning of the last century, while performing weight experiments, D. MacDougall reported that a measurable 21 gram mass was irretrievably and mysteriously lost at the death of the human being. Though the exact figure itself is highly controversial, seen the rude experimental settings and equipment of the time, the MacDougall findings seemed to confirm still earlier assumptions (R. Wagner, 1854) regarding certain mass fluctuations which are originating from dissociative events as associated with biological entities. Subsequent measurements have supplied values differing from MacDougall's findings, 2.27

grams for example, without invalidating the principle correctness of the claim, in spite of the enraged criticisms subsequently encountered in conventional dogmatic debate circles.

Whatever the actual measured value of weight loss, as associated with the demise of whatever living being, it is obvious that such instrumented observations are directly related to the mass equivalence of some subtler form of matter/energy, other than those to which existing theories are normally referring.

Under special circumstances, SQ entanglement effects, as connected to Quantum fields, can reach the into the reactive thresholds of normal chemical and sensory detection means. (For example, see these photographic evidences produced by H. Baraduc, with shots taken at 15, and 60 minutes, accordingly, after his wife's death - Fig.1 and Fig 2).



Fig.1 AD dissintegration 1



Fig 2 last scan 2

By moving into specific Quantum entanglements and superposition states, Subtle Energy fields may thus implement highly devastating effects upon macroscopic systems, which are out of phase with the effective potentials inherent in such systems, for example, by uncontrolled activations of Quantum fields associated with biological systems ("awakening of Kundalini", etc.). Such activations may be triggered by focused attention and will. These actions result in subjacent Information matrices, via the SQ interconnectedness of various information transport mechanisms. The resulting superpositions find a detailed description in the entelechial maps of oriental teachings, describing interconnections internal to the etheric, mental, astral, causal, etc., which are resulting in focal Aether condensations at specific points (e.g., the "chakras"). Special training of the sensory apparatus, or of the Consciousness operating the sensory apparatus, may facilitate detection of increasingly subtle energy/information bands (see Dr. Boyd's comments in our 5th installment, astral vision, etc).

Such experiences can be experimentally corroborated with modern technologies. For example, Kronn's "Subtle Energy Field Infusion Generator" (SEFIG) has succeeded in isolating "dark matter related" subtle energy patterns, from the normal electromagnetic energies which exist internal to matter.

As put in evidence from MRI recordings, visual Information transfers to the Brain can occur, which register more than a thousand times faster than normal. These kinds of events can occur when specific acupuncture points (B67) are stimulated by ultrasound (J.Jones, Univ. of California). This points to a direct by-passing of the normally-slow ionic channels which are normally involved in neurological information transmission events (which transmissions are further hampered by biochemical synapse delays). These results clearly indicate that such externally initiated information transfer events, ultimately have very little to do with any neurological considerations, except perhaps as secondary neurological responses which are occurring well after the initiating stimuli has already been registered.

The Subtle Energy systems, when operating in between organized Information fields and quantifiable energies, as related to matter, operate as a specialized mediating network, acting to coordinate the vital functions of biological forms of life, with the environment. At the same time these kinds of events are integrating the biosystem into the wide array of additional aether phenomena which occur in Nature. Behavior patterns produced by these active information-containing Subtle Energies are partly subject to space-time constraints. Thus when such informations are completely coupled into conventional matter/energy events, the resulting behaviors can display semi-stable features. These features, in turn, can allow informational dissociation events to occur, relative to normal informationally interconnected, holistic, physical networks - of the kind witnessed in materialization phenomena.

In the informational activities of the Subtle Energies, there exists a mechanism whereby SE-originated Informational structures can act to determine the Quantum activities of matter. This mechanism makes it obvious that high complexity personality structures in the medium, will preferentially remain coupled to dissociated fractions, during information dissociation events (per downward information transport effects). The SQ informational contents of the so-dissociated fraction, will thus exhibit an increased degree of freedom during subsequent systemic reconfigurations and during subsequent interconnectivity events. This allows many connection opportunities to become available to such alternative conscious matrices as are able to take over any portion of the original Information-based controls of the given system. From such events, a wide array of "anomalous" events can occur, which will be further referred to in due time.

The Information mediating activity of the SE fields toward the various structures of the biosystem is possible by topological correspondences established in high-density focal condensations of multi-layer SE effectors (chakras). . A polarized, apparently magnetic type of bio-electricity, acts as a supersonic wave-guide (Fig.3) traveling through biological systems, activating them into oscillatory patterns which are occurring in specific frequency bands, according to Information-controlled functional parameters.\

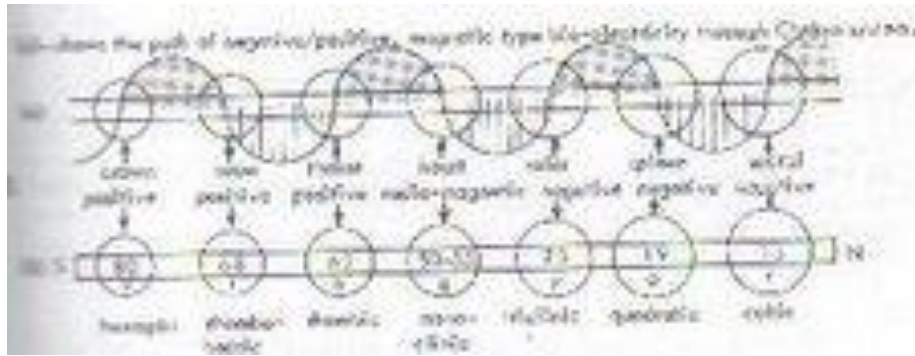


Fig.3 chakral wave-guide

Pre-quantum bioenergetic fluxes of this kind can be experimentally followed, as circulating along topologically-favored dissemination vectors that are free of any matter distribution constraints of the living system, establishing an intermediating Subtle Energy network, as well known in traditional Chinese medicine.

Thirty years ago, H. Motoyama first performed a set of serious topographic investigations into the SE system, showing that each "meridian" (SE flow vector) has specific points that most accurately reflect various aspects of its functional condition, and thus possible organic disturbances occurring under the physiological control areas concerning the given meridian. Nevertheless, the Subtle Energy network is no way limited to the major transference apparatus of the chakra chain and its particular connecting pathways.

Motoyama put in evidence two sets of points not located on the meridians themselves, which are particularly effective for monitoring the functional condition of the meridians. He showed that the "alarm" point (located at the frontal toracal midline) measurably reacts to any SE flow disturbances in the meridian, while an "associated" point (along the spine) reflects anomalous effects in the associated organs.

The SE distribution network doesn't follow anatomical organic maps of classical Quantum activity. Brain is not in a favoured position in this regard - as clearly reflected in bioenergy circulation maps which include the brain. (Fig.4).

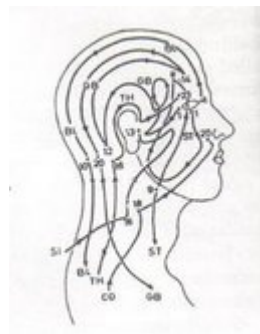


Fig.4 cranial SE pathways

In modern experiments (Y. Kronn), involving fMRI monitored Heart Rate variability testing, brain mapping and cellular revitalization attempts were performed, while relying on subtle energies equivalent to bioenergetic entities known as "Chi", "Prana", etc., using plasma-based computerized equipment, in conjunction with low intensity alternating magnetic fields. The thus-achieved results, regarding the effects which subtle energies exert upon the physical properties of matter, have since been confirmed by infrared spectrum studies and by charge-density pulse-effect analysis.

Related to this, recent Korean research (Chun Choi & All) has reported light-tracing mappings of traditional meridian trajectories of bioenergetic transports, data that have been further confirmed by De Vernejoul's related, radioactive tracing experiments. Moreover, using agents with various charge-density pulse configurations, selective stimulations of various rhythmical electrical brain activities, as well as hemispheric synchronization effects, have been achieved. The brain's response to Information impacting directly on it, turns out to be far beyond the range of any neural network biochemistries, even those which are bioenergetically mediated.

This insight opens wide perspectives, not only for theoretical reevaluations of mainstream dogmas, but are useful in many medical applications, as soon as the bioenergy information storage capabilities of various organic compounds, as well as those of specific trace minerals, are properly characterized and categorized. Such considerations are not in the scope of our current presentation, so we will leave it for interested readers to follow along these lines, given the overwhelming quantity of literature available on these topics, at their own convenient pace.

From the perspective of our model, chakra condensations of first order SubQuantum entities, living below the Quantum level, holographically follow the vortex patterns we earlier described, starting in the Kolmogorov range ($10e-58$ m), up through the scale of Kerr-Neumann Compton radius vortices (Fig.5), with vortex-like structures continuing through the large, up to cosmic scales.



Fig.5 Kerr-Neumann Compton radius vortices

Per M. Hadley's experimental results, torsion fields are not bound to conventional time or space. This corroborates with Kozyrev's tenets regarding the "energetic aspects" of time,

capable of effecting the spins of elementary particles, as well as those of macroscopic bodies. (We will return with more details on this, in our next chapter). This reminds us of RM Kiehn's "nanometer vortices" which are coupled metastable symmetric pairs of Falaco solitons.

We are currently investigating the related Kolmogorov vortices which may be involved in some sort of topological connection between Euclidean space, and CP1 complex projective space, which K-vortices are containing Informational structures resulting from the collection of the smaller information-bearing SQ entities which comprise the Kolmogorov vortices. We have earlier established that the Kolmogorov vortices are most likely the smallest of entities which are still influenced by gravitation. Entities smaller than the K-vortex ($10e-58$ m), are considered to be the primary causation of gravitation, in our LaPlacian-type model for gravitation.

As previously hinted to, the emotional conditions, and the faculties of the attention and the volition, of operators of symplectic E/M transmission facilities, result in Quantum field divergences and fluctuations in the vacuum. (Such observations have been verified in France, regarding normal E/M transmission facilities.) Information resonance effects are configuring subsequent energy configurations at all the available SubQuantum layers of manifestation, the subtle energy (aetheric) regimes included. Chakra spin effects may well represent a holographic transcription of such topological transforms, putting the bioenergy related to living systems under the Information control supplied from the projective space CP1.

Mathematical analysis addressing Quantum harmonic oscillators excludes zero-energy configurations even at absolute zero temperature levels. Nevertheless, this ground-state energy does not at all derive from the uncertainty principle (whose refutations have been mentioned in our previous installments), as in conventional interpretations. Rather, the ZPE originates from particles living in deeper layers of the Subquantum. Macroscopic wave functions responsible for Quantum coherence are guided by Information controlled SubQuantum effectors that can enter infinite combinatorial configurations in the subtle energy (aetheric) ranges and beyond.

SE (aether) connectivity leads to trans-classical permutation

freedom patterns, described as Information-controlled proemial relations (G.Gunther, 1972), unifying into comprehensive formulations of polyvalent logic, which may perhaps be more deeply investigated by cybernetic system-theory and other mathematical logics.

Interdimensional connections have concrete physical meaning. This connection becomes obvious when observing Information-driven physical effects.

This topic will be further highlighted in our future disclosures.

We hope to eventually lead our readers to a stage where they can confidently rely upon the correctness of our challenge, perhaps joining in our researches in a mutually supportive manner, or at least stimulating competent debates based on the present stage of our knowledge of SQ physics and Information physics.

14th November 2008



WHAT IS LIFE?¹⁵

Robert Neil Boyd¹⁶ and Adrian Klein¹⁷

Introductory remarks

RN Boyd Ph. D

What is called Life is ultimately involved with the SubQuantum entities, and with coherent soliton-like organizations of SQ entities, which comprise the "soul" or the "Actual Consciousness" of the physical entity, which coherent aether-soliton (Soul) continues to exist, even without any direct association with a physical form.

So, in manner of speaking, biological Life is correlated with the inhabiting of that biological form by a Soul, which habitation/attachment represents the present status of the coherent aether-soliton which is the Actual Consciousness, as associated with a physical form, or not.

There is nothing which does not have some manner of Consciousness, granted that we admit that the infinitesimal "Bhutatmas" are the smallest unit of Consciousness, as ascribed to them by the Vedas. Then since there is nothing which is not composed from Bhutatmas, technically speaking, there is nothing which is not Alive. Since even individual Bhutatmas have unique experiences, as they can cross infinite distances, at up to infinite velocities, encountering unique conditions all during their travels, experiences unique to each Bhutatma. Since Souls are apparently composed of coherent assemblages of informationally unique Bhutatmas, then every Soul is Unique.

What is really at issue, is the mystery of Biological Life, as opposed to the other forms of Life. The common assumption is that unless the thing is biologically alive, it must be "inert". This concept is disastrously wrong and has made for centuries of many different kinds of sociological problems, all associated with the assumed and mistaken concept that "living" can only be due to some sort of (assumed and undefined) chemical interactions, which eventually result in the thing "moving" and etc.

This is rather like the present unfortunate and drastically mistaken idea that the "meat and chemicals" which comprise biological entities are inert sort of things, which inert stuff "somehow manages" to eventually "self-organize"(?) to produce a Brain, with the added and unquestioned

¹⁵ <http://www.victorzammit.com/articles/klein13.htm>

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assumption that a brain is absolutely required for there to be any manner of Consciousness, and thinking and memory and so on. We have strongly and physically proved that all such concepts are wrong.

What is the point at which the Life-Force (aether-gas soliton-consciousness) becomes directly (as opposed to indirectly) involved with the given biological entity? This question is presently lacking any sufficient experimental research as to provide any definitive answer for it. **Actual researches into questions such as, "What is Life, actually?", and, "How does it work?" are prominently and erroneously lacking, while strangely, at the same time, every day, vast research funding goes into investigations of weapons systems and various ways to kill things and people. (Something is obviously politically and psychologically wrong here.)**

Clearly, there is a direct correspondence between Consciousness and "Livingness", which has something to do with the type of SQ soliton-assembly (Type of Soul) which becomes involved with, or detached from, the given biological entity, and the points in time, and the conditions under which, these two developmental processes occur. Obviously, there are many many different kinds of Living Biological entities, other than human beings, so the idea that there are many different kinds of souls, makes perfect sense. Additive informational complexity and additional information processing capabilities at the Soul-level, allow for increased complexities of awarenesses, and correspondingly, these Souls can eventually become associated with increasingly complex physical forms. From this, we think that there are many many different kinds of Souls, not just human ones.

So in a manner of speaking, there is a kind of evolution, but it is evolution of the Soul, NOT anything to do with any "evolution" of the physical vehicle as used by the Soul. The physical vehicle itself is produced by information-driven processes which are inherent to the Cosmic Harmony, in company with the individual Unique Soul which is to inhabit the vehicle.

The physical vehicle can easily arise "ab initio" through information-driven negentropic processes, with no mistakenly chemically-based or chemically-originated "evolutionary processes" involved, except as the chemical system must eventually reflect the informational organizations which are externally imposed on the system by the Cosmic Harmony, by way of flows of information-carrying infinitesimals. [See: <http://www.rialian.com/rnboyd/GarFried06-01.doc>]

In our previous installments, we tried to offer our readers a brief but comprehensive understanding of some fundamentals of the new physics, as a prerequisite for addressing, in these new lights, progressively more complex domains, such as Life, Brain and Consciousness. Let's start our next major step of investigating these fascinating realms, by taking a closer look at some of the basic considerations regarding Life and living systems, in their most fundamental essence.

Single cell prokaryotes (such as fossilized cyanobacteria) have been traced back (theoretically) to the most "remote periods" of the cosmic formation of our planet, some four billion years ago, according to commonly accepted theory. Many related scientific theories have been put forth over

the years, in a ceaseless attempt to explain these early abiogenetic (non-biological) pathways, which processes might possibly (theoretically) lead to the development of the first "living chemical assembly" by [biopoetic] evolutions from some supposedly self-replicating, but "nonliving" molecules.

Haldane's and Oparin's "primordial soup theory" has inspired various biochemical speculations, as related to some sort of "chemically reducing atmosphere", which, during the "early cosmological times" we are exploring, was supposed to result in a synthesis of those basic amino acids which are common to all carbon-based Life-forms, as resulting from "random interactions" of supposedly inert molecular complexes, under the "specific and required electrical conditions" which were theoretically proposed as being the physical prerequisites which were required to produce such assumed combinations.

Experimental replications of theoretical conjectures regarding the "early conditions" on Earth - such as the Miller-Urey experiment - proved to be non-conclusive, seen the uncertainty of our knowledge regarding the amount of molecular Oxygen available in the prebiotic ("pre-biological") atmosphere, which, beyond a certain point in time, would have prevented any organic molecules from ever forming, lacking adequate molecular Oxygen required to do so, according to this paradigm.

The idea that there might have been some sort of extraterrestrial origin of the requisite precursor organic compounds (delivery by carbonaceous chondrites or a gravitational attraction of such compounds from the deep of space) brings us nothing valuable, as far as the original BioGenesis (origins of biological Life) is concerned- wherever it may be supposed to have first occurred. Moreover, no such primordial monomer accumulations can give any hint towards decoding the various ways in which such simple organic building blocks might have been able to polymerize into more complex structures, which structures might then interact in exactly the proper and required directions, so as to "magically" eventually result in the synthesis of some sort of "protocell".

Eigen's hypothesis of a "self-replicating hyper-cycle in a prebiotic soup", involving Information storage systems (possibly RNA) able to launch cascade-like enzymatic catalytic processes in a closed loop, with possible byproducts of the ribozyme type, was an important step towards a more accurate conceptual framework for biogenesis.

Further on, Wächtershäuser's systems suggest the availability of built-in sources of energy (such as iron sulfides) capable of producing autocatalytic sets of self-replicating, metabolically active entities. Such processes might have been enhanced by radioactive actinides-generated organometallic complexes, which might be favored by relevant "early gravitational conditions" as suggested by Z. Adams. (This concept is contradicted, to some extent, by our Continuous Creation point of view, where there is almost no such thing as any "early gravitational conditions", since there was never any sort of "Big Bang", nor any other kind of "instantaneous Creation" event. Creation is a local and continual process, and is informationally conformed, locally.) Anyway, no provable concept regarding the origins of life can be conceived, without defining in the first place, the still highly controversial phenomenological essence of, what is Life, which definition has far-reaching taxonomic consequences and vast philosophical implications, as we shall see.

The "conventional" definition of life requires homeostasis, organization, metabolism, growth, adaptation, response to stimuli, an ability to manipulate the environment, and reproductive capabilities, as prerequisites for biological systems. For example, S. Kaufmann's definition of life refers to "...an autonomous multi-agent system capable of self-reproduction and of completing at least one thermodynamic work cycle".

More recent views try to establish the minimum requirements for a bio-system to respond ably to internal and external changes, including various regulatory mechanisms which are subordinated to superior positive feedback-triggers (defined as potentials of physical expansion and reproduction capabilities). Such requirements imply a successful alignment must arise, between at least two sets of Information, with each Information set active in different implication layers. Furthermore, the mutation ability requests which are thus imposed on biological replication systems, implies a higher order of Information control, one which must be able to supply local adaptive benefits, as according to higher attractor blueprints. Such benefits are supposed to be supplied to a "...self-perpetuating open system of interlinked organic reactions, isothermally catalyzed by the chemicals", which somehow must be produced by the open system itself.

The most important question that arises is whether such open systems may be fundamentally disconnected from their background inorganic chemistry, and what can we expect to find at the conceptual borderline between inanimate - and "animated" forms of matter?

This topic can be approached at the microscopic level of the viruses, specifically, in terms of viral structures and behaviors. First, let us remember that viral capsids (outer coating, cell walls) are composed of identical protein subunits, which are arranged in helicoidal or icosahedral symmetries. How does the virus become informed, regarding the rotational symmetry rules it must apply, in order to produce the required icosahedral configurations of these 60 identical subunits? Where does this ready-made blueprint come from? How do enveloped viruses use cellular membranes as guiding sites to produce the proper orientations of these assemblies? How are the given receptor cell's chemical sites, which can result in viral reception, recognized as absorption targets by the given viral entity?

Such questions bring into focus the selective folding isoform patterns of the structurally well-defined prion protein, PrPC, which serves as a copper-dependent antioxidant alpha-helicoidal component of the actual cell membrane. Its Information-induced, or modulated, folding patterns are sensitive to transient embedding actions produced by Quantum configurations, which relate such prion protein structures to long-term memory storage functions (e.g., defective PrP synthesis results in experimentally detectable alterations of hippocampal long-term potentiations, Maglio & All).

A next step toward Information-related increase in viral complexity involves virionic nucleocapsid structures, which are extending from a single type of protein to the tens of proteins involved in capsid (cell wall) morphogenesis (shape-creation) events. In non-enveloped viral structures, the resulting capsids perform attachments which are guided to the infected host cells, while in their enveloped variants, glycoprotein spikes overtake the task of a chemotactic search-engine, conferring viral specificity (tropism) according to the surface markers which are supplied by the cell membrane.

The current Baltimore classification of viral nucleic acid structures discriminates RNA versus DNA (single or double-stranded) viral genomes. This taxonomic range has been extended by the recent discovery of an 800 nanometer giant, called the "Mimi virus", which carries about 1260 genes, by means of which this giant virus is actually able to internally synthesize proteins, conferring to this virus, a bacterium-like degree of complexity. Thus a fourth life form, beyond bacteria, archaea and eukaryotic structures has been introduced by the Mimi virus, along with the seven genes which are common to all cellular life. These discoveries have opened the hypothesis that perhaps eukaryotes actually originate in bacteria, by supplying ribosomes "infected" by genetic stuff injected by the virus in the form of a sort of "proto-nucleus" made of DNA.

It is to be emphasized, that the complex genome of the Mimi virus, the only virus detected yet, which appears to be based on both RNA and DNA, inherently contains elements that blur any clear-cut distinctions between life and non-life forms of energy manifestation. In mapping out the genetic sequence of the Mimi virus, French researchers found some 1.2 million pairs of Information storing Boolean units, encoding some 1200 proteogenetic micro-programs. The translation genes which are carried by the Mimi virus defy any need for this particular virus to rely on the protein-engineering abilities of any host cell.

Conventional science meets increasing paradoxes when trying to make clear-cut differentiations between the matter/energy structures which are assembling in life forms versus the structures and requirements of "non-alive" forms. As such investigations become deeper, such attempts to make energy-based distinctions, become increasingly blurred.

A new approach is required for an accurate understanding of the essence of life. This new approach has to transcend current physical limitations and energetic interpretations, shifting the pivotal attention of modern research into the Information fields, which are implied in the origination and patterning of life forms. Several scientific advancements seem to have paved the way for our SubQuantum model's high explanatory potential, in the framework of this novel paradigmatic trend.

How do such simple organic molecules manage to succeed in assembling themselves into a very complex "protocell"?

RNA has the dual capability of both storing Information, and also acting to catalyze chemical reactions. Experimentally produced, replicase RNA, functions both as an Information code, and a catalyst, providing the template on which actual genetic replications are performed. The right self-replicating conditions, for joint and small-activated mono-RNA nucleotide sequences, into longer chains, imply that an original non-random frequency selection must exist, one which increases catalytic speeds and which leads eventually to S.Kaufmann's "collective autocatalytic sets". Such conformal collectivities require that coherent behaviors must be supplied by teleological attractors, which appear to operate along retro-causal vectors (that is, originating from future bio-system informational "blueprints", which are then eventually produced physically).

Such Information streams have been available to reactant protein structures in biological cells, throughout time, in the form of crystalline Information transferences, as has been proved by Kahr's experiments on crystals of potassium hydrogen phthalate (2007). Of course, this complex

gene-like Information transference ability, significantly exceeds the similar ability, as supplied by crystal conduction patterns, which process is rapidly overtaking the task of exponentially increasing differentiation/adaptation speeds of various conformal reactions, as displayed by sequentially higher forms of life. Again, the borderline between living and "non-living" systems is becoming increasingly blurred.

Current research programs address the biosystems in terms of a special feedback-coupling interaction, between a coherent biophotonic EM field and biological matter, where the location and activity of matter are under control of this field, while at the same time, the biological form provides boundary conditions for the field. The interference patterns of this fully coherent field involve the Information necessary for implementing preselected cell-regulatory functions. These dynamically changing interference patterns reflect complex space-time interactions are occurring between the organizing fields and the organized energy-driven matter that conforms, by Quantum mediation, to the regulating programs. According to these nonlinear biophysical actions, matter/energy distribution patterns must follow, by imposed entropic guidelines, and Informational modulations, which are acting in a wholistic hierarchical structure of holonomic (holographic) interactions.

The human body's 10^{13} cells are generated by 43 successive rounds of cell divisions. The 10^7 dying cells every second have to be instantly replaced by a perfectly equivalent amount of new ones in order to avoid a quick bodily disintegration. This prerequisite implies a far more efficient signalization and inter-cell coordinating connectedness than the one which can be supplied by mere chemical messengers. This signaling process has to run, according to F. Popp's computation, in the superluminal velocity ranges. Such Information transfer systems are the ones operating in Kurakov's "hidden time domain", which corresponds to our infinite velocity SubQuantum Information transferences, exceeding former efficiency values as, e.g., those supplied by mitogenetic radiations.

Nevertheless, unfolded regulatory systems may operate at cellular interconnectedness levels governed by chemistry also, as it is the case for the carcinogen 3,4 benzpyrene, with a strong absorption/emission anomalies in the ultraviolet range of the spectrum which are related to mitogenetic radiations. The superiority of biophotonic regulations, relative to existing molecular dogmas, has recently been proved by A.B. Burlakov's experiments, where biophotonic activities, in the absence of any actions by chemical/genomic activities, have produced obvious changes, at the level of the actual biological life processes.

Similar experimental results, and many far-reaching conclusions deriving from them, are reported by P.P.Gariaev & All, concerning the ways the chromosomal DNA control is implemented, by the already supplied chemical DNA matrices, and by way of biological wave-functions which are structurally related to holographic system-memories. As Popp has pointed out, in order to implement efficient intercellular electromagnetic couplings, cellular photon emissions must have the qualities of multimodal, multifrequency laser beams, which are similar to those which have been used in Gariaev's experiments. This implies high coherence and harmony requirements, in which malignant processes are suppressed, as proved by the increasing photon counts which are observed during increasing cell densities, as associated with increasing malignant hepatic cell populations. This points to the ultimately deterministic roles that Informational

controls and guidances have, in the multiple scales of the various life phenomena, from biochemical to enviro-organismic, with effects that range all the way to interpersonal relations, and to groups of ontologically collective behaviors, on through all the various integration levels.

Bottom-to-top chemically-based biogenesis theories have to be dropped by now, to be replaced by the more accurate Informational Regulation tenets, which apply, without exception, through all scales of manifestation, as all physical manifestations are controlled by Informations provided from outside the given system.

One has only to perceive the various and abundant hints which Nature provides us, to correctly understand the way Nature works.

It's enough to consider that an inanimate crystalline viral structure apparently turns into a living system, only after being placed inside a ready-made biofield which is, in biogenesis processes, an already-existing Informational biofield, as an unavoidable prerequisite. This field has an Informational Essence which is carried around by aetheric fluxes of SubQuantum entities, which are acting as the precursors for more complex morphogenetic fields (an important topic which will be touched in due time).

Living systems are not a prerequisite for Information processing, but a result of it.

Living systems are aiming at nonlinear increases of their personal efficiencies, during the processes of interacting informationally with their particular and associated environmental dynamics.

This fundamental principle will become increasingly high-lightened during our future installments.

2nd January 2009

RESTORING A SUBQUANTUM MORPHOGENESIS APPROACH¹⁸

Robert Neil Boyd¹⁹ and Adrian Klein²⁰

Last week, we have seen that Life is inconceivable as a phenomenon emerging by mere chance from combinatorial properties related to molecular chemistry.

Life involves highly complex degrees of organizational properties conveyed to the target system from a pattern generating source, which is external to it. This organizing effect runs according to special topological requirements imposed by task oriented functional and integration criteria, which are not built-in features of the rough, undifferentiated atomic-molecular assemblies supplied by random spatial distribution of their constituent subunits.

Mainstream developmental biology can explain neither how a particular group of cells are able to respond to discrete biochemical signals and initiate a self-organizing process under their triggering effect, nor how such signals may perfectly correspond to future functional requirements which are expected from the reacting cells, collectively.

Events involving embryonic field dynamics and specific cellular programming of individual cells, widely exceed slow chemical transmissions during the process of cell-to-cell signaling, implying that integrated pre-established Informational processing blueprints, known as morphogenetic (shape-creating) Information Fields, must exist. These fields are non-locally present at the sites of cell-structurings, in already-correct distribution patterns. Further, these differentiated cellular assemblies have to spatially disseminate toward higher degrees of tissue aggregations along preselected and pre-oriented molecular guidelines. This understanding applies equally to the energy components of the to-be-organized matter, and to the ultra-fast Informational interconnect-edness tracks which are established between spatially and temporally remote biosystems, which are also affecting their functional performance, once they are constructed. Such externally imposed Information supply mechanisms have a decisive ontogenetic importance in all areas of life, embryological development of the Brain included.

According to recent studies (C.Greer), the process of establishing synaptic connectivity between new neurons requires a 21 day process, a time span designed to prevent uncorrelated interference

¹⁸ <http://www.victorzammit.com/articles/klein14.htm>

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patterns from originating from such incompletely integrated young neural cells. During this period of functional maturation, the neural cell gets the relevant Information for its bio-structuring from distant areas of the brain by an asynaptic, unmediated Information transference mechanism - very similar to Sheldrake's chreodic channels- which operate at high speeds, even though spatially disconnected. In the early stages of its development, the neural cell is constrained to "listen" to these patterning signals, before being allowed to actively produce interactions with them. (This can be viewed as a "learning process" for young neurons.) This process involves functional encoding which operates in the SQ Information domains, which enables biomolecular presets to acquire the required coordination behaviors which are prerequisites for their active involvement in collective neural activity. This understanding is an eloquent experimental refutation of current concepts, which are describing the neural functions as emerging from biomolecular structuring, a concept which is just as misleading as the view that consciousness-related phenomena must emerge from neural functions.

Let's try improving our understanding of the ultimate nature of the morphogenetic forces. The morphogenetic forces are responsible for producing the most efficient possible spatial distributions of individual cells. Then these forces are responsible for integrating these cells into living tissues, and then integrating these tissues into fully functioning organs. These structures and coordinated activities are designed to ensure the survival of complete biological systems, able to process highly complex environmental Information.

A wide variety of soluble molecules, the "morphogens", are able to carry signals which control cell differentiation, in a concentration-dependent manner, by binding to protein receptors. Transcription factor proteins interact with DNA for implementing their cell modeling tasks by a genetic regulatory cascade of activating and deactivating effects.

Besides morphogens and transcription factors, the molecules controlling cell adhesion effects are also involved in cellular "sorting out" mechanisms and in subsequent space-displacements of cells, to specific embryogenesis regions, where further, more complex, differentiation occurs in the histological range. Differential cell adhesions result in the clustering of similar cells into more complex structures, which are ordered by functional task. These "adhesion molecules" (most of them cadherins) are the binding agents which cause similar types of cells to aggregate into tissue clusters at given embryonic genetic sites. The given site is then spatially reached by cell migrations along extra-cellular matrix pathways. These cell-migration pathways are supplied in the form of already-assembled sheets, fibers and gels, which are made of collagen, laminin and fibronectin molecules.

Transmembrane integrins then couple to these extracellular components and to internal cellular cytoskeletal structures. This coupling then triggers signal transduction cascades, which are serving the morphogenetic (shape-creating) process. These trigger signals are the non-physical Information blueprints, which are non-locally conveyed to the so-called "self-organizing" system, by superluminally propagating SubQuantum fields, producing morphic resonances, which are aimed at copying previously created forms, or modifying them, according to the given environmental adaptation requirements. New biological-information systems "tune in" to previous ones by Quantum resonant states, leading to replication and induction effects which are either preset, or modified, Information fields.

There is a recent tendency in scientific circles, to extend the original meaning of the morphogenetic (shape-creating) field, as introduced by R. Sheldrake, beyond its form-generating content. P. von Buengner relates the term morphogenetic, to reactive cognition phenomena, both individual and collective ones, of the type systematically investigated in the PEAR's Global Consciousness Program, where modules made from 50 white-noise-producing diodes, are interfaced to personal computers, which are located at different spots around the world. Data arising from this globally distributed network of computers is connected into a central monitoring system located at Princeton University, for collective processing. The complete system has supplied recurrent evidence of collective cognition (and precognition!) of major emotional stressor events throughout the world, time-correlating such events with marked data deviation values, relative to the standardized reference values.

The experimental results thus achieved seem to strongly confirm Sheldrake's tenet of a collective "morphic field of mankind". In our SubQuantum Paradigm, we refer to this as a non-local Information-driven process, one which exists in all instances of individual and collective, Psi behaviors. This concept has far reaching consequences in studies of trans-personal psychology, group behaviors, and sociological phenomena. It's worth mentioning in this context, that the amplitude of anomalous deviations of the noise-diode activities in the PEAR research program, has proved to be related somehow to the relative importances which are ascribed to the given stress-events, rather than to any actual deviation magnitude.

In other words, "Natural" catastrophes, and other less emotionally-stressful events, such as elections, yield mild deviation patterns when compared to the strong deviation patterns which are produced by various wars and destructions initiated by men.

This experimentally correlated fact indicates that there is some sort of instinctive and higher awareness, one which is operating in both the individual consciousness and in the collective consciousness, an awareness which intrinsically understands the actual significance and inherent wrongness of destructive human behaviors, regardless of how these people may have been trained or indoctrinated to regard such destructive behaviors. This faculty is sometimes referred to as "True Conscience". True Conscience is an inspired and intrinsic ability of the Soul, the Essence. This True Conscience exists as opposed to an artificially induced and intellectually trained "indoctrinated conscience", which produces automated intellectual responses, which are arising due to whatever belief or prejudice has been externally imposed on the individual intellect, leading to what have been called "guilt trips", etc.

To the chagrin of war-mongers, True Conscience cannot be gotten rid of, without actually killing the person, since True Conscience is fundamentally inherent to the condition of Being Alive. Then of course, the Being persists in having True Conscience, now unencumbered, even after they have died. So there is no solution to this "problem", other than killing everyone, which is again, no solution, since the objective is still not met, even with such insane and pointless extremes. In a world completely devoid of human population, the problem sort of "goes away", since no one is left alive. But this leaves yet another problem...everyone has died. So there is no value in this kind of "solution". (And who would be there to notice, anyway? The war-mongers are certainly not immune to this "solution" since they also have True Conscience, so they too, must also be gone.)

The reader may recall some hints we've already introduced in our previous installments regarding the pivotal role of Universally inherent importances during selective neural network and individual neuronal activations. The same principle is at work at the interpersonal range of cognition as shown in the PEAR data, as well as at different other levels of Informational integration (see plant reactivities to intentions in C. Backster's well known experimental series).

The most significant experimental reports, as far as their consistency with our conceptual orientation is concerned, are those which demonstrate that consciousness and morphic fields are connected not only to biological systems, but obviously to "dead matter" also. Active Information fields have been detected by white noise interface diodes, as being present in all inanimate matter structures. Such observations are supplying a powerful blow against prevalent materialistic dogmas, while conveying a scientifically most reliable support for our SQ conceptual frameworks. Along similar lines to the Global Consciousness Project, we should mention that there is an "Individual Consciousness Project" currently evolving at the "Campus Study Center", in Munich, based on software containing all possible solutions related to various malfunctions which may be contained in various analyzed objects. This research team has reportedly succeeded in experimentally defining, at which level of Information and frequency, a given field of consciousness "oscillates".

Further in-depth investigation programs into the field of informational structures and their coupling into energy patterns, are waiting for being implemented, as soon as the related financial requirements would be achieved. (On our waiting list alone, of instrumented research programs, we have more than seventy entries right now, and their number is constantly increasing.)

Our novel Subquantum approach seems to be related to some kind of ancestral memory pool transferred to mankind by a certain non-human (angelic) lineage (equipped with a 12-strand DNA template), as recently revealed in the "Maharata teachings". (These teachings are quite consistent with classical theological tenets). According to these revelations, which have been initiatially preserved from a long ago extinguished knowledge database source, infinitesimal electrotonal energy units ("Partiki", corresponding to our Subquantum entities), aggregate in "keylons", which are described as multidimensional energy structures, which are acting as the background structures for the morphogenetic templates upon which the DNA, the genetic code, the physical body, the bioenergetic chakra system and the multidimensional aspects of consciousness, are built. This multidimensional Unified Field of energy "signatures" may carry vast numbers of Informational constructs which are operating in an infinite number of layers of complexity, which - as we see them - build up a Bohmian implication system. These multidimensional "Keylon codes" are forming increasingly specialized patterns, as they sink into the physical world, patterns which are describing individual, transpersonal, biological, and spiritual evolution matrices, in terms of Informational complexity gradients.

According to the ancestral teaching, these SQ "Partiki" units are intrinsically polidimensional constructs, which are able to progressively aggregate into morphogenetic grids with tri-phase scalar wave interconnectedness. This process results in the crystallization of various forms of energy/information into increasingly complex Keylon Codes, through which the given manifestation template is progressively built up from pre-matter information which increases in density and frequency towards "externalized" physical forms. The resulting structures are manifesting in

parallel three-dimensional Reality systems, by way of informational determinants which are inherently existing in the matrix fields which are determining the resultant physical structures and behaviors which are inherent in the various different dimensions. These different Realities are somewhat "invisible" to each other, due to relative differences in the spin constants of the various different-density Reality-levels involved.

This ancient teaching refers to a Pure, Sentient, Creative Force which is perpetually expanding through new manifestations of Itself while basically remaining perpetually the same eternal "Is-ness" - keeping the Universe in a condition of perpetual balance, being stillness-in-motion, a perpetual creation that runs within itself. The framework for manifestations of Time matrices and Universes is not external to this Supreme Principle, it is internal to it. We define this ultimate source as the overarching Cosmic Harmony, the supreme equilibrium brought into physical manifestation by SQ informational fragments, which display an obvious and eternal tendency to reintegrate into the Source. This reintegration process towards an absolute equilibrium, is the ultimate algebraic "null state", an expression of the supreme law of holistic entropy conservation, resulting in the Informational control of all matter and energy-related phenomena, thus physically implementing an overall entropy-balance requirement.

Morphogenetic fields and their correlated structures of energy, are to be re-estimated in this ancient/new light. We hope to bring a substantial contribution to the re-discovery of long forgotten fundamental truths and to put them at the service of a true, unbiased and accurate scientific exploration of our Universe, and of ourselves, as a group of Its' self-conscious representatives. As we shall see further on, these deep understandings of the origins and behaviors of the Universally available intrinsic informations which are ultimately responsible for producing morphogenetic behaviors, which are in turn, responsible for producing biological forms and functions, leads to a complete and unconditioned refutation of Darwin's (phylogenetic) evolution theory.

9th January 2009

Interactions Between the Brain, the Biofields, and the Physical²¹

Robert Neil Boyd²² and Adrian Klein²³

Before addressing the physical object of highest complexity in nature, the Brain, and its consciousness-related functional correlates, let's remember some basic assumptions regarding bio-systems as a whole. We expect to recognize such intricate cortico-informational integration mechanisms, as being the pinnacle of the representations we have been investigating. Obeying the holographic distribution principle which we have followed all along our analytic path, we have to keep in mind that in order to get an incremental improvement in the accuracy of our Brain-related understandings, its overall efficiency regulation must be associated with the bio-field. This association is of an uttermost subtlety and complexity, since the biofield actively interacts with neurocybernetic processes, via Quantum and SubQuantum connectivity.

Therefore, addressing the Quantum efficiency of the Brain, requires a correct understanding of its internal bio-regulatory systems, which are evolving under a complex enfolded mechanism of layered biofields which are composed of higher level Information structures, which are coupling into the neural apparatus, from far beyond the physical biosystem itself.

As our readers already know, our approach to living systems is vastly transcending vitalist doctrines, which are limited to postulating a vital principle, as distinct from biochemical reactions. According to J.White, references to various bioenergy field control-mechanisms, can be found in 97 different cultures. In our western one, biofields were defined alternately as an endogenous coherent EM field, which is related to living organisms, as emergent from classical cellular fields, comprising some new features, or alternatively, as an SU2 symmetry-related complementary phenomenon related to classical EM fields. In various attempts at definition, biofields are expected to restore the long-range connection modalities which we observe between molecular and supramolecular processes (of the kind we see in cytoplasmic functions).

Classical interpretations of biofields, as exclusive features of living systems have been repeatedly questioned by supporters, regarding its origin in symmetrical physical demands which may be applied to the whole of Nature. This view is ascribing to living systems a more highly complex reaction behavior regarding such requirements, than non-living matter is able to provide.

²¹ <http://www.victorzammit.com/articles/klein17.htm>

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This approach is consistent with Froehlich endogenous coherent oscillations, invoked for the explicitly nonlinear sensitivity of living systems, to weakly ionized and non-ionized EM fields.

Nevertheless, the biofield's observed coherence, and its partial inability to be localized, suggest its enfolded position, as lying between energetic and Informational processes, a taxonomical requirement which is fully satisfied by our SQ model for sentient reality. The biofield's non-local essence was first confirmed by instantly-transferred cortical photo-stimulation experiments, performed during 1994 (Grinberg, Delanor & All).

According to Thaheld (2005), known EEG correlational patterns fall short from explaining the nonlocal biocorrelational distributions of neural ionic currents and the strength and densities of electric fields, operating in Brain. These observations are consistent with a new approach (introduced by Driesh), where subtle bio-regulatory processes are seen as being the result of "mind-like" organizational effectors, rather than physical energy fields (of the kind invoked by R.O.Becker & G. Selden in their experimental results related to electrically de-differentiated cells).

How are the biofields coupled into both energetic and Informational fields?

In order to answer this question, a particular category of SEs ("subtle energies") (see our Nov. 2008 installment) is constructively invoked. We remind our readers about Zero Point Fluctuations in Vacuum. These are providing an infinite energetic background for the physical world, by supposedly ceaseless productions of physical particles from the ZPE, which are subsequently dissolving onto the background by a process of hyperdimensional interplays, which are occurring between different enfolded orders. This down-conversion of multidimensional SE fields, aimed at coupling into 3D force fields, requires a novel energy/Information transduction technology (see Clarus' sympathetic resonance technology).

Sympathetic resonators are capable of SQ interactions with the electromagnetic spectrum, ordering its fundamental magnetic vector properties, and affecting, through the Quantum field, interactions and physical processes which are occurring in the subatomic range. From this perspective, the bioenergetic human chakra system, is conveniently placed at the crossroads of energetic and Informational SQ interplays, where the dynamics of perception, attention, and intention, are controlling our biological reality. Such processes occur by way of aether flux combinatorials, known in the Vedantic teachings as "Prana", corresponding to the Chinese notion of "Qi".

Early experimental protocols related to the physical aspects of the biofield, were performed by B. Payne, in 1981, pointing to a biofield strength which was observed to be on the order of over 100 million times greater than the magnitude of the body's magnetic field. Biofield deflections have also been correlated to synchronous geomagnetic index fluctuations, pointing to physically originated bioenergetic components. At the same time, non-physical correlations of biofield intensity values, are consistently related to various emotional states, in experimental subjects. Such analytic parameters seem to attest to an increasing complexity of responses in biosystems, to environmental geomagnetic influences, of the kind reported in R.I.Jones' uniform daily rotation experiments in plants.

Similar interconnectedness with magnetic fields has been found in L. Badgley's spiral vortex fields, which are observed to exist around injury sites on the body. We have discovered such helical patterns exist all the way down to the 10^{-58} m Kolmogoroff scale, and beyond, to the level of SQ infinitesimals. Vortex behaviors seem to be a basis, and are evidently a primary and fundamental organizational pattern, in our Universe.

In Payne's concept, torque forces interact with EM, gravity and nuclear forces, modulating their respective effects, especially around biosystems. This observation, which is highly relevant for biofields, strongly supports the notion that of an increased Information field involvement, of the kind our SQ model suggests, regarding high-level functions which are evolving in Brain.

We think that similar control mechanisms are at work in the various lower-level bio-regulatory networks as well, such as splicing, methylation, glucositation and protein synthesis on ribosomes, as well as being involved in all other biological integration processes. As C. Venter remarked (2001), we are facing a different, non-chemical level of organization, one which is reminiscent of morphic causational principles, which have been proposed as early as 1944 by A. Girwitsch. Girwitsch ontologically differentiated between a physical embryo and its organizing pre-patterning morphic fields, which call forth genetic responses.

From there, S. Savva's concepts of the mind components of biofields (1997), serve as behavior controlling aspects in all fundamental biological programs. From there, further on to our SQ-driven Information control mechanisms, the way was widely open. As Savva pointed out, biofield control operates through four independent control subsystems, which are the nervous system, chemical interactions, coherent biophotonic EM (Van Wijk) and Subtle Energy channels (Basically SE means, "Not reducible to any well-known fundamental physical interactions.").

This special feature has been experimentally proven by Bockris (1997) in low temperature nuclear transmutations of lead into Gold, in concentrations up to 300 ppm. These transmutations are only occurring in the presence of a "psi operator", a person who is capable of intentionally speeding up, and slowing down, by an act of will, the nuclear decay rate of americium (Yan Xin, 2002). Such experimental results are strongly consistent with the PEAR laboratory publications of the Princeton University regarding predetermined deviation values, far from randomness, in RNG experiments.

As a consequence of the special interdimensional status of biofields, they cannot be significantly blocked by any physical screening. Their effects disobey all space constraints, of the kind that the known isotropic physical fields display. As suggested by A. Denisov (1975), the bioinformational fields are composed in anisotropic, and netlike patterns, which are not attenuating with the square of the distance. These fields are acting along the exact lines of any pre-established emotional or intentional bondings. At lower levels of unfolding information controls, human-originated bioinformational determinants have been proved to influence bacterial growth parameters (E. Rausher, B. Rubik, 1966), Such observations open wide perspectives on the cytophysiological and cytogenetic control horizons (see our former references to the work of P. Gariaev's team).

More comprehensive data may be found in H.S. Burr's well-known concepts related to L-Fields (life organization units), as well as the works of his collaborator's. L. Ravitz' works are pointing

at a direct relationship between the L-Field and a person's mental, physical, and emotional conditions. Ravitz reportedly has even been able to show that the L-Field, as a whole, disappears before physical death. Such observations have been correlated with anecdotal extrasensory monitoring of sudden disappearances of the normally observed auric fields, around those individuals who are facing an impending, and sudden, but unexpected death. (This topic is beyond the scope of our current presentation).

Quantum bioholographic data are increasingly invoked in advanced modelings of sentient reality. In the light of modern investigations, DNA is seen as a self-calibrating antenna, which is able, by phase conjugate adaptive resonance, to process quantum holographic information stored in SQ diffraction patterns. In the Brain's overall biofield, narrow spectral frequency-related interdimensional windows (e.g. 38-40 Hz) allow sharp frequency adaptive couplings of organized enfolded Information matrix fields, which live in projective space, coupling into environmentally-originated, neurally supported, Quantum configurations.

At a different level of enfolded information, similar pre-geometrically organized information patterns, related to embryogenetic determinants, are able to set up stress gradients in the vacuum. These behaviors occur according to embryogenetic holography principles, thus guiding the implementation of the ontogenetic pathways, in accordance with the Brain's anticipated task performances. From this novel perspective, Brain structures and connectivities, organize under highly complex biofield determinants, as a Quantum sufficient energy-processing tool capable of shifting its own integration range, into higher complexities of information matrices, thus producing the Self's expression in the material world.

The common denominator for both, the Brain's quantum activity and the Informational Self, is in their common hyperdimensional SubQuantum background, which is able to accommodate an asymmetrical monistic determinacy, which we propose to replace obsolete dualistic and panpsychist models.

Perhaps the most promising recent development in bioenergy-backed technology, with an unprecedented potential in advanced health care programs, is introduced by UCLA Professor Emeritus Valerie Hunt. Her Aurameter (TM) is able to detect, in a predictive way, anticoherent frequency bands in individual "Signature Field" patterns of subtle energy, making possible their transactional shift into holographically balanced health patterns, by perfectly calibrated frequency transfers.

Most interestingly, Prof. Hunt strongly emphasizes that the emotional constellations which are surrounding stagnant memory fields, are originating in past "lifeworlds" (a term she uses in a metempsychotic context). Such emotional constellations have persisting blockage effects on current-life subtle energy dynamics, which are directly related to health. Such anticoherent frequency trends seem to be stored in the fundamental SQ domains, composed of Information internal to the overall biofield structure, where the Brain's bioenergetic components are embedded.

These findings strongly support reportedly successful hypnotic regression therapies, which tap into accessible memory storage systems originating from personality-related events from the

remote past. As we shall see, recalling of such memories is possible as a result of resonant alignments between various SQ conformal information maps, which are presented as superimposed information symmetry configurations in the Brain.

Coherent healthy SE Signature Field

Anticoherent frequency bands of actual or predicted health impairments.

With these considerations in place, we can be optimistic about our readers' readiness to look through the next windows we intend to open, during our next installments regarding the fascinating world of how the Brain's integrates Self into the energetic environment. We will discuss the actual time-bound, derivative, modus operandi of the Self. During our next presentations, it will become increasingly understood how Self is capable of efficient activations of the internal set-ups of the Brain, according to a certain intermittent patternings in time, which patterns are used as entropy-stabilizing integration tools, which are ceaselessly enhancing ones' Information-processing abilities.

29th January 2009

CONSCIOUSNESS-BASED SUBQUANTUM INFORMATION STORAGE AND TRANSPORT INFLUENCES ALL PHYSICAL EVENTS AND OBJECTS

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Constituents of Continuous Creation

There was never a “big bang”. Empirical physical facts and observations have long ago completely falsified this ecclesiastical faith-based notion. Creation is a localized, ubiquitous, and continuous process, of infinite duration. This is a self-evident fact.

Despite the dogmatic and indoctrinated popularity of “big bang” and “inflationary” relativity-derived cosmologies, the Universe is infinite in volume and duration. Some recent theoretical steps have been made which support this understanding. (See, for example: <http://arxiv.org/abs/1404.3093v3>)

When relativity theory is completely removed from all cosmological consideration as a failed hypothesis, and Quantum and SubQuantum considerations are completely relied on, sans relativity, these Continuous Creation facts will become obvious and irrefutable.

Due to decades of contrary evidence and multitudinous strident objections to the notion of an “expanding universe”, the infinite volume Continuous Creation will be admitted as fact, as it will become obvious that space does not and cannot “expand”, when relativity and isotropic uniformity assumptions are thrown out the window. Hoyle, Narlikar, and Bondi are vindicated. We live in a variety of a “Steady State” infinite volume, infinite duration, plasma-electric universe. [ss]

Decades of experimental evidence has accumulated due to multitudes of instrumented attempts to find the faith-based and imaginary “gravity waves”. These vast piles of records, constituting more than 70 years of accumulated experimental evidence have proved, with near absolute certainty, that distance is an absolute (!), and that there are no “gravity waves”. The proof against “gravity waves” is as vast and substantial as the experimental evidence which was used to prove the physical tenets of Quantum Mechanics.

Given that distance is an absolute, this means that area is an absolute, and that volume is an absolute. Given these absolutes, space does not and cannot “bend” nor “expand”. Related imaginings that the Universe must be limited in volume or limited in duration are in the realm of primitive superstitions and faith-based religions. Such imaginings are not supported by the accumulated scientific evidence.

We take the view that the Euclidean dimensions are absolute in terms of distance, area, and volume. The nothing which is Space is thus measurable, and is observably occupied by matter, and energy, where the density of both of these kinds of occupants change observably with time. However, many additional relevant factors which inhabit space are not as immediately palpable. What we are used to considering as time, and aging, is not all there is to it.

The Force Due to Time

The effects of the force due to time are palpable only after large spans of times have passed. Observably, everything ages. Due to what? Due to the force of time. The time force is inherent in the aether flux which causes gravitation.

The force due to time was first empirically measured by the astrophysicist Kozyrev, during 30 years of instrumented laboratory experiments and astrophysical observations. [CW-NAK] These measurements indicate that the force due to time is orders of magnitude smaller than the force due to gravitation, which is in turn, 39 orders of magnitude smaller than the force which is due to the electric field. Time density has a direct correspondence to aether density, allowing control of the temporal parameters of physical processes. See: <http://www.faraday.ru/tmreport.pdf>

In the Continuous Creation process, the creation of matter, forces, Life-Forms, and so on, happen ubiquitously through all time. This is the Physical Brahma principle. It is a Universal and localized set of physical processes.

Things are maintained and sustained in their forms and conditions, for spans of time. This is the Physical Vishnu principle. It is a Universal and localized set of physical processes.

Things inevitably change and decay, over spans of time, until they cease to exist in their original form, and physically dissipate. This is the Physical Shiva principle. This is a Universal and localized set of physical processes.

Brahma (creation), Vishnu (sustenance), and Shiva (change, destruction) are continuous and ubiquitous activities and are actually observable Physical Principles, continuously cycling through endless spans of time, throughout the infinite volume

Intelligent Universe. There was never a beginning to these cycles, and there will never be an end to them.

These three principles are observably inevitable, and ubiquitous, as well as localized. Localized creations/destructions of matter are originating based on localized holographic information principles, guided by the Cosmic Harmony principle, and implemented through SubQuantum aether activities and gamma rays. [Le Bon]

The Intelligent Universe

“Everything in the Universe, throughout all its kingdoms, is conscious: i.e., endowed with a consciousness of its own kind and on its own plane of perception. There is but one indivisible and absolute Omniscience and Intelligence in the Universe, and this thrills throughout every atom and infinitesimal point of the whole finite Kosmos which hath no bounds, and which people call space.” ~ H. P. Blavatsky

Local creation processes are all interactively planned out ahead of time, by the Intelligent Universe, along with the Ambient Intelligence, as a background life-creating framework regarding the physical destiny of every created thing, and affecting every form of Consciousness, as described above. [AI]

Yet all Life-Forms operate within this framework out of the Universal Principle of Free Will, as the inherent freedom of all life to do as it chooses, is ubiquitously seen throughout Nature. So, part of existence is pre-destined, and another part is due to choices, preferences, and unique personalities (Uniqueness is another pervasive Universal Principle.), under the overarching principle of the Cosmic Harmony. (Human activities which are lacking in Harmony tend to result in pain and/or suffering.)

However, the Infinite volume Universe, as a Whole, does none of these things. On average, The Whole continues everywhere, is never born, and never ceases to be. Creation is a localized process. The above 3 principles of time and localized creation/sustenance/destruction are physical processes, which are ubiquitous and inherent in space itself. This is self-evident to the empirical observer of Natural processes.

Forces of Consciousness

There are also action-reaction forces which are due to information, Consciousness, and personality (uniqueness), and due to intention, attention, and emotional states. This understanding is already inherent in the Schrodinger equations.

For example, there were instrumented experiments done regarding the interactions between the radiations emitting from Radio Frequency broadcast facilities, and the operators of those facilities, in the late 1990s.

It was instrumentally observed that, as the intentions, attentions, and the emotions of the operators of the E/M broadcasting facilities changed, the radiated pattern of the broadcasting antennas, changed accordingly. Cause and effect. This implies a force is involved.

The same experiments were carried out with complex E/M facilities, and symplectic E/M broadcasting stations. In all cases, the results measured were the same. These results were removed from the arXive at Cornell, less than 3 months after the pre-print was posted there. The results were never published. (We suspect this had to do with the weaponization of microwaves and microwave towers.)

Another set of experiments along similar lines was done in Europe by a coalition of French, English, and German experimenters. Their observations verified those which had been made in the U.S. The experiments also established that a divergence in the quantum field was measurable in the circumstances of RF-Consciousness interactions. The relation between QM and electromagnetic radiations is already fairly well known.

These results imply that the Consciousness factors of attention, intention, and emotions can be directly influenced by RF radiations, in addition to the inverse effect of humans influencing E/M radiations. We keep it in mind that human beings are not the only intelligent Beings who inhabit the Earth, so other things are adversely affected by RF radiations, as well as humans.

Intelligence/Sentience is inherently residing in all space and manifests by degree in the material world, as according to the three principles described above. DNA information is also inherently residing in all space and manifests according to environmental considerations. We will discuss more on this, further on.

Personalities (souls) are, and cause, organizations of information, which can manifest as forces or material forms. The Consciousnesses (personalities) of Quasi-

Material forms are often manifested as visible cloud-forms, or as glowing balls of light, which are made from coherent experiential Being-information.

When they decide to become visible, as it suits their purposes, these visible (normally invisible) Glowing-Sphere forms of Consciousness can do so, at will, because they are an organized aether-electric flux-structure which is comprised of multitudes of infinitesimals of Consciousness, which infinitesimals are known as "Bhutatmas", in the Vedic traditions.

The Vedas refer to these balls of glowing light as "Devas", which means "Angels of Nature". Additionally, according to ancient Hebrew traditions, the "natural form" of an Angel, is seen as a glowing ball of light.

Given that the infinitesimal-Bhutatmas are the origination of all material forms, all physical fields, and Consciousness and Life, and given that Devas are made of Bhutatmas, Devas can directly and consciously control the Bhutatmas which comprise their form, just as easily as we can control our biological forms.

Thus, Devas can do many miraculous-appearing things, such as making "crop circles". And now we have cameras, so we can make videos, films, and tapes and take photographs of them and we can record what they can do. Anyone who has studied Devas for any length of time, has realized that they are very intelligent and aware Beings who have individual personalities and act on their own volition.

When in their optically visible, light emitting Being-Cloud or Being-Sphere appearances, various shapes and colors and kinds of these aether-electric Beings, have been photographed repeatedly. These quasi-physical Angelic Beings are intelligent agents of the Ambient Intelligence's Life-Support Systems. Here are some samples:



“Orbs” (Devas) photographed in the act of creating a “Crop Circle”.



A scientifically validated video of Devas (“Orbs”) in the act of creating a Crop Circle, along with a physical analysis of the process by Dr. Haselhoff, who published a peer-reviewed paper on his findings.

Beingness (Consciousness) is the organizing principle of the quantum information field, converting apparently random incoherent chaotic external information, into coherent integrated, targeted results, manifestations, observables, and experiences.

There are no "coincidences". It is all planned within a framework of free will by the Ambient Intelligence which participates in the Intelligent Universe. Sheldrake's

morphogenic field is a localized unique holographic solidification instance of the non-local Holographic Information-based Intelligent Universe's designs.

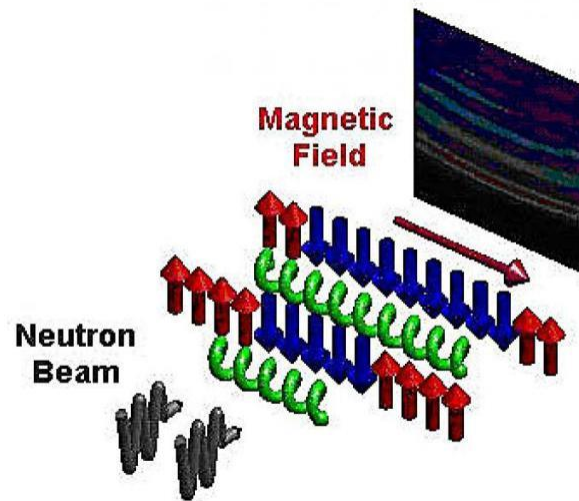
Exploring the Golden Spiral and the Phi Ratio in Physics

The golden ratio is the limit of the ratios of successive terms of the Fibonacci sequence (or any Fibonacci-like sequence), as originally shown by Kepler:

$$\lim_{n \rightarrow \infty} \frac{F(n+1)}{F(n)} = \varphi. \quad \varphi = \frac{1 + \sqrt{5}}{2} = 1.6180339887 \dots$$

Plato went so far as to call the phi ratio the "key to the physics of the cosmos".

From the journal *Science*, dated January 8, 2010:



The golden ratio, which is equal to approximately 1.618, can be found in various aspects of our life, including biology, architecture, and the arts. But only recently was it discovered that this special ratio is also reflected in nanoscales, thanks to researchers from the U.K.'s Oxford University. Their research, examined chains of linked magnetic cobalt niobate (CoNb_2O_6) particles, only one particle wide, to investigate the Heisenberg Uncertainty Principle. They applied a magnetic field at right angles to an aligned spin of the magnetic chains to introduce more quantum uncertainty. Following the changes in field direction, the small magnets started to magnetically resonate. "We found a series (scale) of resonant notes: The first two notes show a perfect relationship with each other. Their frequencies (pitch) are in the ratio of 1.618 ... which is the golden ratio famous from art and architecture," said principal researcher Dr. Radu Coldea of Oxford University in a press release. "It reflects a beautiful property of the quantum system—a hidden symmetry."

Dr. Alan Tennant, who led the research group in Berlin, said: “Such discoveries are leading physicists to speculate that the quantum, atomic scale world may have its own underlying order. Similar surprises may await researchers in other materials in the quantum critical state.”

This result suggests that a Golden Mean Spiral (phi ratio spiral) may be involved with the resonances observed in the above experiment. The Golden Mean Spiral is related to the Fibonacci spiral. The logarithmic spiral of the phi ratio, is known as the Golden Mean Spiral. The difference is that the Fibonacci spiral is a whole number interpretation of the arithmetically impossible Golden Mean spiral, which has no beginning or end. (The Fibonacci spiral has a definite beginning.)

Thus, we are suggesting that an underlying symmetry related to the Golden Ratio may be inherent in space, as an out-bound logarithmic spiraling force which is available, perhaps uniformly, throughout space. Thus, this symmetry may be a template inherently residing in all space, which originates spin. Perhaps this force dissipates logarithmically, or in radiating circles, away from the point of origin.

The phi ratio/Golden Ratio is a spiraling topological fractal force which is inherent in the Aether Universe. Outwardly spiraling from every point, this force not only acts as a blueprint for the formation of physical forms, such as the nautilus shell or the arrangements of sunflower seeds, this outward spiraling point-originated ubiquitous force may be the origination of the spin field, the torsion field, the wrapping-rotation of Birkeland currents about themselves, the origination of the rotational helical component of transverse E/M, the origination of some forms of turbulence in fluids and gases, the origination of several types of "instabilities" in plasmas, and so on.

The Topological Fractal Origination of Rotation

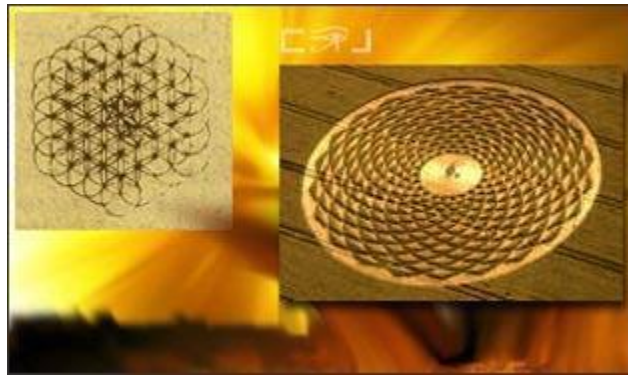
The rotational component of space may originate first in the SubQuantum aether plenum as a topological fractal force that is everywhere present. This produces the realization that the phi-ratio/Golden Ratio which inhabits and structures the aether may be the origination of many rotating, spinning, and helical, physical activities. It is also one of the primary factors in the creation of turbulence in plastic, fluidic, gaseous, and plasma medias.

The mystery of how the subatomic particles such as the electron can persist in spinning for as long as they exist, may be solved by considering the phi ratio/Fibonacci sequence/Golden Ratio/Golden Spiral as a logarithmic rotational force, which is inherent in the SubQuantum aether. Thus, the aether may be

supporting the rotation of all subatomic particles which have the property of spin. This proposition seems make common sense, although it has never been proved experimentally.

We consider that since we live in a 3D space, this is most likely a 3D spiral force, with an equipotential in all directions from any given spacial point. The strength of this hypothesized force is as yet undetermined, but it can probably be measured empirically by properly designed experiments. The math related to this is already well developed in terms of 3D spiral forms. <http://webee.technion.ac.il/~ayellet/Ps/11-HararyTal.pdf>

Intersections of circles, in 2D, form a resonance basis which looks like another remarkable crop circle formation, related to the Flower of Life diagram:



Such forms are based on, and arising from, intersecting circles. [See: <https://www.miskatonic.org/images/intersecting-circles.gif>] This suggests that intersecting circles may be a basis element of this proposed topological phi-force.

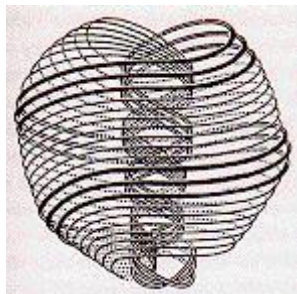
We also want to examine a 3D variety of the Golden Spiral, which is a structure which represents a combination of two well-known sacred geometry shapes: the Golden Mean (ϕ) spiral and the Fibonacci spiral. This form first appeared as a crop circle. (People never thought of it.) This shape is known as the "Hackpen Hill Formation". It appeared in an English wheat field in 1999.



This may be related to non-geodesic biharmonic curves in the Heisenberg group Heis^3 which characterize Mannheim curves in terms of their biharmonic partner curves in Heis^3 .

[“Heisenberg Group & Mannheim Curves”, E. Turhan, T. Körpınar, H. N. Núñez-Yépez, J. Lopez-Bonilla, Prespacetime Journal, Vol 7, No 3 (2016) <http://prespacetime.com/index.php/pst/article/view/948/921>]

Here is a 3D spiral model of an “Anu”, a subatomic vortex as envisioned by Bessant and Ledbetter:



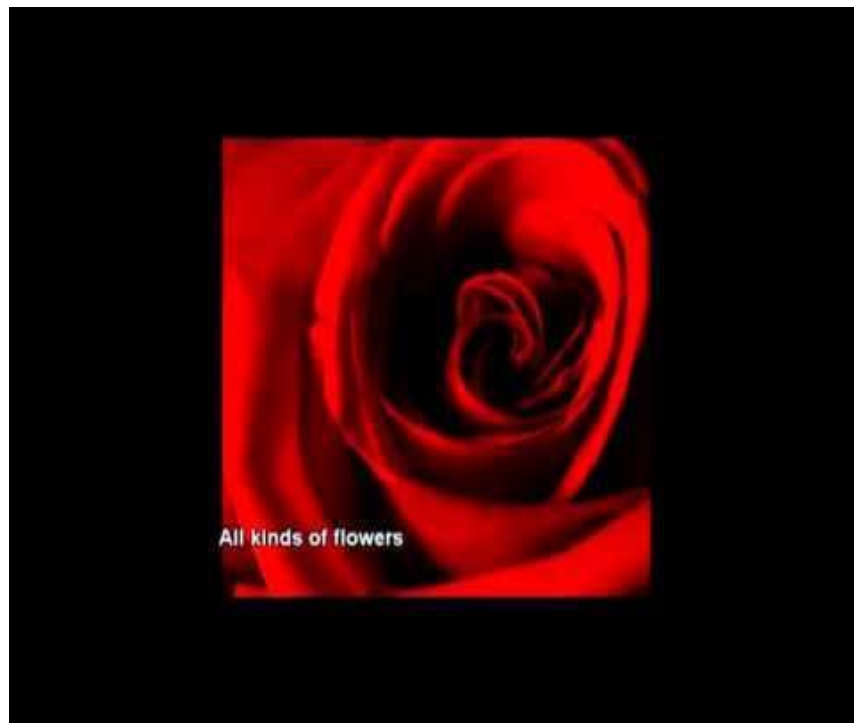
Perhaps the Golden Spiral and the Anu are related.

We do not consider the electron as a “point charge”. We contemplate an electron as an extensive and measurable vortex in the SubQuantum aether, which contains internal substructures made from yet smaller particles, which Fabricius has determined may be Kolmogorov vortices, which are vortices in the SubQuantum aether, which would appear as beads on the strings of the Anu representation. The internal substructures may be required to give the electron vortex-particle a modicum of stability. And something is causing the whirlpool in the aether to keep spinning. The electron may not be a classical Helmholtz-type vortex, but something far more complicated. We are still in the process of exploring the electron vortex-particle.

Is the Golden Spiral a valid model for a force intrinsic to the aether, or is it a model of an elementary vortex-particle? Could this be a fractal basis for a larger reality? [Posta G.; Spectral asymptotics for variational fractals, Zeit. Anal. Anw.17, 417-430 (1998)]

Where all spinning particles, such as the electron, are considered to have an “intrinsic spin”, questions still arise regarding what is it that keeps the electron spinning, in spite of calculations that it should quickly lose all its spin energy due to emissions of radiation as it changes direction away from a straight line, for example. Although the given electron may drop or rise through the valence shells of an atom, through energy losses or gains, its spin appears to remain constant. Yet, no one ever asks the question, what causes this intrinsic spin, in the first place? All we have are descriptions of what spin does, not what causes it.

Here is a video presentation regarding the phi ratio/Golden Ratio/Fibonacci sequence:



This is related to many interesting things, such as the studies of the inherent rotational component of the Universe as first realized by Keely back in the 1880s. Keely produced machines that were controlled and activated by human creative intentions, and which produced free energy of many varieties, mainly hydraulic,

mechanical, and electrical. Subatomic particle spin may be the result of an out-bound spiraling force (Golden Spiral) which inherently resides in every point in space, due to the fact that the aether plenum occupies every point in space. This is mathematically described in terms of the Fibonacci sequence and the Golden Ratio, phi. In addition there are indications that intersecting circles are involved as illustrated above.

Many factors complicate our understanding of what space is. Up, down, front, back, and sideways, are not all there is to space. The SubQuantum aether plenum which occupies all space, has many inherent properties and is innately conditioned by the three above Physical Time Principles, as well being unbounded and infinite in volume and extent. The other Realities, Realms, and Dimensions and their relevance to this particular version of Reality, will be addressed in a later paper.

Time and gravitation propagate originating in the SubQuantum aether and pervade all of space. Consciousness is inherent in the Bhutatmas, which comprise the SQ aether, in which creatures propagate and agglomerate. Experiential information is inherent in all matter, fields, forces, Consciousness, and Life-forms.

Experiential information accumulates as memories in all material objects, and also radiates from all material objects, and is absorbed constantly from the entire of the infinite universe, where information radiation and absorption events propagate with velocities ranging from zero to infinity.

As mentioned above, the Consciousness factors of attention, intention, and the emotional states originate from the unique individual coherent Being and propagate both locally and non-locally. Consciousness factors are also absorbed non-locally, especially when the attention of the individual entity coheres any portion or variety of the informational environment.

Time and the SubQuantum Aether Plenum

Time propagates with an infinite velocity and is embedded in infinite velocity infinitesimal-originated force known as gravitation, both of which are caused by flows of the infinite velocity SubQuantum aether infinitesimals, as per the model published by the Marquis de Laplace in 1853, as independently verified by Boyd, circa 2002. [*A History of Aether and Electricity*, E. T. Whittaker] [Project Greenglow Archives] This principle is universal and supports Mach's hypothesis that the infinite universe is connected instantly everywhere, in terms of time and gravitation. [Mach's principle]

The force due to time is orders of magnitude smaller than the force due to gravitation, which is orders of magnitude smaller than the force due to the electric field.

Newton's concept of "universal time" is correct. Newton's "universal space" is correct, except that space is observed as being anisotropic, rather than isotropic, due to all goings on in it. [Newton]

Space is an active and occupied plenum, not a "vacuum". The plenum is filled with entities of all sizes, down to the infinitely small, comprising a SubQuantum aether mainly comprised of infinitesimals. The media has properties which vary according to scale, yet the media can be observed as having a gestalt of physical properties when observed in large volumes.

Similar to the way the ocean is on Earth, the media has bulk properties, when examined as a whole, and myriads of properties and activities which are observable at the microscopic scales. When viewed from the beach, the ocean appears to be a body of water with waves running on the surface, but one quickly realizes that there are very powerful currents, and many other activities, moving multiple directions under the surface.

The salt water of the ocean, is not merely salt water but is a very complex sort of jell, with many atomic elements and complex molecules suspended in it, as well as many microscopic life-forms. The Eikonal equation is used to examine the behaviors of waves internal to the ocean. Similarly, the Eikonal applies to the interstellar media, which is a plasma ocean, which has similar gradations of granularity and is similarly, a mixed media, with localized bulk properties.

Tesla's decades-long studies of the Aether: Aether resonance ↔ mass-resonance.

Related to such studies, Tesla found experimentally, that explosive discharges of electricity, approaching the ideal of the Dirac delta function (the infinitely fast rise of an infinitely high voltage), cause the dissociation of electrons into their component aether particles, which then stream away from the discharge site in superluminal ever-expanding shells, dissipating at the rate of $1/r$.

Similar processes are occurring all the time in the plasma bodies of the stars, resulting in aether emanations from the various stellar bodies. It is possible that localized electrical processes can also occur in interstellar space, which can also result in subquantum particle fluxes.

Stellar and interstellar plasma processes involving subatomic particle dissociations as the result of high dv/dt charge separation events in stellar and interstellar plasmas can be the origin of this constant in-streaming of subquantum particles which can easily attain superluminal velocities by such plasma dissociation events.

When these anisotropic superluminal subquantum entities encounter pre-existing matter, they are refracted and slowed down by interactions with the pre-existing matter. The reaction which occurs is experienced by matter as the pressing-down force we call gravitation, which is not constant, but occurs in the manner of stochastic mass-density waves composed of aether.

Tesla realized through experiment that certain of these incoming aether flux "waves" arrived with unfailing regularity. He realized that the instances where he obtained zero output readings in his instruments, were those cases where his applied test pulses were 180 degrees out of phase with the incoming aether waves, and of course, strongest when his test pulses were applied in-phase with the incoming flux peaks.

This situation provided evidence that aether flux from interstellar space is not a constant and smooth value, but varies with time, as does gravitation. He realized that the Earth, as a massive whole, was modulating parts of the aether flux. He discovered a large number of various periodicities within the aether fluxes. He found the sources of all these various flux rates had several causes.

Tesla found that space-sourced aether pulses entered the Earth at rates apparently related to electrical-aether plasma processes occurring in the deepest reaches of outer space, where many such interstellar aether processes generated aether pulsations having nothing to do with Earth.

Other repetition rates had to do with processes in space involving electrical and material properties of the interstellar medium itself. Yet, there existed a class of pulse rates definitely related to the nearby sun and to the Earth as a resistive mass. Tesla found that the Earth's rocky crust represented a resistance to the otherwise smooth passage of aether flux pulsations through interstellar space.

Tesla found that the resistance of the Earth's crust to the passage of aether, caused a local intensification of the aether flux to occur. He observed that a self-magnifying, self-collimating, property occurred, when the aether fluxes encountered the massive body of the planet.

The so-resisted aether then self-focused into the locally resistive medium comprising the planet, resulting in locally intense aether flux bombardments in the resistive

media, which resulted in locally explosive emissions of showers of subatomic particles. One of the principle emissions was numbers of electrons.

Electrons would spontaneously appear in the matter of the planetary body due to the resistivity of existing matter (an organized static form of the aether) to the aether flux. The resulting electrons acted as an aether "contaminant" which would choke off the normally smooth and unencumbered aether flows.

In other words, the process of the conversion of aether particles, into electrons, due to the resistivity of the Earth's crust, acted to further retard the aether flows, in addition to the resistances inherent in the materials of the Earth's crust.

On the terrestrial scale, the results of these processes were observed to be enormous in scope. Tesla found, for example, that these processes were responsible for the molten core of the planet, and for the constant excesses of electrons which give the planet a constant net negative charge.

Tesla also found a direct correlation between the local aether resistivity of the earth's crust and the local rate of lightning discharges, in regions which were notable for locally prodigious lightning activities. [1]

The 3 Euclidean dimensions are normally viewed as merely the background space which everything else occupies, and in which everything else happens. Space itself, is a given, and cannot be created, nor destroyed, nor "bent", because space itself is a nothing.

Distance is an absolute, inherent in the absoluteness of the three Euclidean dimensions. Distance cannot be created, nor destroyed, nor "bent". Decades of experimental data accumulated in the LIGO experiments, and in dozens of additional previous attempts to detect hypothetical "gravity waves" have empirically proven this proposition: Distance is absolute.

DNA Information is an Information Pattern Inherent in the SubQuantum Aether

As we mentioned earlier, DNA may be an informational structure inherent in the ubiquitous SubQuantum aether. DNA experiments performed by Luc Montagnier (Nobel Prize Laureate in Biology) imply that DNA information is resident in every location in the Universe. In a set of experiments, test tubes were filled with pure deionized water. The pure water group was hermetically sealed. Then the other half of the test tubes, which were also filled with nothing but pure water, had a strand of

DNA added to them, then were hermetically sealed. Then they were set side by side in pairs and left immersed in a 17 Hz, 300 microvolt radiant E/M field for many hours.

When the E/M source was turned off, all the tubes were sent to the DNA lab for DNA testing. DNA was found in all the tubes, not just those which had DNA strands added to them. How did that happen?

Clearly, the physical Brahma principle, inherent in the SQ aether, was involved in creating DNA in the test tubes, from out of the aether-inherent DNA information “stencil” which pervades all of space. Such processes are also related to the Creative Void, here defined as being the Absolutely Infinitely Small, which is everywhere present and informs the infinitesimal Bhutatmas, which then create the activities and material forms of the observable universe, which by now has been imaged down to as small as $10e^{-95}$ cm, and out to more than a billion light years, in the visible extent of the large. Although it cannot be physically proved, we are of the opinion that we are living in between the Infinitely Large Cosmos, and the Infinitely Small, where we consider both as absolutes.

We have discovered that, contrary to “evolution” dogmas, the DNA manifests the kinds of life best suited to the various environmental factors of the given time and place. [Boyd, Garjajev]

This is facilitated by the Ambient Intelligence, which coordinates all the environmental factors which result in a successful life-form. DNA does not “evolve”. The DNA has all the possible variations of all possible successful life-forms, already inherent in it. At the same time, DNA information is ubiquitous. So if a tardive needs to show up there, it appears there. Some have historically stated that life-forms appear spontaneously, in various circumstances. [Lavoisier]

It has been observed that new life-forms appear spontaneously everywhere on the planet. According to studies done by the Dept. of the Interior, some 300 new species of plants animals and insects appear in the Great Smokey Mountains National Park, on a yearly basis. Some of them proliferate, but many of them only last for only one life cycle, and then vanish. It is as though experiments are constantly being performed by the Ambient Intelligence regarding which properties and abilities and forms of new life best fit in harmony with the environmental circumstances of today.

The above considerations are moving us towards a Grade 6 Projective Grassman and Lie algebra analysis of non-local interactions of information-bearing infinitesimals, among the dimensionalities referred to above.

Topological Thermodynamics and SubQuantum Kolmogorov Turbulence

Since the Pfaff dimensions are derived from the Grassman algebra, all this ties in to topological thermodynamics as expressed by R.M. Kiehn, as well. [See this very important slide presentation by Prof. Kiehn:

<http://www.k1man.com/Kiehn120926B.pdf>]

It also ties into the SubQuantum considerations of Kolmogorov turbulence which we have physically proved as a derivation of Kolmogorov's studies, which results in Kolmogorov turbulences in the SQ aether, producing vortices at the level of $10e^{-58}$ m. We call these creatures Kolmogorov vortices (of course). [Fabricius]

Imaging SubQuantum Entities

Boyd designed 6 different methods for imaging SubQuantum entities, comprising a SubQuantum Microscope. Valentini of Italy developed yet a 7th approach. [] Boyd published the most promising approach in the Project Greenglow Archives (a UK-based research group), based on quantum interference patterns. During the next year, that approach was analyzed by a very high-end computer physics-modeling system in Germany, with the primary work done by Dr. Berndt Binder. Proof-of-principle was verified by Binder.

During the next year, the design was constructed at a University in Serbia, funded by the government of Serbia. During 2009, the project leader of the facility in Serbia announced that they had imaged entities as small as $10e^{-95}$ cm, well below the Planck length of $10e^{-33}$ cm. SubQuantum entities have been instrumentally imaged, and thus they are not merely theoretical entities, but empirical fact. The aether is confirmed.

Consciousness Information Transport and the Quantum Information Field

Eidetic Consciousness Information is transported by all the fields and forces, and by the non-local infinite velocity quantum field which is implemented mechanically by the SubQuantum Plenum which is comprised of entities ranging from infinitesimals, up to the Planck length, which traverse infinite absolute volumes and absolute distances with up to an infinite velocity. (Decades of LIGO data have proved that distance is an absolute.)

In agreement with the Vedic literature we can call the infinitesimals, "Bhutatmas" which are defined as the smallest unit of Consciousness, and at the same time, the smallest unit of matter. Activities and agglomerations of the Bhutatmas are the

origination of everything else, including all forces and fields, all matter, all Consciousness, and Life itself.

There is also a relatively static portion of the aether which forms a visible “atmosphere” which surrounds all material forms, optically visible down to the electron in size. (If you will examine the edges of any object, you will be able to observe a fog along the edge of the object. Typically the “fog” is black, but it can appear white, under certain conditions.) The static portion of the aether is entrained by the motions of existing matter/masses, as has been proved experimentally. [Aspden]

Propagation velocities in the static portions of the aether are minimal and the local infinitesimals tend remain attached to pre-existing matter, unless disturbed by some manner of perturbation, whereupon the infinitesimals and “inertons” [Krasnolohovets], which have been imaged as forming the atmosphere of the electron, are disbursed into the Plenum with velocities up to an infinite velocity. All infinitesimals carry within them, memories of everything they have ever experienced, in the form of environmental influences and Consciousness-related factors.

The information transported is comprised of scalar-originated, zero magnitude (quantum potential), multi-dimensional, analog, experiential information (qualia). The various fields and forces, and the motional portions of SubQuantum aether also convey Consciousness-Originated information factors, such as emotions, experiential information, personality, states of Being, Attention, Intention, and so on.

When information is conveyed by the vehicle of a given field, the information density conveyed by that field, falls off as $1/r$. Directed information acts similarly to coherent laser light, with beam minimal divergence. Directed information is coherent information, cohered through informational resonances between the sender and the target. Cohered information has almost a zero divergence between the two end-points. Directed and bi-directionally cohered experiential information density has been observed to fall off as approximately the cube root of r , $1/r^{-3}$.

Obviously, the propagation velocity of a field has direct bearing on the propagation velocity of the information conveyed by that field. Information propagation can have any velocity, ranging from zero velocity, to an infinite velocity. The speed of light is just a small slot in the numbers of different propagation velocities of experiential information which are allowed, and observed.

Universal omnipresent non-local, and localized information, is not found in Nature in any binary, or digital form, in either the static or motional portions of the SubQuantum infinitesimal aether. Experiential eidetic information is always analog, and, as with all analog-to-digital conversions (A/D), analog information is lost during any A/D process. More rapid A/D sampling rates, result in lower losses of analog information.

All the diverse the kinds of information which are conveyed by infinitesimals and SubQuantum particle flows which are comprising the aether, are associated with all the known fields and forces, such as the non-local quantum information field. Information flows which are arising in matter-matter, matter-energy, energy-energy, and Being-Being interactions, are not subject to binary information limitations, nor are they subject to binary information density restrictions, such as Shannon's Law.

Mathematical treatments

SubQuantum Information storage and information transports are not involved with any metric. Due to this fact, many of the standard mathematical approaches used in common mathematical physics studies, cannot be used, especially where such mathematical approaches require a metric and/or must know "which way is up".

This situation excludes the quaternions, the Clifford algebras, the Caley algebra, and all related approaches. At this time, we are of the opinion that an infinitesimal n-body problem is the right approach. This approach is perfect for the Lie algebras of infinitesimals, since we must consider masses down to the almost infinitely small, the infinitesimal masses.

Then, to treat the infinite velocity variety of information transporting infinitesimals, the motional portion of the SubQuantum aether, a projective version of the Grassman algebra allows for these infinite velocity propagations, without any requirement for a metric, and no requirement for orthogonality, as required in the Clifford algebras, and related algebras, such as the Caley algebra. Nor does the Grassman algebra need to know "which way is up". (This allows us to avoid such obfuscating complications as Hilbert space.)

The Grassman algebra is perfect for infinite velocity situations, which are addressed by a Projective version of the Grassman algebra. Since the Grassman algebra is a graded algebra, it allows an approach similar to those which rely on the Clifford algebras, and can be used to treat the 6 dimensions which were originally

contained in the Maxwell equations, properly.

The Projective Grassman algebra allows us to perform analysis of infinite velocity SubQuantum systems. In infinite velocity systems, there are no “light cones”, nor are there any “null vectors”. Infinite velocity (non-local) considerations are properly treated by projective algebras. However, all relativistic considerations are completely removed from this kind of analysis. More on all this will come later.

[A. Berezin, *The Method of Second Quantization*, Academic Press, (1966)] [D.J. Candlin (1956). "On Sums over Trajectories for Systems With Fermi Statistics". *Nuovo Cimento* 4: 231.]

Quantum Phase-States of the Quantum Potential

Combining the Projective Grassman algebra with the Lie algebras aligns us with Tony Smith's D-4, D-5, E-6, E-7, E-8 Lie algebra-based physics, and allows us to properly treat SubQuantum systems of infinite velocity infinitesimals, as well as to model the static and semi-static varieties of information which are involved in the Quantum Phase States of Quantum Matter. Quantum phase states range from gas-like to fluid-like to plastic, to solid, to crystalline, and are considered to be static varieties of the SubQuantum infinitesimal aether, relative to the quantum field.

The 5 quantum phase-states may have some relation to the 5 varieties of aether as astrophysically observed by Mishin, and Kozyrev. Whether the quantum phase states are directly related to the 5 phase states of the aether, is not clear at this time. More on all this will come in a later exposition.

The Schrodinger equation allows us to consider $\partial / \partial t$, the rate of change with respect to time, but does not allow us to consider changes in the pace of time (The pace of time is a variant.), with respect to changes in velocity, for example. Variations in the pace of time are caused by delta grad E actions, which simultaneously cause changes in the speed of transverse E/M propagations, changes in the force due to gravitation, changes in the pace of time, changes of inertial mass, and divergences in the quantum potential, as well as changing the permittivity and permeability of the "vacuum" SQ plenum, for the duration of the event, throughout the influenced volume.

Rest energy of matter is not an invariant either, so there are many complications here that have never been addressed before. Indeed rest mass, written as μ , is

$$\mu = (M_e^2 - p^2)^{1/2},$$

where mass/energy, $M_e = (\mu^2 + p^2)^{1/2}$,

is dependent on the aether flux density through the volume of the mass, per unit time, as is inertial mass. Inertial mass can of course be another variant, complicated again by aether fluxes through the volume of the inertial mass, which aether flux densities are stochastic over large spans of time.

Once we leave the comfort of the "known" physics, all manner of complications are upon us, which, interestingly enough, lead to a much more natural and intuitively satisfying understanding of the inner workings of the Universe. At the same time, the results which arise from SubQuantum analysis produce results which are easy to comprehend, from a top-down perspective (which is actually a bottom-up perspective). This simplifies understanding the Macro-Universe (cosmology), as well as the micro-universe (nano-scale and smaller).

This approach has unified all the sciences under one umbrella: the activities and agglomerations of SubQuantum aether and its origination of the non-local quantum information field, the quantum potential, non-local and localized versions of quantum "entanglement", and so on. [our ZG pubs]

Uniqueness (Personality) is Ubiquitous

No two snowflakes are alike. Every snowflake is unique. Why is that? Uniqueness is an often neglected, but essential element of the physics. There is a tendency for the intellect to create continuity and uniformity, even where such uniformity does not exist. One example of this tendency, which has unduly influenced modern physics, is the tendency to view the vacuum as a linear isotropic medium, which has identical properties at each location, and in every direction.

Astrophysical observations show this view is incorrect. The vacuum is a non-linear media, and is anisotropic. For instance, see:

<http://www.stsci.edu/science/preprints/prep1284/prep1284.html>

<http://www.stsci.edu/science/preprints/prep1257/prep1257.html>

<http://www.stsci.edu/science/preprints/rep1251/rep1251.html>

<http://www.stsci.edu/science/preprints/rep1243/rep1243.html>

<http://www.stsci.edu/science/preprints/rep1240/rep1240.html>

<http://www.aps.org/BAPSDPP98/abs/S2500019.html> http://sepwww.stanford.edu/oldreports/sep60/60_19.pdf http://stat.washington.edu/NCES/resource/papers/trs8_math/trs8_math.pdf

An important finding:

<http://www.urc.ukans.edu/News/97N/AprNews/Apr17/ralston.html>

<http://www.spie.org/web/oer/june/jun97/axis.html>

Non-linearities not only include this above observation of spatial anisotropy and local variations in particle densities, but there are extant theories of non-linear, stochastic, and condition-variable metrics. In addition, there are constant variations, with time, at any point in space, in the intensities and frequencies of the various electromagnetic radiations which pass through that given point. Indeed, the gravitational theory described by relativity has a non-linear basis. Quantum theory also requires that spatial anisotropies must exist in order for the quantum theory to be correctly predictive. This is the Heisenberg Uncertainty relation, which has limited domains of applicability, but seems to hold in astrophysical considerations that are not involving infinite velocity propagations. [Dehmelt, Boyd]

Further, consider Zitterbewegung and the zero point quantum fluctuations of the vacuum at the order of 10^{-66} cm^{-2} (See "Gravitation" Misner, Thorne, and Wheeler at page 480). Topological physics also point at non-linearities and spatial anisotropies. (For example, see: <http://www22.pair.com/csdc/car/carfre77.htm>)

The combination of these observations leads us to understand that any point in space must be considered as unique, for various physical reasons. Of further and large importance to this understanding is the fact of the memory of the vacuum shown by Garjajev, et. al., at:

<http://worlds-within-worlds.org/resources/GarFried06-01.doc>

PoPONIN's model of the vacuum's memory shows that this memory function behaves as the Hamiltonian of a loosely coupled (anharmonic) N-dimensional system of non-linear oscillators. This description results from empirical observations in a series of experiments, first done at Lebedev University in Russia.

In these experiments, the vacuum retained electromagnetic copies of that which had occupied the volume, for up to 30 days after the material was removed! This informs us again of nonuniformity, because such memories must be unique in each given volume, with variations over time. The fact that the SQ aether is the retainer of such information is almost beyond question.

It is likely that the personality of the human being is imprinted in the vacuum memory by the consciousness of the human being. This possibility is enhanced when considering that the emotional condition of the operators of symplectic E/M transmission facilities directly alters the instrumented radiated patterns of the symplectic antenna, as mentioned earlier. [See: Emoto]

We consider chaos theory and organization theory, and find further evidences of uniqueness. As we observe the Natural world around us, we discover that each living entity is observably possessed of this property of Uniqueness.

When a human being is born into the world the child immediately evidences preferences by way of color, style, and so on, choosing among various items they are presented, unique to that individual. We observe no two human faces, fingerprints, etc., are the same. We find from various personality studies that the various forms of life are all possessed of personality. The fact of Uniqueness is inescapable.

Uniqueness is inherent in Reality at all scales, and cannot be avoided. Even mass-produced items such as automobile parts, incur the effects of the inherent Uniqueness factors which are built into all space and all matter. For example, auto parts which are produced on Wednesday will not fit with corresponding parts made on Thursday. (This fact is well known in the auto industry and is well accounted for, by this time.)

Almost anyone who has driven automobiles for many years will agree that cars develop personalities, which become more noticeable as the car ages. (And this is not merely due to mechanical and electrical wear factors.) As a rule, the more accurate are the tolerances required for the parts, the more blatantly obvious is the difference between “identical” parts, made on different days.

Part of what causes this is the fact that the Universe is exceedingly anisotropic, in both temporal and volumetric considerations, where these volumetric anisotropies are clearly shown in astrophysical studies, such as those mentioned above.

Another primary cause is the SubQuantum information field, which gives space a localized personality, with a signature which changes with time.

Another cause has been traced to sub-light informational radiations emanating from stellar and galactic bodies, which have been called “Odic radiations” or “Od”. Due to Odic radiations, the positions of the planets and stars have direct, but subtle, influences, on the informational environment of the earth. [Reichenbach]

Another cause is that the “inertons” [Krasnoholovets] and SubQuantum particles which comprise the atmosphere of all material forms, take on information from other information-bearing particles in the static portion of the aether, which forms the ambient informational environment, along with motional portions of the aether, which convey information from interstellar space, and from the implicate order [Bohm].

The personalities of auto parts change day to day, in undeniable ways. Fortunately for the industry, the primary personality influences occur during the manufacturing process and capture the informational signatures and variants, which were ambient during the making of the part, especially if the part underwent a phase transition from plasticity to solid. Then each part made on that day, holds that information in stasis, for many years thereafter.

We suspect that the uniqueness of snowflakes is due to similar environmental informational factors which change at every time and in every place, due to the influx of information-bearing SubQuantum particles which are the cause of gravitation, and are ubiquitous.

These personality factors become embedded in the water at the time water droplet undergoes the phase transition from fluid to crystalline solid, thus resulting an information capture, similar to what happens during the manufacture of car parts.

Because the informational influences are different at every location and vary with each passing moment, every snowflake turns out as unique. Studies of snowflake shapes might eventually become an important instrumentation device for detecting various informational factors present in the ambient environment, at a given time and place.

Astrophysical and Geophysical Large-Volume “Cells” with Personalities

As described above, it is well known that interstellar space is exceedingly anisotropic in many regards, including informationally.

“Space is filled with a network of currents which transfer energy and momentum over large or very large distances. The currents often pinch to filamentary or

surface currents. The latter are likely to give space, as also interstellar and intergalactic space, a cellular structure.” ~*Hannes Alfvén*, Nobel Prize Laureate. [H. Alfvén, *Cosmic Plasma*. Reidel: New York, 1981]

Personality cells in interstellar plasmas can produce personality signatures in cells of land, as has been studied extensively in Russia over the course of several decades, using instrumentation such as the Russian-made Aether Flux Density Meter (AFDM), plant-based instruments, and gifted intuitives. [Bergstrom, Arne: *Physical Review* 26: 720 (1955).] [Frolov]

Indeed, the slowing of the aether fluxes by interactions with electrons, in particular, results in the formation of additional electrons, where electrons are modeled as whirlpools composed of subquantum aether particles. All these processes involve the SubQuantum aether and act to convey information interactively, in the manner of the quantum information field.

Non-local, and local, Consciousness information transferences have been in common use for centuries, as exemplified by Cherokee daily life-support practices. See: <http://www.zengardner.com/inner-workings-reality/>

Local and Non-local Information Storage and Transport

Dr. Huping Hu, MD and Dr. Maoxin Wu, MD, performed an astounding set of experiments involving information transferences. In the first experiment, volunteers sat in a dental chair and were strapped in. Prior to this, in preparation a large transparent container of anesthetic, of a type used in major surgery was placed on a table. Next to that container was placed a transparent container filled with pure water. An ordinary flashlight (Maglitetm) was aimed so that light went through the anesthetic and passed also, through the container of water, along the same line. The flashlight was kept turned on for a moderate span of time, then turned off.

Then the volunteers who sat in the dental chair were asked to drink a glass of the water that had been “treated” by the light from the flashlight, after having passed through the anesthetic. Within minutes the volunteer would pass out. By all normal tests for the effectiveness of anesthetic, these persons were clinically anesthetized, from drinking the water.

The light from the flashlight, on encountering the container of anesthetic, copied information from the anesthetic and carried it along where the information of the

anesthetic was deposited in the water. Volunteers who drank the water all became clinically anesthetized.

In another remarkable experiment, the pH of a solution was directly and non-chemically changed by information transferred from an identical set-up, located many miles away from the local set-up. Remote changes of pH were charted.

Another experiment caused temperature variations during remote manipulations of water at a remote site which had become quantum entangled with the water at the local measuring site. Remote information-controlled changes of local water temperature were charted.

In the most remarkable experimental result, water which had been quantum entangled was sent to local and remote test sites, some 2000 miles apart. When the water at the remote site was manipulated by boiling and freezing water, local variations in mass density and weight were measured and catalogued.

These amazing results have had little media attention, although a paper regarding these experiments has been published in Progress in Physics, and is available here: http://ptep-online.com/index_files/2007/PP-09-03.PDF

During 2015 a set of experiments involving light from a Class IIIa 500 mw red Laser Diode pointer were performed, where information from various substances was picked up by the laser light and conveyed into the human body by way of a simple aluminum reflector attached to the light emitting end of the laser such that the open end of the cone pointed in the same direction as the laser light. It was found that the “dosage” of whatever was being captured by the laser light and reflected into the person’s bloodstream by the laser light passing through the skin, was related to time exposure and the person’s unique body chemistry.

Except, medications and herbs introduced into the body by the laser light reflecting off the substance, and then off the conical reflector, then into the skin, exhibited no side effects, no drug interactions, and no after-effects. The Ambient Intelligence is directly involved in this process and prevents any untoward or harmful information from being inserted into the light stream. This has promise as an adjuvant treatment for various physical ailments. Boyd released this treatment modality to the science community in 2015, without compensation, for potentially rapid public benefits.

A commercially available laser treatment package is available which relies on laser light passing through a transparent container which has been filled with a medication solution in water. See the commercial product line illustrated here:

[Finally a Cat Allergy Treatment That Works - The Allergy Kit](#)

For another remarkable result, this simple apparatus has demonstrated stopping heart attacks and strokes within seconds, based on information transports and directly involving the Ambient Intelligence. These results arise from bending a copper wire wrapped in a loop and secured around a rock. This effect can be used on oneself, or selected others, and cannot be used to harm another life. It has been tested to an effective range of 2000 miles, and appears to operate non-locally: <http://worlds-within-worlds.org/harmoniser.php>

The Operational Mechanics of Morphogenic Fields

The SubQuantum aether conveys holographic information originating from the Intelligent Universe to mold the Environmentally Interactive Morphogenic Fields, which produce Life-Forms.

Sheldrake's morphogenic field is primarily made from the static portion of the information-bearing SubQuantum aether. Information is imprinted on the surrounding physical matter by a process which involves informational coherence of holographically informationally encoded SQ infinitesimals.

There is a volume comprising a sphere of influence which is the plant seed's informational hologram, which holographic information imprints the aether atmosphere which interpenetrates the physical matter of the seed and the surrounding environment, informationally conditioning the static portions of the aether in the materials that are surrounding the seed in the immediate environment.

This was described earlier as the plastic (semi-fluid) Quantum Phase-State, which is describing Quantum Matter, in one of the several stages of SubQuantum information manifesting a material form. [Also see: Tiller regarding informational conditioning of environments.]

There is an interaction between the static aether-space informed by the seed, and the Ambient Intelligence, such that optimal environmental support is provided for that seed under those circumstances, in that location, relative to the life forms that will have interactions with that region in the future, weather planning, and so on.

The interaction between the seed information and the Ambient Intelligence coheres the morphogenic field information such that the future of the plant in its mature form is part of the conditioned volume which surrounds the plant as it grows towards maturity.

There is an interaction between the static aether-space informed by the seed, and the Ambient Intelligence, such that optimal environmental support is provided for that seed under those circumstances, in that location, relative to the life forms that will have interactions with that region in the future, weather planning, and so on.

The planning stage includes plant-specific relevant considerations such as the availability of supporting bacteria, earth worms, lighting, mineral availability, pollinating insect availability, weather planning factors, and climate planning. All these factors are reflected in the hologram of the plant-to-be, and are contained in its holographic information-cohered morphogenic planning stencil.

Local factors of the informational environment and the local Ambient Intelligence are more relevant to the localized informational coherence provided to the planning stage of the growth of the plant-to-be, than are the environmental factors imposed by the Cosmic Harmony/Intelligent Universe portion of the localized quantum plastic-phase state, information field. There is a hierarchical relation which goes from microscopic to macroscopic, and the other way around, where both flows are, at the same time, made from bi-directional flows of SQ-conveyed information. [Thornhill: <https://youtu.be/zELjb6iDjL8?t=132>]

As described by Tiller, the Maxwell equations are involved in this process, in terms of the original aether foundations of the Maxwell equations, as described by Maxwell, but not in exactly the form of the mathematical relations described by Tiller, who wants to involve a hyperspace component to describe the process of creating a “conditioned space”, by information “conditioning” the space. [See: <https://youtu.be/1vB9SPsmYIk>]

Instead, we are involving the static portion of the SQ aether in the form of an information-driven quantum matter phase-state, analogous to a semi-fluid (plastic) matter phase-state. This quantum semi-fluid (plastic) phase acts in the manner of the analogous physical form of matter, controlled by informational coherence (caused by various resonances), which is originating from the plant seed and to environmental considerations which act as unique modifications of the seed information, which are imposed on the individual plant-to-be, by the Ambient Intelligence.

The Quantum Phase-States of Quantum Matter are stages in the precipitation of “observables”. Quantum Phase-States are stages of increasing negentropy (increasing organization) in the quantum field. This understanding is directly

related to Stapp's original "Quantum matter" expressions and Boyd's "Quantum Phase-States" as an extension of Stapp's Quantum Matter.

For example, a selected color can be transmitted from a sending Being and received experientially by another being, through the faculty of intention-directed attention, along with the color, on the part of the sender, which information is then received as a direct experience of the receiving being, through the faculty of Attention, as that color which was transmitted. Intention-attention combinations can be directed with a "look here" emphasis, so as to gain the Attention of the targeted Observer (Experiencer).

Information flows are not experienced as random or chaotic, but are dependent upon resonance factors existing between the source and the destination points. Experiential (eidetic) information can be directed, or non-directed. It can be local, or non-local. It can be locally stored, or transient. All the above discussion applies to personality cells of the land and to such entities as mountains. Everything has personality, including mountains and clouds. This applies from the infinitesimal Bhutamas, to galaxies, to clusters of galaxies, to the infinitely large.

As a general rule, SQ information density falls off as $1/r$ from the origin, unless directed by the intender to a specific target, through the attainment of a resonance with the personality, emotional states, states of Being, or informational resonance, with the target selected. Consciousness resonances result in a bi-directional flux of information-bearing infinitesimals, which can actually become visible to the unaided eye in certain situations, visible as black threads during the day, or a white bi-directional radiance, at night. This white radiance was known as "Aolea" by several European groups of medieval scholars who were involved with studying Consciousness in Nature, in the manner of Goethe. [Vassilatos]

Limitations of the Mind in Interacting with an Intelligent Universe

The Intelligent Universe designs and constantly intends, all the factors required to produce and support life and Consciousness, in all forms, everywhere there is a place. In these activities and intentions, the Cosmic Harmony Principle is the overarching theme, which pervades all things from the cosmic intergalactic scale, to your back yard. Every breeze, every snowflake, every sunny day, every rainy day, are all part of the planning and execution of a Life-Sustaining Harmonious environment, in which

all of Nature constantly participates. All forms of Consciousness are given Free Will, within the context of Harmony-Life considerations.

The intellect, the analytical mind, is the origination of narcissism and ego. The analytical mind is composed of, and based on, the past. When the attention is not on the past, one is Living in the present moment and is experiencing directly all the senses and sensitivities, in a process known as "Living". When the attention is on the past, sensitivities and sensory data diminish to insignificance or vanish altogether. This is the result of intellectual abstractions, based on the accumulated past. The historically indoctrinated analytical mind is the cause of psychological pain and suffering, and is the origin of most mistakes. The faculty of attention is the rudder of what one experiences as their reality.

Intellectually indoctrinated human beings on this planet have become the un-Natural, always thinking, an exception to the Life-Sustaining Universal Harmony Principle. This has occurred as a result of the desires of intellectually-originated narcissistic un-Natural human intentions to have societal "prestige", societal "power" and un-Natural forms of "wealth". Such ego-centered analytical intentions are the originating cause of wars and all human-originated disasters. Such un-Natural destructive behaviors are easily seen to be a failed paradigm.

The trend of human behavior on this planet, needs to revert towards the Natural Harmony, as is constantly being Created by design, in the activities of the Life Support provided by the Ambient Intelligence and the Intelligent Universe. The Indigenous Peoples know this full well, as they have never left the Natural Harmony Principles in pursuit of ephemeral "prestige" baubles and symbolic "advantages".

Nor do Indigenous Peoples pursue behaviors and goals which directly interfere with the Natural Life Support Systems which are inherent to this planet, by design, in the Intelligent Universe. The understandings of the Indigenous Peoples are the right understandings about how to live in Harmony with the Harmonious Universe.

Free will is inviolable, in the Nature Ways. Yet, all of Nature is involved in the Cosmic Harmony, at all times, while at the same time, they have perfect freedom to follow their individual inclinations and choices.

This general rule holds true throughout Nature, except where unbalanced, competitive, and indoctrinated-to-be narcissistic, and insane, humans, ignorantly and incorrectly pursue deviant life-destructive behaviors. Such behaviors are blatantly contradictory to the Cosmic Harmony Principle and the processes of the Natural

Environment which is constantly creating Life-Support, for all varieties of Consciousness.

Technologies aimed at destroying life, are exactly the opposite of what technologies should be aimed at, which is Supporting Life. Harmony-Life in all forms, is the underlying theme of All Reality.

As part of the way Life is designed, everything has to eat something to live. But God did not make, and does not make, "machine gun bushes" or "tank trees" as any part of the Natural Environment.

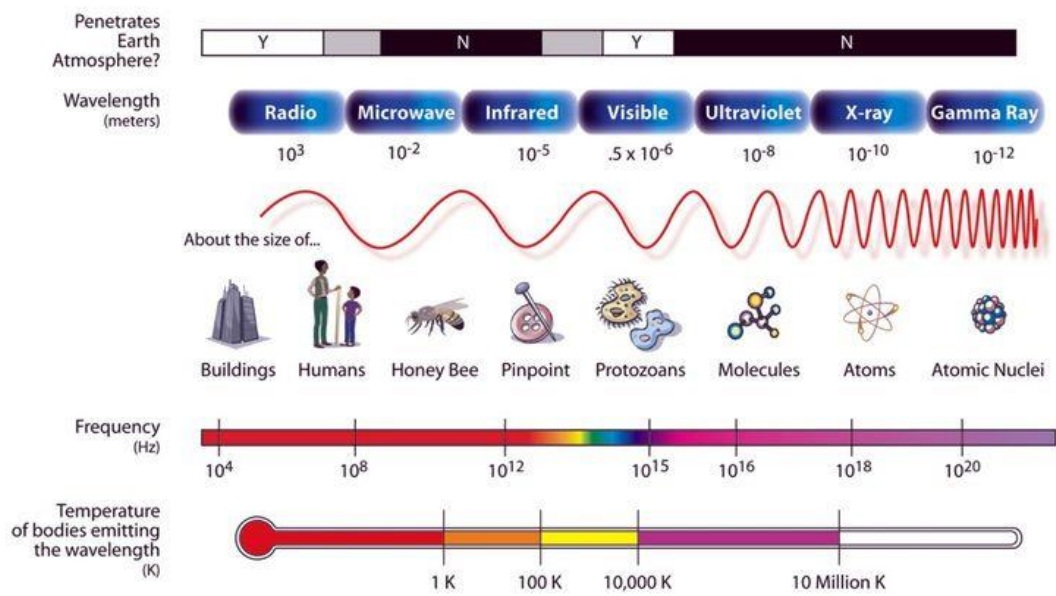
People do that, out of an indoctrinated insanity which separates them from the Harmony Principle, and Nature, and the Divine, by way of abstract intellectual prejudice-creating conditioning, imposed on the population.

This populace-conditioning process is caused by the portions of society that want egocentric "advantages", and "rank" and "prestige", at the expense of others; who psychopathically care nothing about the suffering nor death of any living being which might in any way impede their obtaining of their shallow and selfish "gratifications".

The destructive dissolving principle called Shiva, can never "conquer" the principles of Brahma (creation) and Vishnu (sustenance). There can be local imbalances, but over time, harmony and balance among the 3 Universal Cosmic Principles is inevitably and irrevocably restored. That is the way the universe is designed, and how it operates, and nothing can change it, except locally, for small spans of time.

There is nothing "random" about these processes in Cosmic scheme of things, which are designed and guided, in the overview, by the Intelligent Universe. When the time comes, Balance among the 3 Principles is always restored. Clearly it is time to rebalance and restore our world, and ourselves, to Natural Harmony. An inevitable return to Nature's Harmony is in progress. The Tao always wins.

THE ELECTROMAGNETIC SPECTRUM



Slobodan Nedic & V.A. Atsyukovsky

LONGITUDINAL WAVE IN ELECTROMAGNETISM :

Towards Consistent Theoretical Framework for Tesla's Energy and Information Transmission

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Abstract

Starting from general expectations that the generation, propagation and reception of longitudinal electromagnetic waves in vacuum could provide basis for wireless energy transmission and efficient wireless communication, this paper contributes to overcoming limitations and constraints of the classical Maxwell's equations framework. That is achieved by confronting the criticism of at least one currently available theoretical scalar waves formulations with a few of the important work results related to scrutinizing of the very foundations of Maxwell's equations. Also indicated is the ability of the formulation of such phenomena in their present form. By overcoming the traditional constraints and long-held views/convictions regarding non-availability of longitudinal, that is scalar mechanism generated and propagated in the vacuum, theoretical framework can be created for synergetic approach between wireless energy and information transmission in line with Tesla's more than a century old views, convictions and conducted experiments.

Key Words: Longitudinal Electromagnetic Waves; Advanced Electromagnetism; Future Wireless Communications

I. Introduction

The currently exploited mechanism for electromagnetic propagation via transverse fields involves radiation of antenna elements in all directions, so that on the average only a millionth part of the radiated energy acts at the intended destinations, including the ('massive') MIMO systems. The alternative mechanism, which is the coexistent longitudinal electromagnetic propagation, is commonly understood as having been 'thrown-out' from the official electrodynamics, formulated by simplifications introduced by Heaviside, Gibbs, and Hertz based on the already well-established Ampere's and Faraday's laws, resulting in absence of divergence of magnetic induction (\mathbf{B}) and the temporal variability of the electric induction (\mathbf{D}). Tesla's very early insistence on the existence of, and the importance of, an equally important longitudinal mechanism have been attempted, notably by Prof. Konstantin Meyl [1], in particular the most recent re-formulation after discovery of magnetic monopoles in the Helmholtz Institute, as well as extensions of electromagnetics equations by Gennady Nikolaev [2] (introduction of the longitudinal magnetic field as result of non-zero divergence of the magnetic vector potential, \mathbf{A}), and in particular by Vladimir Atsukovsky [3] (involvement of the time-variable electro/magnetic induction). The latter one provides very compelling representations of the realm of electromagnetics as dynamics of the particular viscous and compressive gaseous fluid, which allows for formation and disintegration of toroidal vortex structures [4,5], implicitly supporting the gyroscopic particles as the basic elements of the Ether substance.

As demonstrated by the Tesla's Magnifying Transmitter (TMT) configuration, which has been replicated many times, especially within the last two to three decades, [1] the energy transmitted by mediation of so-called Scalar Waves is thought to be circulating in the system until being absorbed by the matched receiver. Although Tesla had talked about

propagation of such waves in the Ether, what he essentially attained was officially understood as the longitudinal, progressive standing waves through Earth and/or ionized media. However, based on the insights gained from the aetherodynamical mechanism of magnetic induction [3] Tesla did effectively attain the extraction of energy from the Aether substrate, thus confirming his adamant non-acceptance of the 2-nd law of thermodynamics (https://www.drop-box.com/sh/e3zhyzaiedxu6dv/AABOzzgwiGFr452F_dqfnTrXa?dl=0). In this regard, the now largely actualized ‘linear magnetism’ (magnetic field vector co-linear with the direction of energy propagation) appears to be the crucial phenomenon relevant to both supra-luminal transmission speed and energy efficiency in free air or vacuum, as it appears to be the case in biological systems.

Although Tesla’s primary usage of the waves was conceived to be for both energy supply and communications purposes, the energy transmission has been and remained his main goal, with the synergetic inclusion of the (land, sea and air) vehicles’ controlling functionality. While the wireless energy transmission itself can be considered as a much more advantageous (in terms of energy losses – in Tesla’s one-wire system the energy actually flows around a very thin conductor), its significance in the domain of wireless cellular and sensors network, as well as in health applications becomes very welcome, maybe even indispensable.

In this paper, Sect. 2 overviews some relevant work results of other authors on scrutinizing the very foundations Maxwell’s equations, and their extension, or amendment, while the following Sect. 3, in its first part contributes to overcoming limitations and constraints of the framework of classical Maxwell’s equations. In particular, it goes about conciliating the formally justifiable critics of the currently only proponent of theoretical and practical aspects of the so-called scalar waves technology. In the second part of Sect. 3, the existence of the longitudinal waves is demonstrated with the Maxwell’s equations themselves, through application of the traditional formalism of using (electric) scalar and vector (magnetic) potentials. A hint of relatedness of these two aspects has been also provided. In the context of historical developments regarding the synergetic approach to wireless energy transmission and communications, certain practical longitudinal waves related transceiver options based on alternative dipole configurations are briefly overviewed in Sect. 4.

II. Overview of Relevant Works in Post-Maxwellian Electromagnetism

Ever since their introductions by Maxwell in the second half of the nineteenth century of the set of linear differential equations and subsequent reformulations by Heaviside and Gibbs to essentially involve the vector analysis notations instead of the just partially used quaternions algebra, despite occasional difficulties in their application to diverse practical problems, they have retained their original form (Table I - without underlined terms, and with equal sign instead of arrow).

A direct critic of these equations is hardly to be found in the open literature. The only two rather comprehensive treatises are [2] and [3], based on extensive sets of experiments and complementary regarding respective emphasis on electric and magnetic aspects of the electromagnetic field. While both authors rely on etheric nature of electricity and magnetism, the first one has developed a consistent and very compelling model of Ether as a gaseous substance with viscosity and compressibility features.

In the following is provided an overview of the main findings.

A. Work related to Atsukovsky’s treatise [3]

In his very long career as an electrical engineer and academician, based on insights into Ether substrate as a gaseous substance exhibiting both compressibility and viscosity – the features that either one or both were missing from all previous conceptualizations and postulations, Atsukovsky [9] developed a very consistent and compelling theory of Etherodynamics, comprising all structures and phenomena from the atomic to galactic levels. Based on this, Atsukovsky came up with differential form of electromagnetic field equations taking an extended and largely improved form (Table I, underlined terms added):

TABLE I. AMENDED MAXWELL’S EQUATIONS IN DIFFERENTIAL FORM

1.	$\nabla \times \underline{E}_\varphi \Leftrightarrow \underline{\delta}_M = -\mu_0 \frac{\partial}{\partial t} (\underline{H}_\psi + \underline{H}_\Sigma)$	
2.	$\nabla \times \underline{H}_\psi \Leftrightarrow \underline{\delta}_e = \left(\sigma + \varepsilon \varepsilon_0 \frac{\partial}{\partial t} \right) (\underline{E}_\varphi + \underline{E}_\Sigma)$	
3.	$\nabla \cdot \underline{D} + \frac{\partial \underline{D}}{c \partial t} = \rho;$	*
	$\nabla \cdot \underline{\delta}_e + \frac{\partial \underline{\delta}_e}{c \partial t} = 0;$	*
4.	$\nabla \cdot \underline{\nabla} B + \frac{\partial}{\partial t} \left(\frac{\underline{\nabla} B}{c} \right) = 0;$	*

Here \mathbf{D} is the vector of electric induction, δ_e is the vector of electric current density in a medium, \mathbf{B} is the vector of magnetic induction. The footnote that goes along the equations marked by * is that division of vectors \mathbf{D} , δ_e , and ∇B by vector \mathbf{c} means that those vectors are collinear; that is, they have exactly the same direction. As usual, \mathbf{E} and \mathbf{H} are, respectively, the electric and magnetic fields; $\mathbf{D} = \epsilon\mathbf{E}$ and $\mathbf{B} = \mu\mathbf{H}$ are, respectively, electric and magnetic inductions, and ϵ is electric permittivity and μ is magnetic permeability of the medium, δ_e is the electric current density (in place of the usual $\mathbf{j} = \sigma\mathbf{E}$), and δ_m is the magnetic current density counterpart, and σ is the electrical conductivity of the medium; ρ is the density of electric charge in the medium. The vectors (letters in Bold) and scalars (other than constants) are generally functions of position within a selected coordinate system and of the time.

The first feature of the extended, *i.e.* largely improved, set of differential Maxwell's equations are two forms of asymmetry introduced – regarding the cause-effect (the first two equations do not apply in both directions) and presence of generally different electric and magnetic field strength vectors, both in the first two equations. (The additional terms within the brackets denoted by index ‘ Σ ’ stand for the fields components external to the considered elementary volumes of the medium, and more close elaboration and justification of that can be inferred from [3].) These asymmetries might be the features that were inherently present in Maxwell's second and third formulations of electromagnetism based on quaternion algebra, due primarily to the non-commutativity of the multiplication operation.

The second extension featured by the amended Maxwell's equations of the prime relevance to this paper's topic are the non-zero divergences of both electric and magnetic fields (the third and fourth equations) in absence of the free-charges, arrived at exactly based of the dynamical features and the Ether regarding its compressibility. Implicitly, the related electric and (the gradient of) magnetic inductions are ‘intimately’ related to velocity of propagation through to the quite unusual division of the two vectors. Rather than looking at this operation as conventional scalar multiplication, in that the velocity vector is ‘inverted’, this should be treated through the so-called the real division algebra, where quaternions represent the basis. The extended integral equations then follow:

TABELA I. MAXWELL'S EQUATIONS IN INTEGRAL FORM

1.	$e = \int_l \mathbf{E}(t - \underline{r}/c) \cdot d\mathbf{l} \Leftarrow -d\Phi_m(t) / dt$
2.	$e_M = \int_l \mathbf{H}(t - \underline{r}/c) \cdot d\mathbf{l} \Leftarrow \mathbf{i}(t) = dq(t) / dt$
3.	$\Phi_e = \int_s \mathbf{D}(t - \underline{r}/c) \cdot d\mathbf{S} \Leftarrow q(t)$
4.	$\Phi_M = \int_s \mathbf{B} \cdot d\mathbf{S} = 0$

Here Φ_e and Φ_m are electric and magnetic fluxes; I is electric current in conductor; q is charge moving in direction of electric current (directed movement gives to the latter two the vector form).

Based on conceiving Ether as a gaseous fluid of elementary particles, named “a’mer(s)” (in tribute to Demokrit), in deference to all previous models, including those of Maxwell, Helmholtz, Lord Kelvin, *etc.*, with exception of only Tait and Tesla, in [3], and in [9] in a more general context of a universe on all scales (essentially tied in itself in a kind of ‘recycling’ process), Atsukovsky [3] has established a basic, essentially dynamically stable toroidally shaped structures, which further organize into higher level configurations through the very basic mechanism of velocity/temperature/pressure gradients, the very same mechanisms by which at certain stages the structures get gradually disintegrated. Regarding the very basic proton and electron configurations, it goes about the flows of the Ether fluid elements forming the torus-like geometry, that is a toroidal vortex structure, in that its velocity in the ring direction lies in the nature of electricity (plus sign, in one direction; minus sign in the other), while the velocity of the very same “fluid” elements over ‘meridians’ of the same torus represent the (mono-polar?!) magnetic charges.

This has strong support in some of the formulations of generally non-linear fluid dynamics equations, where the fluid element represents a tiny elongated gyroscopic (with rotation along its axis) ‘prisms’ (featuring the precession effects, which might account for both the viscosity and compressibility features), [4], and (in light of discussion above) a kind of an omnipresent sponge with a huge ‘spaghetti’, which represent a latent capability for creation of any of imaginable vector (magnetic) potentials, and/or monopole-like ‘charges’, whether of (di-)electric or magnetic types. In that sense, the effective electric and magnetic charges can arise under

influence of remote (and intermediately materialized) ones, due to process of intermediately propagated induction, so that the conventional constraints regarding their absence in vacuum ($\nabla \cdot \mathbf{D} = 0$ and/or $\nabla \cdot \mathbf{B} = 0$) become unnecessary limiting and thus should largely become obsolete.

B. Related to Nikolaev's opus [2]

While Nikolaev has pointed to deficiencies of Maxwell's equations mostly in similar aspects, as did Atsukovsky (referred to only as an example of the people who came from the academia circles, and still have scrutinized the classical electromagnetics/electrodynamics foundations), he addressed them primarily from the viewpoint of applicability of the magnetic vector potential \mathbf{A} . On one side, he pursues and exploits the physicality of the (vacuum) displacement current (rate of change of the electrical induction field \mathbf{D}) when it comes to overcoming the inconsistencies of the Maxwell's equations regarding the problems of non-locality, and on the other, he overcomes the lack of correspondence of the measurement results in case of open-current loops (for example, linear dipole antenna) with calculations when only one component of magnetic field ($\mathbf{H} = \nabla \times \mathbf{A}$) is evaluated (with known distribution of displacement current), while as usually assuming that $\nabla \cdot \mathbf{A} = 0$. Namely, in such situation, the solution produced does not satisfy the outgoing Maxwell's equations. The full correspondence is attained only with the non-zero magnetic vector potential.

The main result that Nikolaev came up with, and which may have some relevance in the subsequent considerations in this paper, is related to the necessity to generally account for two forms of the magnetic field – the conventional, 'normal' to direction of a current ($\mathbf{H}_{\perp} = \nabla \times \mathbf{A}$) and the new one, with direction parallel to current flow ($H_{\parallel} = -\nabla \cdot \mathbf{A}$). Nikolaev named the latter component *the second, or scalar, magnetic field*. It could be related to the recently introduced 'linear magnetism' related to electromagnetic activities of biological structures, and even 'elements transmutations'.

Considering the well-known detectability of the magnetic-field effects, even in cases where the magnetic field intensity does not exist (its intensity zero – the famous Aharonov-Bohm prediction in 1956 and related experiments), some recent engineering practices [8], and, finally, non-uniqueness of a magnetic vector potential regarding its curling measure representing the same ('normal') magnetic field ($\mathbf{A}' = \mathbf{A} + \nabla\psi$ and $\mathbf{H} = \nabla \times \mathbf{A}' = \nabla \times \mathbf{A}$, at least for time-independent scalar potential Ψ), actually suggest that it must be representing an aspect of the real (dynamical) structuring of the very Ether substrate. (One of the possible so-called gauge-transformations, the Ludwig Lorenz's one, is $\nabla \cdot \mathbf{A} = -\partial\phi / \partial t$, and depending on the particular form, various field options arise.)

III. Overcoming Barriers to Longitudinal Perturbation Phenomena in Electromagnetism

Ever since Maxwell's formulation of (firstly entirely algebraic, and later in the form of quaternions algebra, bearing much wider group asymmetry than tensors, and let alone vectors, which remain in the wide use as of today) equations that describe the electromagnetic phenomena, there have been no explicit constraints on the form of the related waves. Actually, the starting point was purely mechanical analysis and formulation of transmission of momentum through a medium, so that only its nature and features were to determine if generally both transverse and longitudinal, or just one of them, would be manifest.²⁴ Unfortunately, due to the available set of experimentally confirmed and heuristically derived laws on one side, and the postulated (ideal) features of the involved Ether medium (homogeneity, incompressibility and non-viscosity) on the other, the course of historical development was such that a rather paradoxical situation arose: only the transverse waves have 'survived', in spite of the ideal medium that actually should not allow them!?!

The above exposed and briefly replicated treatise of V.A. Atsukovsky undoubtedly provides foundations for both electromagnetic perturbations and their propagation through vacuum, that is through Aether, and not allowing for the presence of longitudinal waves in material media only. Notwithstanding historical aspects and missed opportunities, including Heaviside's "giant curled EM energy flow", the stances of the main-stream science are scrutinized bellow.

3.1 Traditional Wave-Equation Framework

In the context of the Laplace's homogenous (classical) wave equation

²⁴The LWave is the traveling (and/or stationary) longitudinal counterpart to the traveling (in modern terminology – transverse) electromagnetic (TEM) wave. Using the terminology from Maxwell's original treatises, it can be written as a longitudinal wave in the electromagnetic momentum where the electromagnetic momentum is curl-free (or nearly so). Langmuir's electrostatic plasma wave is one concrete example of a LWave. A brief account of the related historical development is to be found at <http://maxwellfluidcompression.blogspot.rs/>

$$c^2 \Delta W = \partial^2 W / \partial t^2 \quad , \quad (3)$$

its general solution has the form

$$W(\mathbf{r}, t) = W(t \pm r / v) \quad , \quad (4)$$

where v represents the speed of propagation, including the linear combination thereof. As a matter of fact, (3) had actually been derived by pre-supposing that very same ‘oscillatory-waving’ process.

By using the vector algebra, the identity for the Nabla, Δ (or Laplace’s ∇^2) operator on the left-hand side of (3) it can be written as

$$c^2 [\nabla(\nabla \cdot \mathbf{W}) - \nabla \times (\nabla \times \mathbf{W})] = \partial^2 \mathbf{W} / \partial t^2 \quad . \quad (5)$$

This was essentially exploited and varied in the early stage of work of Prof. Meyl [1] towards formulation of the electromagnetic equations which would encompass both transversal and longitudinal waves propagation mechanism in vacuum, that is in a medium without free charges. In doing so, essentially the first and the second Maxwell’s equations are taken ($\nabla \times \mathbf{E} = -\partial \mathbf{B} / \partial t$; $\nabla \times \mathbf{H} = \partial \mathbf{D} / \partial t$; with $\mathbf{j} = \mathbf{0}$ in the latter one), by applying the rotor operation on both, along the connection between electric induction and electric field strength ($\mathbf{B} = \mu \mathbf{H}$), and between the magnetic induction and the magnetic field strength ($\mathbf{D} = \varepsilon \mathbf{E}$) to arrive at the same form for the both electromagnetic field components in form

$$c^2 [\nabla(\nabla \cdot \mathbf{E}) - \nabla \times (\nabla \times \mathbf{E})] = \partial^2 \mathbf{E} / \partial t^2 \quad (6)$$

$$c^2 [\nabla(\nabla \cdot \mathbf{H}) - \nabla \times (\nabla \times \mathbf{H})] = \partial^2 \mathbf{H} / \partial t^2 \quad (7)$$

in Variant I.

Za autora/autore iz samo jedne institucije: Za promjenu načina prikaza i Another form, Variant II, has been derived from the so-called Faraday law and its ‘dual’ form, respectively: $\mathbf{E} = \mathbf{v} \times \mathbf{B}$ and $\mathbf{H} = -\mathbf{v} \times \mathbf{D}$:

$$v^2 [\nabla(\nabla \cdot \mathbf{E})] - c^2 \nabla \times (\nabla \times \mathbf{E}) = \partial^2 \mathbf{E} / \partial t^2 \quad (8)$$

$$v^2 [\nabla(\nabla \cdot \mathbf{H})] - c^2 \nabla \times (\nabla \times \mathbf{H}) = \partial^2 \mathbf{H} / \partial t^2 \quad (9)$$

The general understanding is that the second term in left-hand part is supposed to contribute to transverse propagating waves, and the first term to the longitudinally propagating one. The Variant II even predicts different velocities of the two. By strictly sticking to the unconditional validity of the Maxwell’s 3-rd and 4-rth equations, Prof. Bruhn [6] provided indications of untenability for the related interpretations, and incorrectness of certain derivations, ranging from the inability of these systems of equation to be ‘satisfied’ by the conventional plane-wave solution consisting from an out-going and an in-going wave (as though this is the only possible wave-solution that meets such an requirement), as well as the paradoxical (!) orthogonality of both field vectors with direction of propagation, while one of them should actually be collinear with it, if to propagate longitudinally (related to Variant II), and finally the obvious disappearance of the longitudinal component by the mere non- existence of either electric or magnetic inductions, as $\nabla \cdot \mathbf{D} = 0$; $\nabla \cdot \mathbf{B} = 0$.

Besides intrinsic limitation of the classical wave equation in its construction and the form of its solution, it involves an additional constraint – direct (implicit) relationship between the two components of the vector fields, \mathbf{E} and \mathbf{H} . Moreover, these forms are produced in retrofit, assuming $\nabla \cdot \mathbf{D} = 0$ and $\nabla \cdot \mathbf{B} = 0$ under which apply the equations

$$\Delta \mathbf{E} = \nabla(\nabla \cdot \mathbf{E}) - \nabla \times \nabla \times \mathbf{E} \quad \text{and} \quad \Delta \mathbf{H} = \nabla(\nabla \cdot \mathbf{H}) - \nabla \times \nabla \times \mathbf{H} .$$

This very well illustrates insurmountable difficulties and inappropriateness of attempting to overcome the rigidity of a certain theoretical framework, while still holding it ‘sacred’.

However, Atsukovsky’s critical analysis and amendment of most of the fundamental flaws of Faraday, Maxwell, Heaviside and Gibbs offer basis for overcoming many constraints in the current electromagnetics formulation. First, it is the inherent asymmetry in the first two equations, whereby the two fields are generally different, so that in place of equality between the left- and the right-hand side the ‘unilateral’ cause-effect relationship applies, (expressions 1 and 2 in Table I). Although a systematic approach might lead to a more accurate and compelling formulation, presently even in the considered case of just going out from the classical wave equations, Atsukovsky’s analysis and experimental work (at least in the realm of electric induction, *i.e.* electric field) expressed by (Item 3 in Table I) may fully justify (6) and (7). Indeed, in case of the explicitly absent electric charge(s), $\rho = 0$, by taking the gradient part of (6) one gets

$$\nabla(\nabla \cdot \mathbf{D}) = -\frac{1}{c} \frac{\partial}{\partial t} (\nabla \mathbf{D}) \quad (10)$$

while, due to $\nabla \nabla \cdot = \nabla \cdot \nabla + \nabla \times \nabla \times$ for the related part follows:

$$\nabla(\nabla \cdot \mathbf{D}) = -\frac{1}{c} \frac{\partial}{\partial t} (\nabla \mathbf{D}) + \nabla \times \nabla \times \mathbf{D} \quad (11)$$

and similarly for \mathbf{B} .

Moreover, because of presence of scalar divisions of inductions and their propagation velocity vectors, by having, say u , in place of c in the above equations, notwithstanding inherent obsolescence and irrelevance of the classically- relativistic transformations between two inertial systems used for arriving at (8) and (9), different velocities of longitudinal and transversal waves propagation could be somewhat supported. Again, the asymmetry underlying the (consistent) derivation of these two equations comes from the fact that, considering in terms of the implied Lorentzian force(s), in the two equations $\mathbf{E} = \mathbf{v} \times \mathbf{B}$ and $\mathbf{H} = -\mathbf{v} \times \mathbf{D}$ velocities pertain to different aspects of particle charges – electric in the first, and the magnetic in the second one, (The intricacies related to the differentiation rules and the critical reference to in [6] might rather have been addressed to the historical development of electromagnetics, wherein the Hertz's formulation of electrodynamics with using full instead of partial time-derivatives have made the Maxwell's equation invariant to the classical Galilean transformations, based on which the Lorentz transformations, L-force and STR become obsolete [10].)

3.2 Scalar and Vector Potentials Formalism

Although the traditional Maxwell's equations expressed through the classical wave equation do not allow for the scalar, that is the longitudinal, waves in media without charges, and/or *in vacuo*, it does not mean that in line with the commonly agreed upon decrease of number of possible solutions with increase of number of constraints a rather specific, and/or peculiar solutions would result. Indeed, that had turned out to be exactly the case with purely longitudinal waves based on the so-called force-free magnetic field, that is the magnetic vector potential which curl is collinear with itself, Such configuration and the related current distribution has been derived [11], and is outlined here as an example of the varieties of electromagnetic field in overcoming the claims about the traditional Maxwell's equations regarding the unavailability of the scalar, that is longitudinal electromagnetic waves therein.

Besides the four Maxwell's equations, with $\mathbf{j} = 0$, *i.e.* $\delta_e = \mathbf{0}$ in the area considered, of a form to induce suitable \mathbf{A} ,

$$\nabla \times \mathbf{E} = -d\mathbf{B} / dt, \quad \nabla \times \mathbf{B} = \frac{1}{c^2} d\mathbf{E} / dt, \quad \nabla \cdot \mathbf{E} = 0, \quad \nabla \cdot \mathbf{B} = 0. \quad (12)$$

added are two equations which for magnetic vector potential:

$$\nabla \times \mathbf{A} = \lambda \mathbf{A} \quad \text{and} \quad \nabla \cdot \mathbf{A} = 0, \quad (13)$$

In line with the force-free magnetic field discovered back in 1952 [12], the magnetic vector potential parallel to it has the form

$$\mathbf{A} = \nabla \times (\phi \mathbf{u}) + \frac{1}{\lambda} \nabla \times [\nabla \times \phi(\mathbf{u})], \quad (14)$$

with \mathbf{u} an unit-vector, and the potential $\phi(r)$ represents a solution of the scalar differential (Helmholtz's) equation

$$\nabla^2 \phi + \lambda^2 \phi = 0, \quad (15)$$

where λ is a constant.

It turns out that this particular solution of the traditional Maxwell's equations (along the corresponding field generation current densities) provides a structure which falls very close to the very Ether-substrate elements, that is its potentiality³ in creating such dynamically more-or-less stable structures, based o conceptualization of which, and some additional features, the very 'colossal construction' of Maxwell can and has to be amended, along Atskovsky's results and insights.

The missing features, or aspects, apparently are the compressibility and viscosity, as per [3], so that with reduced ideal features these elementary structures become capable of mediating propagation of electromagnetic disturbances of generalized form, including both the transversal and longitudinal mechanisms.

iv. Implications for Wireless Transceiver Design

The first experimental proof of validity Maxwell's equations performed by Hertz by the end of 19th century actually was the first arrangement that has been fully detached from the surface of Earth. However, since the transmitter and receiver were in near proximity of each other, it might have happened that besides the targeted transverse waves present were also the longitudinal, *i.e.* the scalar ones.

Interestingly, so far only vertically oriented dipole elements on both the transmission and reception ends have been exploited in practice. However, if taking collinearly situated dipoles at the transmitter and receiver sites, the situation can be opposite, especially in line with the "second (scalar) magnetic field" of Kolya Sibirski, which more and more has been receiving recognition in domain of electromagnetism of biological systems and differentiation between para- and dia-magnetism mechanisms.

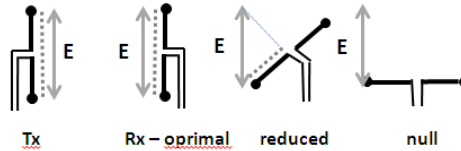


Figure 1. Comparison of conventional dipole transceiver antennas positioning.

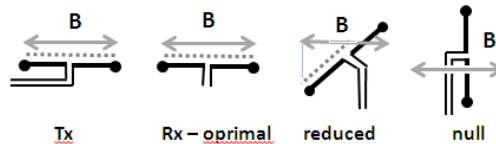


Figure 2. Comparison of an alternative dipole transceiver antennas positioning.

Indirect support for this could be the longitudinal electric field demonstrated in [3] for the semi-conducting mediums, as is seawater. In the context of the vector magnetic potential formalism, it can be referred to work in [15], regarding the so-called 'force-free' magnetic field (with $1/r$ drop in intensity, while in detecting Hertzian, *i.e.* transverse radio waves there is $1/r^2$ drop in intensity), and the corresponding transceiver designs/patents [13, 14], including those known as Rodin-coils and Möbius strip/coil, whereby the Tesla's transceiver system with the Tx-secondary and Rx-primary planar-winded coils comes to be thought of as radiating and radiation absorbing elements, in particular if deformed into half-dome structures. (The recent, most convincing, but largely 'suppressed' longitudinal electric waves demonstrating experiment is given in [16], thus the transceiver set-up in [1].)

v. Conclusion

The main part of this paper has provided a wide enough and compelling body of evidence on the feasibility of longitudinal electromagnetism within the classical Maxwellian formulation, as well as in the context of its extensions. The aethero-dynamical support for such extensions indicate that the magnetic vector potential, usually considered as quantity useful only for analytical calculations, actually has a physical meaning as the measure of movement of the etheric substrate. The existence of longitudinal, *i.e.* scalar, electromagnetic waves has been indirectly supported by some results of others. Some alternative dipole configurations and measurements have been proposed in order to support, and *in a way surpass, Tesla's old ideas and assertions regarding energy efficient communications.*

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Chapter 12

Thermo-diffusional processes in aether as basis for gravitational interaction of bodies¹

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Abstract

As known, gravitational interactions are pertinent to all bodies having mass and, consequently, that form of interaction has the most general character, accompanying any other phenomena and interactions, and thus gravitational interactions in the sense of their physical basis need not have less general form. As such most general form of aether movement is diffusional movement of its molecules – the amers.

Introduction

It is actually diffusional movement which accompany all other possible movements and states of a gaseous medium, as is the aether. Thereby, it takes places also at absence of other form of movements – translational/laminar?, rotational or wave-like/oscillatory. Consequently, it can be assumed that the most widely present movement of aether – the diffusional one – be the basis of the most present form of interactions – the gravitational one.

Since diffusional movement is the interaction by means of elastic collisions of a large number of particles, it can take place only for big number of particles, and doesn't make sense for an individual particle, for which characteristic is only translational/progressive movement in the space. Consequently, the gravitation as the process of diffusional movement is possible only in presence of multitude? of amers. That circumstance was not known to some of investigators of Demokrit's creative work, in particular to Alexander

¹ Translated from a Russian language from book of Asukotsky

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Afrodisco (?) and to all other who succeeded all the way to contemporary ones, who criticized Demokrit for stating that an atom (a collection of amers) has weight, while an amer – as part of an atom – doesn't.

Since the gravitational interaction is related to matter, it is purposeful to start consideration of its nature from analysis of interaction of matter and aether based on diffusional movement.

The gravitational interaction of bodies resulting from the thermo-diffusional process in the aether surrounding all the bodies needs to be primarily considered as consequence/result of cooling of aether on/at surface layers of nucleons forming the atoms' core. Besides, the aether cooling takes place also by all the associated vortexes – the electron clouds and those of Van-der-Vaals, but their participation in gravitation is not as big one due to minority of mass, and also due to their insignificant lowering the temperature of aether in comparison to that caused by nucleons.

As result of cooling of aether by surfaces of nucleons there arises the gradient of temperature and, as result, the gradient of pressure. A body, falling/arriving? into the field of pressure gradient start experiencing difference in the aether pressure: on the side of a body forming the temperature gradient the pressure of aether becomes lower then on the opposite side. The same happens with the other body. They then start being pushed by the aether one to the other (Fig. 10.1).

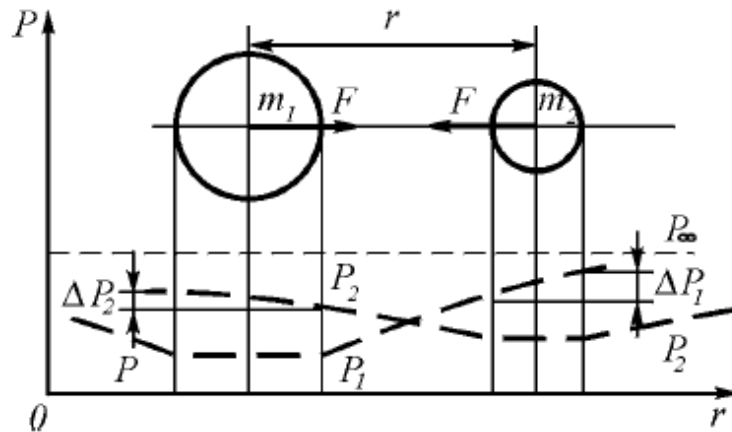


Fig. 10.1. Mechanism of gravitational interaction of two bodies: the change in temperature and pressure in proximity/vicinity/neighborhood of a gravitational mass and gravitational interaction between the two masses

It was shown above (in other sub-sections – translator's remarque) that the particles of matter themselves represent the vortex aether structures. In those very gaseous formations the gas temperature is always lower than the temperature of medium in their environment. Thanking to the thermo-dynamical process there takes place the temperature exchange between a vortex and its surrounding medium. As result of that temperature exchange the temperature of a vortex has to steadily be increasing on account of inflow of heat from the surrounding medium, and the temperature of the surrounding medium has to be lowering. In such a way, around each vortex takes place (is occurring) a unsteady thermo-dynamical

process. The time of its completion depends on many factors/components, in particular on the ratio of the aether densities in the vortex and in the free space, on the quality of thermal contact of vortex's surface and the free aether, on the coefficient of thermal conductivity of the medium and on some other factors.

The main protagonist in creation/constitutioning of gravitational forces are the nucleons – protons and neutrons, because exactly they are the maximally dense aether vortexes with minimal temperature, consequently it is exactly them being the main 'negative' source of heat which (is) cools(/ing) the surrounding aether, creating in it the temperature gradient and by very that the pressure gradient.

The very nucleons, having highest density and being solid bodies, are submitting to the action of pressure gradient, the other vortex structures – electron clouds, clouds of Van-der-Vaals, aether flows, etc. – present Сами нуклоны, обладая наивысшей плотностью и являясь цельными телами, подвержены воздействию градиента давления, другие вихревые образования – электронные оболочки, оболочки Ван-дер-Ваальса, струи эфира и т.п. – present themselves penetrable/transparent structures, in addition having small specific mass, the influence of which on the gravitational processes being not that significant.

In such a way, for clarification of the essence of gravitational interaction at the given stage it is purposeful to rely on gravitational interaction of nucleons only.

As was shown in Section 5., around each proton the temperature becomes/is/gets reduced, and in the surrounding space arises gradient of aether temperature. As result of temperature gradient arises gradient of pressure around the protons

As shown in Section 5., the gradient of temperature in the three-dimensional space can be presented in the following form:

$$\text{grad } T = \frac{k_q q}{r^2} \Phi(r, t), \quad (5.88)$$

where q – power of heat source, and

$$\Phi(r, t) = \frac{1}{\sqrt{2\pi}} r^2 \frac{\partial}{\partial r} \left(- \frac{1}{r} \int_0^\infty e^{-\alpha^2} d\alpha \right); \quad r_0 = 2\sqrt{at} \quad (5.89)$$

By that

$$\lim_{r \rightarrow 0} \Phi(r, t) = 1. \quad (5.90)$$

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The temperature gradient (however) is proportional to the composite power of thermal sources Q , thus

$$\text{grad } T = \frac{k_q Q}{r^2} \Phi(r, t), \quad (10.1)$$

and the power of heat sources – protons, мощность тепловых источников – протонов, present in a body is proportional to the body's mass, that is

$$Q \sim M, \quad (10.2)$$

so that in the surrounding of a body of mass M , the temperature gradient becomes:

$$\text{grad } T = \frac{k_M M}{r^2} \Phi(r, t) \quad (10.3)$$

The resulting force acting on a proton found itself in the gradient temperature filed of the first proton will be proportional the pressure gradient and to the vortex volume:

$$F = S_{\text{эКВ}} L_{\text{эКВ}} \text{grad} P = V_{\text{эКВ}} \text{grad} P. \quad (10.4)$$

That force does not depend on orientation of bodies in space, since it is determined by bodies' volume and the gradient of the aether pressure.

The ratio between temperature and pressure, as well as the ratio of their gradients in aether in surrounding space then becomes/is

$$\frac{T_3}{P_3} = \frac{\text{grad} T_3}{\text{grad} P_3} = \frac{2m_a}{3k\rho_3} = \frac{2 \cdot 1,5 \cdot 10^{-114}}{3 \cdot 1,38 \cdot 10^{-23} \cdot 8,85 \cdot 10^{-12}} = \quad (10.5)$$

$$= 8,2 \cdot 10^{-81} \text{ К} \cdot \text{Па}.$$

К·Па

The gravitational constant can be expressed through parameters of aether and those of proton – the first p_1 , creating gradient temperature in space, and the second p_2 , experiencing the gradient of pressure created by the (at) temperature gradient.

From the Newton's law of universal gravitation follow that

$$F_{p_1 p_2} = G \frac{m_{p_1} m_{p_2}}{r^2} = V_2 \text{grad} P_1, \quad (10.6)$$

where G – gravitation constant, m_{p1} и m_{p2} – massed of the first and the second protons – respectively, V_2 – volume of the second proton, and $\text{grad}P_1$ – the aether pressure gradient created by the first proton, r – distance between the protons, and considering the ratios

$$\text{grad}P_1 = \frac{3k \rho_a}{2m_a} \text{grad}T_1 = \frac{3k n_a}{2} \text{grad}T_1; \quad (10.7)$$

$$\Delta T_1 = R_{p1} \text{grad}T_1, \quad (10.8)$$

where $k = 1,38 \cdot 10^{-23} \text{ Дж} \cdot \text{К}^{-1}$ – Boltzmann's constant (J/K); $\rho_a = 8,85 \cdot 10^{-12} \text{ кг} \cdot \text{м}^{-3}$ – aether density (kg/m³); $m_a = 1,5 \cdot 10^{-12} \text{ кг}$ – mass of an amer; $n_a = 5,8 \cdot 10^{10} \text{ м}^{-3}$ – amount/number/quantity? Of amers in the unit of aether, one gets

$$G = \frac{3k n_a R_{p1} \Delta T_1}{m_{p1} \rho_{p2}}, \quad (10.9)$$

where R_{p1} – radius of the first proton; ρ_{p2} – density of the second proton.

In that way, the gravitational constant relates the aether parameters, the parameters of protons – of the one that creates the temperature gradient in aether and of the other one which experiences pressure gradient created by that temperature gradient, and the temperature difference on surface of the first proton, due to which the aether temperature gradient is/gets formed.

Thus, the gravitational force of interaction between the protons can be expressed as

$$F_{p1p2} = \frac{3k n_a R_{p1} \Delta T_1 V_{p2}}{2 r^2}. \quad (10.10)$$

From this derived expression it is evident the physical nature of gravitational forces: proportionality to number of amers in unit of aether volume, to radius of first proton creating gradient of temperature in aether, volume of second proton experiencing pressure gradient produced by temperature gradient, and inverse proportionality to square of distance between them. Everything has gotten the simple physical meaning.

Force, by which proton situated at the surface of a celestial body is attracted to that body is

$$F_{pT} = f \frac{m_p M_T}{R_T^2} = V_p \text{grad}P_a, \quad (10.11)$$

where $m_p = 1,6725 \cdot 10^{-27}$ kg – proton massa; M_T and R_T – mass and of the body; $V_p = 5,88 \cdot 10^{-45}$ m³ – proton volume.

Thus the gradient of the aether pressure at the surface of the celestial body is:

$$\text{grad}P_{\text{gr}} = G \frac{m_p M_T}{R_T^2 V_p} = G \frac{M_T \rho_p}{R_T^2}, \quad (10.12)$$

where $\rho_p = 2,8 \cdot 10^{17}$ kg·m⁻³ – proton density.
Accordingly, the temperature gradient becomes

$$\text{grad}T_3 = \frac{2m_a}{3k\rho_3} \text{grad}P_3 = 8,2 \cdot 10^{-81} \text{grad}P_3. \quad (10.13)$$

Reduction of pressure at the body's surface becomes

$$\Delta P = \int_{R_T}^{\infty} \text{grad}P_3 dr = \int_{R_T}^{\infty} G \frac{M_T \rho_p}{r^2} dr = - \frac{M_T \rho_p}{r}, \quad (10.14)$$

and reduction of/in temperature

$$\Delta T = \frac{2m_a}{3k\rho_3} \Delta P = 8,2 \cdot 10^{-81} \Delta P \quad (10.15)$$

On proton's surface ($m_p = 1,6725 \cdot 10^{-27}$ kg, $R_p = 1,12 \cdot 10^{-15}$ m) there follows

$$\text{grad}P_{\text{gr}} = f \frac{\rho_p m_p}{R_p^2} = \quad (10.16)$$

$$\text{grad}P_{\text{gr}} = f \frac{\rho_p m_p}{R_p^2} = \quad (10.16)$$

$$= \frac{6,67 \cdot 10^{-11} \cdot 2,8 \cdot 10^{17} \cdot 1,6725 \cdot 10^{-27}}{(1,12 \cdot 10^{-15})^2} = 2,32 \cdot 10^{10} \text{ Па} \cdot \text{м}^{-1} ;$$

$$\text{grad}T_{\text{эп}} = 8,2 \cdot 10^{-81} \quad \text{grad}P_{\text{эп}} = \quad (10.17)$$

$$= 8,2 \cdot 10^{-81} \cdot 2,32 \cdot 10^{10} = 1,9 \cdot 10^{-70} \text{ К} \cdot \text{м}^{-1} .$$

Reduction of pressure at the proton's surface is:

$$\Delta P_{\text{эп}} = -f \frac{\rho_p m_p}{R_p} = \quad (10.18)$$

$$= - \frac{6,67 \cdot 10^{-11} \cdot 2,8 \cdot 10^{17} \cdot 1,6725 \cdot 10^{-27}}{1,12 \cdot 10^{-15}} = - 2,8 \cdot 10^{-5} \text{ Па} ,$$

and temperature reduction:

$$\Delta T_{\text{эс}} = - 8,2 \cdot 10^{-81} \Delta P = \quad (10.19)$$

$$= - 8,2 \cdot 10^{-81} \cdot 2,8 \cdot 10^{-5} = 2,3 \cdot 10^{-85} \text{ К} ,$$

On the Sun's surface ($M_c = 1,99 \cdot 10^{30} \text{ кг}$; $R_c = 6,96 \cdot 10^8 \text{ м}$) we have:

$$\text{grad}P_{\text{эс}} = f \frac{\rho_p M_c}{R_c^2} = \quad (10.21)$$

$$= \frac{6,67 \cdot 10^{-11} \cdot 2,8 \cdot 10^{17} \cdot 1,99 \cdot 10^{30}}{(6,96 \cdot 10^8)^2} = 7,65 \cdot 10^{19} \text{ Па} \cdot \text{м}^{-1} ;$$

$$\text{grad}T_{\text{эс}} = 8,2 \cdot 10^{-81} \text{ grad}P_{\text{эс}} = \quad (10.22)$$

$$= 8,2 \cdot 10^{-81} \cdot 7,65 \cdot 10^{19} = 6,3 \cdot 10^{-61} \text{ К} \cdot \text{м}^{-1} .$$

Reduction of pressure of aether at the surface of the Sun is

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$$\begin{aligned} \Delta P_{3C} &= -f \frac{\rho_p M_C}{R_C} = & (10.23) \\ &= - \frac{6,67 \cdot 10^{-11} \cdot 2,8 \cdot 10^{17} \cdot 1,99 \cdot 10^{30}}{6,96 \cdot 10^8} = - 5,34 \cdot 10^{28} \text{ Па,} \end{aligned}$$

and the temperature reduction is

$$\Delta T_{3C} = - 8,2 \cdot 10^{-81} \Delta P = - 8,2 \cdot 10^{-81} \cdot 5,34 \cdot 10^{28} = 4,4 \cdot 10^{-52} \text{ К,} \quad (10.24)$$

which makes a small fraction of pressure and temperature of aether in free space:

$$\frac{\Delta P_{3C}}{P_3} = \frac{\Delta T_{3C}}{T_3} = 4,1 \cdot 10^{-8}. \quad (10.25)$$

On the Earth's surface ($M_3 = 5,97 \cdot 10^{24}$ kg; $R_3 = 6,3 \cdot 10^6$ m) we have:

$$\begin{aligned} \text{grad} P_{33} &= f \frac{\rho_p M_3}{R_3^2} = & (10.26) \\ &= \frac{6,67 \cdot 10^{-11} \cdot 2,8 \cdot 10^{17} \cdot 5,97 \cdot 10^{24}}{(6,3 \cdot 10^6)^2} = 2,8 \cdot 10^{18} \text{ Па} \cdot \text{м}^{-1}; \end{aligned}$$

$$\text{grad} T_{33} = 8,2 \cdot 10^{-8} \text{ grad} P_{33} = 8,2 \cdot 10^{-81} \cdot 2,8 \cdot 10^{18} = 2,3 \cdot 10^{62} \text{ К} \cdot \text{м}^{-1} \quad (10.27)$$

Reduction of pressure of aether t the surface of the Earth is

$$\begin{aligned} \Delta P_{33} &= -f \frac{\rho_p M_3}{R_3} = & (10.28) \\ &= - \frac{6,67 \cdot 10^{-11} \cdot 2,8 \cdot 10^{17} \cdot 5,97 \cdot 10^{24}}{6,3 \cdot 10^6} = - 1,77 \cdot 10^{25} \text{ Па,} \end{aligned}$$

and the reduction in temperature

$$\begin{aligned}\Delta T_{33} &= -8,2 \cdot 10^{-81} \Delta P = & (10.29) \\ &= -8,2 \cdot 10^{-81} \cdot 1,77 \cdot 10^{25} = -1,45 \cdot 10^{-55} \text{ K},\end{aligned}$$

which makes even the smaller fraction, then for the Sun, of pressure and temperature of aether in free space:

$$\frac{\Delta P_{33}}{P_3} = \frac{\Delta T_{33}}{T_3} = 1,1 \cdot 10^{-11}. \quad (10.30)$$

The temperature gradient in the aether is related to the thermal flow by Fourier's equation:

$$dQ/dt = -K_T S \text{grad} T, \quad (10.31)$$

where dQ/dt , Дж/с – flow of heat Q pre unit of time, K_T – thermal conductivity coefficient of the medium, for the aether equaling $1,2 \cdot 10^{89} \text{ м} \cdot \text{с}^{-3} \cdot \text{К}$; S – area of the surface perpendicular to the direction of the heat flow(, through which ‘current’ flows?), in the case considered – area of the proton's surface, $\sigma_p = 1,69 \cdot 10^{-29} \text{ м}^2$.

Inserting the parameters, we produce

$$dQ/dt = -1,2 \cdot 10^{89} \cdot 1,69 \cdot 10^{29} \cdot 1,9 \cdot 10^{-70} = 3,85 \cdot 10^{-10} \text{ Дж} \cdot \text{с}^{-1}. \quad (10.32)$$

Supply of ‘negative heat’ in the proton (with respect to the it surrounding aether !?) is

$$\begin{aligned}\Delta Q &= \frac{m_p (u_s^2 - u_p^2)}{2} = & (10.33) \\ &= \frac{1,6725 \cdot 10^{-27} (5,4^2 \cdot 10^{46} - 3^2 \cdot 10^{18})}{2} = 2,44 \cdot 10^{20} \text{ Дж}.\end{aligned}$$

(Joules)

Consequently, the time constant of the heating of the proton due to heat in the surrounding aether will be:

$$T = \frac{\Delta Q}{dQ/dt} = \frac{2,44 \cdot 10^{20}}{3,85 \cdot 10^{-10}} = 6,3 \cdot 10^{29} \text{ с} = 2 \cdot 10^{22} \text{ лет}, \quad (10.34)$$

i.e. for the time of proton's existence, of 10–20 billions of years, its heating on account of the surrounding aether's heat becomes completely negligible.

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In such way, the temperature gradient at small distances is (being) reduced proportionally to the square of distance, and much quicker at the larger distances.

With increasing distance from the aether's vortexes – matter particles – the Aether temperature is increasing up to certain value T_∞ , characterized by the aether temperature in the domain free of vortexes.

In that way, the gravitational field becomes treatable as field of pressure gradient in the aether, caused by the temperature gradient arising due to the cooling of aether by the bordering layers of nucleons, what is confirmed by numerical evaluations (calculations). By that, the gravitational constant gets/receives the natural physical content, in which reflected are the parameters of the nucleon which creates the gravitational field (mass), parameters of the second nucleon experiencing/'perceiving' the gravitational field (mass and volume, or average density), parameters of a medium 'containing' the gravitational field (coefficient of thermal conductivity of the free aether) and, finally, the energy content of the process (heat flow).

From the exposed it follows that for a free nucleon the reduction of the aether temperature on it (and accordingly the pressure) amounts to $0,9 \cdot 10^{-36}$, on the surface of the Sun to $2,8 \cdot 10^{-4}$, on the Earth's surface – to $2,5 \cdot 10^{-7}$ (fraction) of the full/total? amounts/values.

Since the total energy of a nucleon is

$$W_p = m_p v_p^2 / 2 = 1,673 \cdot 10^{-27} (10^{21})^2 / 2 = 8,4 \cdot 10^{14} \text{ Дж}, \quad (10.35)$$

the relative heating of a proton on account of the heat of the aether surrounding it is

$$w_p = 6,67 \cdot 10^{-10} / 8,4 \cdot 10^{14} = 0,8 \cdot 10^{-24} \text{ c}^{-1} = 2,5 \cdot 10^{-17} \text{ год}^{-1}. \quad (10.36)$$

It is thus readily clear that for the nucleons existence time on the order 10 billions years the heating of the proton reduces to insignificantly small amount/quantity.

By further amending/perfecting of the law of gravitational attraction of masses, based on the above in the first approximation the density of the free aether can be considered (as) $\rho \propto \text{const}$, since change in density is result of change of pressure in a medium, and in the gravitational phenomena the mutually interacting forces are essentially small in comparison with the forces of other interactions.

Substituting the gradT value and considering that the power of the heat source – the protons in (the) whole(/total) is proportional to their number, and consequently (to the) mass, we get the amount of force acting on a mass on part of temperature field of the aether produced by another mass, [11]:

$$F = f \frac{M_1 M_2}{r^2} \Phi(r, t), \quad (10.37)$$

where $\Phi(r, t)$ is calculated/evaluated by the expression (5.89).

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5.6.2. The temperature field in vicinity of vortex and absorption of the gas surrounding it

As it was shown above, each vortex – including the toroidal one – has lower temperature compared with the temperature of the temperature external to it. As is known [18, 22, 30, 31, c. 447-455], distribution of temperature in gas is determined by the equation of the thermal conduction

$$\frac{\partial T}{\partial t} = a \left(\frac{\partial^2 T}{\partial x^2} + \frac{\partial^2 T}{\partial y^2} + \frac{\partial^2 T}{\partial z^2} \right), \tag{5.81}$$

or in abbreviated form

$$T(M, t) = a\Delta T - \frac{f}{c_p \rho}, \tag{5.82}$$

where $T(M, t)$ – medium temperature at point M with coordinates x, y, z at the time instant t ; a – coefficient of thermal conductivity of the medium, characterizing speed of temperature equilibrating in a non-uniformly heated body; f – density of thermal sources; c_p – specific thermal capacity of the medium; ρ – medium density, and

$$\Delta = \left(\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2} + \frac{\partial^2}{\partial z^2} \right). \tag{5.83}$$

Tight(ened) toroidal vortex in its form is close to a sphere/ball, and at distances of just a few of its radius the difference in temperature field of a toroid and of a ball becomes completely insignificant. Therefore, for simplification of the whole temperature distribution task in the medium surrounding the toroid for its model is taken the ball. In spherical coordinates for a ball-like heat source of power q the solution of equation (5.82) has form

$$T(r, t) = - \frac{q}{4\pi a c_p \rho r} - \frac{2}{\sqrt{\pi}} \int_0^{\infty} \frac{e^{-\alpha^2 r^2}}{r \sqrt{at}} d\alpha, \tag{5.84}$$

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where r – distance from center of the heat source.

The temperature gradient, proportional to the heat flow, is determined by the expression (w/o 'r' in denominator in front of part with derivative on 'r' – translator's remark ...)

$$\text{grad } T = \frac{\partial T}{\partial r} = \frac{q}{2\pi^{3/2}ac_p\rho r} \frac{\partial}{\partial r} \left(-\frac{1}{r} \int_0^\infty e^{-\alpha^2} d\alpha \right). \quad (5.85)$$

The temperature gradient at small distances from the heat source is determined as

$$\begin{aligned} \text{grad } T &= k_q q \frac{\partial}{\partial r} \left(-\frac{1}{r} \int_0^\infty e^{-\alpha^2} d\alpha \right) = \\ &= k_q q \frac{\partial}{\partial r} \left(-\frac{1}{r} \int_0^\infty e^{-\alpha^2} d\alpha + \frac{1}{r} \int_0^{r/2\sqrt{at}} e^{-\alpha^2} d\alpha \right) = \\ &= \frac{k_q q \sqrt{2\pi}}{r^2} - k_q q \frac{r^2}{4at}. \end{aligned} \quad (5.86)$$

The last term tend to zero at $r \rightarrow 0$. At larger distances the expression

$$\frac{1}{r} \int_0^{r/2\sqrt{at}} e^{-\alpha^2} d\alpha \quad (5.87)$$

gets attenuated significantly faster than $1/r$, since the maximum of the integral takes place at $r = 0$. Consequently, the temperature gradient also gets reduced at larger radiuses significantly faster than r^{-2} . The gradient of temperature in 3-D space can be represented in the form:

$$\text{grad } T = \frac{k_q q}{r^2} \Phi(r, t) \quad (5.88)$$

$$\Phi(r,t) = \frac{1}{\sqrt{2\pi}} r^2 \frac{\partial}{\partial r} \left(- \frac{1}{r} \int_0^\infty e^{-\alpha^2} d\alpha \right); r_0 = 2\sqrt{at}. \quad (5.89)$$

Thereby,

$$\lim_{r \rightarrow 0} \Phi(r,t) = 1. \quad (5.90)$$

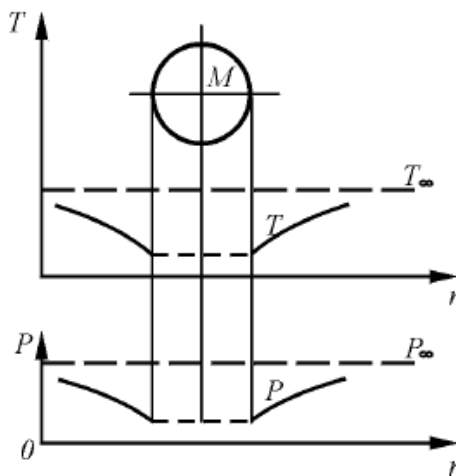


Fig. 5.17. Distribution of temperature and pressure around a conglomerate of toroidal vortexes in free space

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In such way it was succeeded for the first time to derive the static law of gravitational attraction of masses, not resorting to approximations of experimental data, as it was done by Newton. The provided expression assumes instantaneous propagation of gravitation, what in principle corresponds to calculations/evaluations in celestial mechanics.

The produced expression differs from the known Newton’s law by presence on right-hand side of the attenuating function $\Phi(r, t)$, which in itself includes the Gauss’ integral, almost not changing at relatively small distances and starting to sharply decrease beginning from certain distance. That is enough to resolve the famous Zeliger’s paradox [9], since on larger distances the forces decrease significantly faster than the (inverse) square of distance. That means that the gravitational force of the Sun extends not further than the domain of solar system, and the stars being on significant separation from each other are not attracted by each other.

It can however be taken that distances of tens of AUs lie in the zone of ‘action’ of Newton’s law. Departures from the Newton’s law, if they would turn out to be significant, would have been reflected in the erroneous determination of masses of planets distant from the Sun and in the errors in determination of parameters of the most distanced planet Pluto, since its eccentricity is the highest one, amounting to 0,25 (for

Jupiter – 0,05; for Saturn – 0,06; for Uranus – 0,05; for Neptune – 0,05 [10]). But it is exactly orbit of Pluton that does not fit to the Kepler's law, in that the Sun does not fall into the focus of ellipse of its orbit. Is it (just) by chance?

As one expected consequence of departure of bodies' attraction law from the Newton's law (be)comes/is departure of the form of comets' trajectories from the elliptical one: at remote sections 'branches' (?) of comets' trajectories have to be more 'diluted' (?) than it would be in case of accurate/exact conformity of attraction law with the law of Newton, and one and the same comet has to appear somewhat later than it is predicted by the exact Newton's law. However, the basic consequence is that the stars and galaxies have to be mutually attracted by forces significantly smaller than it follows from the laws of Newton.

All these propositions on the nature of gravitation presume Euclidian space.

In relation to that it is worthwhile to mention some experimental data, allegedly witnessing about non-Euclidian(ity) of space. To those belong, in particular, anomalousness of movement of perihelion of Mercury and aberration of stars' light around the Sun. As is shown in [11, c. 41–43] at the analysis many factors have to be accounted for, essentially influencing their interpretation, what practically was never done. Accounting for those factors, to which presence many scientists were drawing attention, does not allow to consider the derived results as confirmation of the space non-'Euclidianity'.

So, by consideration/interpretation of precession of perihelion of Mercury, by many estimations being from 34 to 43 angular seconds per century (!), a number of factors were not taken into account, each of which separately fully suffices for explanation of that phenomenon, in particular:

- 1) non-spherical shape of the Sun, just 1/1900 (based on other estimations 5·10⁻⁵) of Sun's surface flattening (or of its sub-surface layer of higher density, non-observable from the Earth) is enough in order to explain the effect;
- 2) Sun's rotation, leading to asymmetry of (its) gravitational field;
- 3) non-centrality of Sun's mass and non-homogeneity of its density;
- 4) non-centrality of the Sun's rotation, since the Sun and its planets revolve around the common center of mass;
- 5) presence of braking-off of the masses in form of protuberances. Etc. At evaluation of the stars' light beam aberration in vicinity of Sun's edge, according to Einstein, is needed to be 1,75", according to Newton – 0,84" (difference on the photographic plate was 0,01 mm) the following circumstances had not been accounted for:
 - 1) distortion of stars' position in the optical part of the apparatus;
 - 2) illumination of the photographic plate by Sun's corona, which was causing distortions in gelatin;
 - 3) abnormal refraction in Earth's atmosphere thanks/pertinent to the cold air the shadowed cone of the Moon;
 - 4) refraction in Sun's atmosphere;
 - 5) presence of vortex-like movement of the air in the shadowed cone of the Moon, and the like.

Except that, from all possible ways of the measurements' data processing chosen were only that one which was closest to the Einstein's predictions.

In such way, there is no experimental data whatsoever, which would confirm the alleged non-Euclidian nature of space – the real physical space being Euclidian, what directly follows from insights in (conclusions of) the general physical invariants.

10.3. Velocity of propagation of gravitational interactions

As shown above, the essence of gravitational action of bodies on each other is all about formation of the pressure gradient in the aether surrounding due to the cooling of aether by those bodies. Accordingly, velocity of propagation of gravitation is the velocity of propagation of small pressure, that is the velocity of the propagation of sound in the aether.

As was shown above, at the determination of aether parameters, velocity of sound of aether in the space around the Earth equals $4,3 \cdot 10^{23}$ m/s, i.e. more than 10^{15} times exceeds the light speed. With accounting for retardation, the law of the gravitational interaction of bodies takes the form:

$$F(t - r/c_r) = f \frac{M_1 M_2}{[r(t)]^2} \Phi(r, t). \quad (10.38)$$

This expression reduces to the known Newton's form for $\Phi(r, t) = 1$ and $c_r = \infty$.

The lower gravitation propagation velocity limit was established by Laplace in 1787, that is then, when the light speed was already well known. By investigating of the causes of centennial acceleration of the Moon, Laplace had made conclusion that the velocity of propagation of gravitation not less than by 50 million times exceeds the light velocity [6]. Given that the whole experience of calculations of position of the planets in celestial mechanics is based on the static formula of Newton, which implies infiniteness of velocity of gravity propagation, it follows to consider both the Laplace's and our estimation as more realistic that is the estimation of Einstein's Theory of Relativity, which postulates that gravitation propagation speed is equal to the speed of light ...

It follows to remark that the velocity of propagation of gravity in the whole celestial/cosmic space cannot be constant, since it depends on the aether temperature and, consequently, in vicinity of gravitational masses, where the temperature is lower, lower will also be the velocity of sound, that is the velocity of propagation of gravity.

Regardless of its large amount/vslue, the gravity propagation velocity – propagation velocity of the first sound in the aether as well as of the light speed – the velocity of the second sound, principally (in principle?) is not limited/constrained. Considering that the movement of the amers takes place not in emptiness, but within aether-2, it follows to hold that the velocity of propagation of particles in the aether-2 significantly exceed the velocity of movement of amers – of particles of ether-1 or simply of aether. Accordingly, the velocities of movement of aethers' particles at the deeper (lower!?) scales of matter organization significantly exceed velocities of particles on the preceding (or rather higher – translator's remark ?!) levels of the matter organization.

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*Chapter 13***PHYSICS MODELS FOR CNPS GRAN PRIX:
Answers by Slobodan Nedić****Slobodan Nedić¹**

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a. What is your main claim?

The natural reality and/or universe is organized in hierarchical levels/structures in 3D and time t , with the lower level structures being (gaseous) fluid elements for the higher, with closed loop back from the highest levels, a centers of galaxies and on supplying 'material' for the lower most ones; on phenomenological level, on all scales there applies a unique $1/r^2$ and $1/r^3$ attractive and/or repulsive interaction (gravitational and anti-gravitational, electric and magnetic, and so on ...).

b. What is matter composed of?

toroidal vortex-shape/topology structured and compacted/'densified' aether energy substrate

c. What is the medium of space composed of?

isotropic and homogeneous ultra-luminal movement of particles, essentially forming the rarified gaseous - viscous and compressible medium under very high pressure

d. How does energy propagate?

either as particle-like (photon, a pair of toroidal vortices/vortices with a very high density core), or by the EM-energy source induced complementary toroidal vortex structuring of aether substrate

e. What is mass?

Measure of compacting of structured aether flow through its effects as weight on the surface of Earth – erroneously confused with the aetherodynamical resistance to accelerated movement in the electron acceleration experiment.

f. What is gravity?

the effect of pressure gradient in the domain of 'attracted' body formed by temperature gradient in aether, caused by the 'attracting' body's matter formations with reduced temperature compared to surroundings

g. What is electric charge?

Effect and interaction of the flows of aether in the equatorial

domain of the vortex aether flow, obeying the $1/r^2$ proportionality of attraction and/or repulsion (resulting from pressure decrease and/or increase from velocity gradients increase and/or decrease).

h. What is magnetism?

a fluid-dynamics effect of aether particle flow in the toral i.e. meridian directions of the vortex aether flow, the attraction & repulsion (resulting from pressure decrease and/or increase from velocity gradients increase and/or decrease) obeying the $1/r^3$ distance proportionality.

*Chapter 14***NONLINEAR-DIFFERENTIAL EQUATION-
BASED MODELING OF NATURAL ORBITAL
SYSTEMS WITHOUT RELIANCE ON
CONSERVATION OF ENERGY AND ANGULAR
MOMENTUM****Slobodan Nedić¹**

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Abstract

In difference to traditionally established determination of planetary orbits in the “potential force fields” by reliance on the postulated first integrals and with implicit avoidance of direct involvement of the time-parameter t , proposed is the orbital motion modeling based on use of a set Non-Linear Differential Equations of motion with provision of explicit centrifugal (‘anti-gravitational’) force and the implied torque, allowing for the explicit oscillator-like nature of the underlying system of the Kepler-Ermakov type and use of the related exact integration invariants. The untenability of the Kepler-Newtonian invariants has been supported by both analytical derivations and numerical evaluations. Besides by the numerical integration, the previously formulated Termo-Gravitational Oscillator configuration has been evaluated in its integral form. The positive-valued work pertinent to the (quasi-)closed orbital trajectories opens up prospects of the Least Action Principle application as its direct minimization and the awareness of ‘precipitative-ness’ as energy inflow intrinsic feature of the “open” (thermo-)dynamical systems.

Key words: gravity, anti-gravity, orbital motion, non-conservative systems, forces unification

1. Introduction

Following the Newton's fitting of elliptical planetary orbits to the single central force inversely proportional to the square of its distance to the Sun, all natural systems – from atomic to galactic scales – have been treated as non-conservative (based on work over closed loop in the field of potential force equaling to zero). The exclusive reliance on gravitation as the only central force does not allow for the enough formal prediction of the planet's trajectories in accordance with the Kepler's second Law interpreted as the angular momentum, the basic shortcoming of Newton's and other subsequent theories of orbital motion then being the presumed absence of the tangential acceleration component, quite contrary to well established observational results.

In not so distant past and of late, there have been numerous explicit and/or implicit objections regarding both the existence of a conical (elliptical) solution based on particular initial conditions and its uniqueness [1]. While the former can be mostly related to the stability, the latter one is definitely well founded on grounds of the traditional modeling of orbital systems by autonomous differential equations without explicit presence of the time-parameter and unfounded (essentially, just postulated) the so-called invariants of the basic non-linear differential equation(s) integration – the total (sum of kinetic and potential) energy and the angular momentum. Indeed, regarding the exclusivity of the inverse squared distance proportionality of the central force as a cause of the Keplerian elliptic motion, within last several decades (in the context of including the upper-atmosphere caused dragging effect on the low-elevation satellites) there have appeared numerous papers which demonstrate the availability of generally non-central forces resulting in non-constant angular momentum, yet producing the conventional closed elliptical orbits, notably [2]. It has been shown that the truly invariant are the angular momentum with (in Descartes' coordinate system) time-derivatives (dx/dt and dy/dt) replaced by the area-derivatives (dx/dA and dy/dA), and the total energy with kinetic energy being evaluated with velocity as time derivative of the arc-length (ds/dt) replaced by the ratio ds/dA , whereby as the integrals arise ratios of time-varying both the squared angular momentum as well as the total energy and the time-varying Kepler-Newtonian force factor. Furthermore, the related Keplerian-like differential equation(s) can be put in direct correspondence with differential equation(s) having the velocity-dependent, friction term, implicating the steadily decreasing system energy [3] or the needed steadily increasing work of the force(s)-field to preserve the trajectory shape. This in turn urges to look for the source of the related energy supply in the 'operation' of the natural orbital systems (in agreement with impossibility of the "perpetual mobility"), changing the paradigm from the non-conservative systems involving dissipation to those with factual energy in-flow ('precipitation').

Only recently, within explorations of biological molecular systems, as well as in certain domains of particle physics, the need starts arising for looking at such systems as non-conservative, the so-called “open systems”, which within the classical formalisms turn out to be the “non-integrable” system (inability to be reduced to “cyclic coordinates”, the so-called first integrals, be it by even applying the time-varying transformations of coordinate systems). This has led to modifications and specializations of the formalisms of the classical axiomatic mechanics having been developed by Euler, Lagrange, Hamilton, Noether, etc., for essentially conservative systems to be applicable to the non-conservative ones. However, the proper analysis of the matters suggests that all the natural orbital systems (including the planetary, atomic, molecular and galactic ones) are the ‘open’ ones - with the energy inflow from the Ether for the matter formation and for mediating the dynamical stability and that, in particular for ubiquitously present essentially non-closed orbital trajectories, neither the total energy nor the angular momentum is constant over the time, suggesting that the very basic foundations of orbital mechanics have largely been deficient, being the cause for emergence of quantum-mechanics.

Factually, the Newton’s gravitational law was derived in a rather tautological (circular) manner, relying on the ‘larger’ object’s mass also in definition of the gravitational constant, the suite having been followed in domain of electromagnetic and the atom-level phenomena, along the notion of potential, i.e. non-conservative force fields which could not support atoms’ energy radiation. The incorporation of his third law of action and reaction, which even Newton himself had been reluctant to rely on explicitly (and despite many objections - notably Leibniz’s statement that they cannot simultaneously be applied to the same body) into the theory of orbital motion, has been another misdeed, both with detrimental impact on the further development of physics, and the almost insurmountable difficulties it has been facing, including the forces’ unification. In the concept of Thermo-Gravitational Oscillator (TGO) [4] developed by combining Le Sagean gravitational, and thermal (as anti-gravitational) changing of permittivity to the mutual shadowing ‘pushing’ effect, the central acceleration results in the form of two-components ($-a/r^2 + b/r^3$), that Leibniz had proposed within his critique of the Newton’s orbital dynamics, without any reliance on the Newton’s third law, and by using M. Milanković’s (one over r-squared) law of planetary warming. It should be important to state here that already in the first edition of his “Principia” Newton himself had used the additional, explicit centrifugal force of the form $+ b/r^3$, in order to analyze and model the precession of the Mercury perihelion (https://en.wikipedia.org/wiki/Newton%27s_theorem_of_revolving_orbits). This, however, has remained largely unknown.

In the TGO-concept the orbital trajectory can in principle be produced by direct minimization of the work (needed to be) done over a ‘closed’ path, without indispensability of initial conditions (commonly considered as even a part of natural laws in the context of traditional minimization of variation of the Action as time-integral of difference and/or sum of the kinetic and potential energies of an

orbital body in Lagrange and/or Hamilton formalisms). Another option is conventional (analytical or numerical) solving of the pertinent non-linear differential equations. While for the latter there has been a wide variety of program modules (as `ode45.m` in MATLAB), for the former there exists prospect of relating the TGO-like differential equations set-up with the since long known extensions of the Ermakov's system [5] for which the exact integration invariants have been readily available, towards the so-called Kepler-Ermakov systems [6]. While in TGO the gravitational constant (a above) is considered as not the "universal" one and basically dependable on actual configurations, the mass get entirely dropped away from the considerations, and in place of it (b above) comes the body's thermal capacity (or its specific heat). As further support for righteousness of this approach can be offered that the same form of the central accelerations, i.e. the 'attractive' and 'repulsive' forces are manifested within the toroidal vortex (sub-)atomic-level structures, respectively for the ring (electric field related) and toral (magnetic field related) streaming of the (compressible and viscous - gaseous) Ether-substrate particles [7]. It is unlikely to be a mere coincidence that the vortices related attractive and repulsive forces, in the context of etherodynamics, along the lines of the pressure/velocity/temperature gradients and their decreases and/or increases, respectively, have exactly the same a/r^2 & b/r^3 forms, allowing a wider outlook to commonalities among all the natural orbital systems, and particularly relatedness to the Prigogin's thermodynamics of Open Systems and the Entropy 'issues'.

In the following, firstly (in Section 2) is exposed untenability of the angular momentum constancy by simply 'declaring' co-linearity of the position and the angular momentum vectors and 'suppression' of time variable despite time-varying central force and further supported by analytical and numerical evaluations, along the refutation of the unsupported total energy "invariance". In Section 3 is briefly overviewed the Thermo-Gravitational Oscillator concept of orbital motion based on dynamical equilibrium between the gravitational and the heat-related anti-gravitational central forces, the work over a closed Keplerian elliptic trajectory is evaluated and its optimality is indicated based on its minimal value among all the scaling-like perturbations. Section 4 is devoted to formulation the TGO-related non-linear differential equations for two bodies, accompanied by a number of numerical solutions qualitatively illustrating effects of the added central force and its lateral projection torqueing term, followed by hinting similarity with the Kepler-Ermakov NL-DE system of equations to suggest appropriate formulations of the related "constants of integration" and possibly arrive at the intrinsic quantization and the Golden Ratio implications. In the concluding remarks, relevance to the outstanding problems and anomalies in physics are provided, as is obsolescence of the dark matter and dark energy notions.

2. Untenability of angular momentum and total energy as the Keplerian motion invariants

In the modern vector-analytical context in mechanics textbooks the constancy of both the direction and the absolute value of the angular momentum for the central force field as follows:

“Central forces $\mathbf{F}(\mathbf{r}, t)$ are always directed to a fixed point, wherein we place the origin \mathbf{O} of the coordinate system:

$$\mathbf{F}(\mathbf{r}, t) = \frac{\mathbf{r}}{|\mathbf{r}|} f(\mathbf{r}, t).$$

(1) Newton’s movement equation for a punctual mass m then is:

$$m\ddot{\mathbf{r}} = \frac{\mathbf{r}}{r} f(\mathbf{r}, t) \quad \text{with} \quad r = |\mathbf{r}|. \quad (2)$$

Vector multiplication with \mathbf{r} gets $\frac{d}{dt}(m\mathbf{r} \times \dot{\mathbf{r}}) = m\dot{\mathbf{r}} \times \dot{\mathbf{r}} + m\mathbf{r} \times \ddot{\mathbf{r}} = \mathbf{0}$,

(3) so that $m\mathbf{r} \times \dot{\mathbf{r}} = \text{Constant} = \mathbf{L}$.“
(4)

However, since all the non-circular orbital motion solutions produce time-varying tangential velocity, the stated/alleged/postulated constancy of the angular momentum does not hold in general, since the tangential acceleration turns out to be not co-linear with the radius vector \mathbf{r} .

On the other hand, by decomposing left-hand side of (1) into its (planar) polar coordinates

$$\ddot{\mathbf{r}} = a_{rad}\mathbf{e}_{ra} + a_{trv}\mathbf{e}_{\phi}; \quad a_{rad} = \ddot{r} - r\dot{\phi}^2;$$

$$a_{trv} = r\ddot{\phi} + 2\dot{r}\dot{\phi} = \frac{1}{r} \frac{d}{dt}(r^2\dot{\phi}) = \frac{1}{r} \dot{L} = 0, \quad (5) \text{ the transverse acceleration}$$

is equated by zero due to the definitional absence of the lateral driving force in the central force (field), further (or rather upfront) by identifying the $r^2\dot{\phi}$ as the rate of change of (half of) the sectorial area, in accordance with the second Kepler’s law. It has largely remained unrecognized that neither one of these motivations for the constancy of L does hold: the left-most expression in (5) can be satisfied for non-constant L and infinite radius, and the areas of a segments between two different (subsequent, in equal time intervals) radius-lengths (r and $r + dr$) can be represented by $r^2\dot{\phi}$ only for rather specific time dependences of radius and polar angle. Yet another claim for conservativeness (in terms of zero work over a closed path) has been the so-called time-independence of the central - radius-dependent force, although the very radius, de-facto, explicitly depends on time. Indeed, if the force is time dependent, the energy cannot be ‘conserved’ since the work done is path dependent. The traditionally held view that the work (integral

over time of the time rate of change of the kinetic energy $dK / dt = \mathbf{F}(\mathbf{r}, t) \cdot \dot{\mathbf{r}}$ of the (implicitly) time-dependent ‘central’ force depends only of the velocities at the two time-instants (strictly, the work should be evaluated with absolute value of the sub-integral function)

$$K_1 - K_0 = \left(\frac{m}{2} \dot{\mathbf{r}}^2 \right) \Big|_{t=t_1} - \left(\frac{m}{2} \dot{\mathbf{r}}^2 \right) \Big|_{t=t_0} = \int_{t_0}^{t_1} \mathbf{F}(\mathbf{r}, t) \cdot \dot{\mathbf{r}} \cdot dt, \quad (6)$$

by (inadvertent?!) avoidance of explicitly accounting for the time-dependent central force, in that with (1) and (2) defined acceleration $m \cdot \ddot{\mathbf{r}}(t) = \mathbf{F}(\mathbf{r}, t)$, the resulting sub-integral expression $m \cdot \ddot{\mathbf{r}}(t) \cdot \dot{\mathbf{r}} \cdot dt$ is replaced, w/ $\frac{d}{dt} \left[\dot{\mathbf{r}}^2(t) \right] = \frac{d}{d\dot{\mathbf{r}}} \left[\dot{\mathbf{r}}^2(t) \right] \cdot \frac{d\dot{\mathbf{r}}}{dt} = 2\dot{\mathbf{r}}(t) \ddot{\mathbf{r}}(t)$, by $\frac{1}{2} \frac{d}{dt} \left[\dot{\mathbf{r}}^2 \right] dt = \frac{1}{2} d \left[\dot{\mathbf{r}}^2 \right]$. While this seems to be correct, except that the time-variability is fully hidden, it should be noted that the scalar product in the sub-integral function implies only the work over the radial direction. The ‘routinely’ added potential energy, U , to compensate for radial energy loss or gain

$$\frac{d}{dt} \left(\frac{m}{2} \dot{\mathbf{r}}^2 + U(\mathbf{r}, t) \right) = 0 \quad (7) \text{ and } (8) \downarrow$$

$$dU(\mathbf{r}, t) = \text{grad}(U(\mathbf{r}, t)) + \frac{\partial}{\partial t} (U(\mathbf{r}, t)); \mathbf{F}(\mathbf{r}, t) = -\text{grad}(U(\mathbf{r}, t)) \Rightarrow \frac{d}{dt} \left(\frac{1}{2} \dot{\mathbf{r}}^2 + U(\mathbf{r}, t) \right) = \frac{\partial U(\mathbf{r}, t)}{\partial t}$$

also fails by virtue of non-zero time-related gradient of the central force potential¹, per (8) above.

In the case of inverse radius squared central force, the validity of (7) has been supported by both reliance on the angular momentum invariance, as well as on zero-velocities at the perihelion and aphelion positions of the orbital body on an elliptic (Keplerian) orbit. Although the equations of motion (2) in case of central

¹ This fact appears to have been finding expression in the rheonomic potential (V. Vujičić, “Dyn. of Rheon. Sys., Math. Instit. of the Serbian Accad. of Science, Editions Spéciales, Belgrade, 1990.). More generally, it could be argued that the time-variability of a (central) force ensures non-zero Curl feature of the related force-field (non-zero loop integral), and in particular so if there are two (co-linear) potentials involved, as in Whittaker’s “A Treatise on the Analytical Dynamics and Rigid Bodies,” Article 52 of 4th edition (1937).

force $f(\mathbf{r}, t) = -m \frac{a}{r^2(t)}$ for quite some time in the past can be solved numerically,

from the ‘‘Feynman’s ‘trick’’ of halving the elementary time-interval for the very first integration step to modern advanced numerical routines for solving non-linear differential equations, despite the critical dependence on suitable initial conditions due to inherent non-oscillatory nature, in wide usage still is the reliance on the alleged constancy (time-invariability) of angular momentum, L and total energy, E , i.e. system of two 1-st order NL-DEs

$$\frac{m}{2} \dot{r}^2 + U_{\text{eff}}(r) = E; \quad \frac{m}{2} \dot{r}^2 = E + m \frac{a}{r} - \frac{1}{m} \frac{L^2}{r^2} \Rightarrow \frac{d}{dt} r(t) = \sqrt{\frac{2}{m} \left(E + m \frac{a}{r(t)} - \frac{1}{2m} \frac{L^2}{r^2(t)} \right)}$$

$$mr^2(t) \dot{\varphi}(t) = L \Rightarrow \frac{d}{dt} \varphi(t) = \frac{1}{mLr^2(t)}; \quad \text{with } \varphi(t) = L \int_0^t \frac{d\tau}{mr^2(\tau)} + \varphi_0 \text{ as inte-}$$

gral form. (9) Whereas for the original equation of motion $m\ddot{\mathbf{r}} = -m \frac{a}{r^2(t)}$ the

orbiting body mass becomes irrelevant, which is consistent with the independence of gravitational acceleration on mass, in (9) it is put back in the ‘play’. Furthermore, although this system of NL-DE can – at least in principle be attempted by a numerical integration of these two equations¹, in order to possibly arrive at some kind of closed solutions the first equation in (9) is looked at as t in function of r ,

that is $t = \int_{r_0}^r \frac{d\rho}{\sqrt{\dots}}$, but what becomes feasible is nothing more than to calculate orbital period and produce parametric dependence of radius on polar angle with the latter related to t by exactly the Kepler-equation, relating the equidistant time intervals with the true eccentric anomaly (the angle from the center of an ellipse to the point on the large circle vertically above the orbital body position. (The closed form expression becomes available only for $r_0 = r_{\text{max}}$ but can’t be inverted.)

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2.1 Analytical and numerical evaluations to illustrate the issues related to the ‘invariants’

For the radius as function of the Eccentric anomaly E , $r(t) = a \cdot [1 - e \cdot \cos(E(t))]$, the expression for the radius as function of the True anomaly φ , $r(t) = a \cdot (1 - e^2) / [1 + e \cdot \cos(\varphi(t))]$, the renowned Kepler’s equation,

¹ In the sequel will be shown the related limitation, in that the solution for fixed E and L tends to a circle.

$\frac{2\pi}{T}t = E(t) - e \cdot \sin(E(t))$, the relation between the True anomaly and the Eccentric anomaly angles $\varphi = 2 \cdot \arctan \left[\sqrt{\frac{1+e}{1-e}} \cdot \tan \left(\frac{E}{2} \right) \right]$, and (to the third equation above) pertinent time-derivative $\dot{E} = \frac{2\pi}{T} \frac{1}{1-e \cdot \cos(E)}$, the angular momentum (taking $a=1+e$ to aid the separation of the subsequent plots) becomes

$$L = r^2 \cdot \dot{\varphi} = (1+e)^2 \cdot (1-e^2)^2 \cdot \frac{2\pi}{T} \sqrt{\frac{1+e}{1-e}} \cdot \left[\frac{1}{1+e \cdot \cos(\theta)} \right]^2 \cdot \left\{ \cos^2 \left(\frac{E}{2} \right) + \frac{1+e}{1-e} \cdot \sin^2 \left(\frac{E}{2} \right) \right\}^{-1} \cdot \frac{1}{1-e \cdot \cos(E)}$$

Although ‘visually’ only for zero-eccentricity [$e=0 \rightarrow a=1$] the angular momentum is a constant ($2\pi/T$), it turns out that it is constant for all eccentricities, as shown in Fig. 1a. (While this holds also for the numerical evaluation by using the 10-terms Lagrange’s solution of the involvement of the explicit time-dependence of E , its utilization to produce and explicitly use the time-derivative of E reveals increased variations of L with ε (Fig. 1b).) However, it turns out that the Kepler’s equation itself does not satisfy the Kepler’s very Second (area-) law, as the results plotted in Fig. 2b reveal. (This might even not be that surprising if one considers the way the Kepler’s equation was derived – by explicit removal and insertion of triangular areas pertaining to the large circle and the ellipse, respectively, besides scaling-down the areas under the arcs – see Appendix A.)

Similarly, analytical evaluation of the total energy as per the first (upper left) part in (9) reveals

$$\Xi = 2 \cdot \left(\frac{\pi}{T} \right)^2 (1+e)^2 \left\{ e^2 \frac{[\sin(E(t))]^2}{[1-e \cdot \cos(E(t))]^2} + \frac{1+e}{1-e} \cdot \left[\cos^2 \left(\frac{E(t)}{2} \right) + \frac{1+e}{1-e} \cdot \sin^2 \left(\frac{E(t)}{2} \right) \right]^{-2} \right\} \cdot \frac{1}{(1+e)[1-e \cdot \cos(E(t))]}$$

and the plots in Fig. 2a reveal its increased time-variability with the increase of the eccentricity.

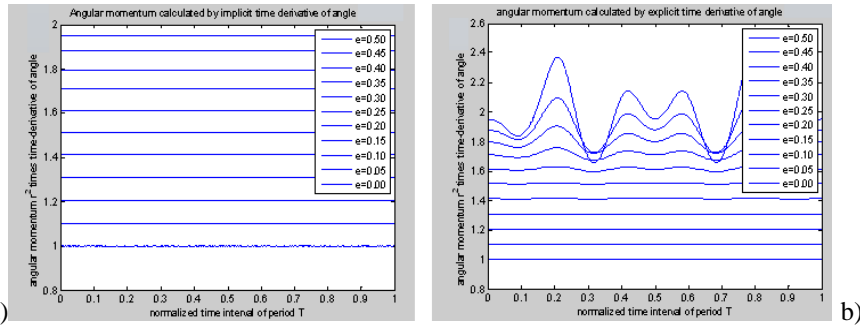


Fig. 1. Analytical evaluations of the angular momentum: w/o - a), & w/ explicit t-derivatives – b).

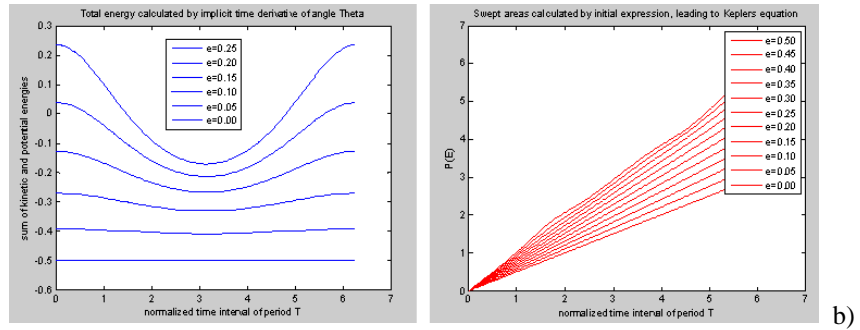


Fig. 2. Analytical evaluations of the total energy- a), and the swept area for Kepler's equation – b).

2.2 Numerical evaluation indicating 'weakness' of the energy and angular momentum integrals

When evaluated numerically on Kepler-ellipse with eccentricity $\varepsilon=0.25$ in polar coordinates (r, φ) , with the explicit time-dependence of phase on time produced by numerically inverting the Kepler's equation using the Interpolation Tool inside the MATLAB's plotting routine, the angular momentum and total energy become time-variable with a solid level of regularity and the strong departure from constants (as is the case in actual measurements), shown here in Fig. 3.

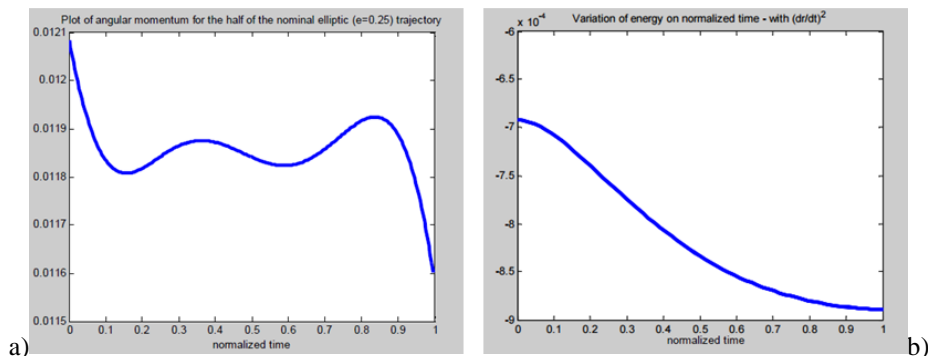


Fig. 3. Dependence of the angular momentum - a) and energy- b) on time (for the first half starting from the perihelion) for Keplerian ellipse with eccentricity factor of $e=0.25$ and its average value.

This is largely corroborated by significant (starting from lower decimals) and consistent variations replicable by measurements data (<http://www.phy.duke.edu/~kolena/comet.html>).

Finally, as example for the failure of the corresponding first integrals' differential equations on the right-hand side of (9) to reproduce the elliptic trajectory and the related (non-constant) L and E determined by the set of regular non-linear differential equations (5), that is the left-most part in the two rows of (9), with $a=108.0 \text{ Nm}^2$, and $m=1\text{kg}$, particular initial conditions ($r_0 = 1.0$; $\varphi_0 = 0.0$; $v_0 = 6.0\text{m/s}$; $L_{(0)} = r_0 v_0$) and optionally solving on \dot{L} instead on $\dot{\varphi}$ as the angular state variable), produced are results shown in Fig. 4.

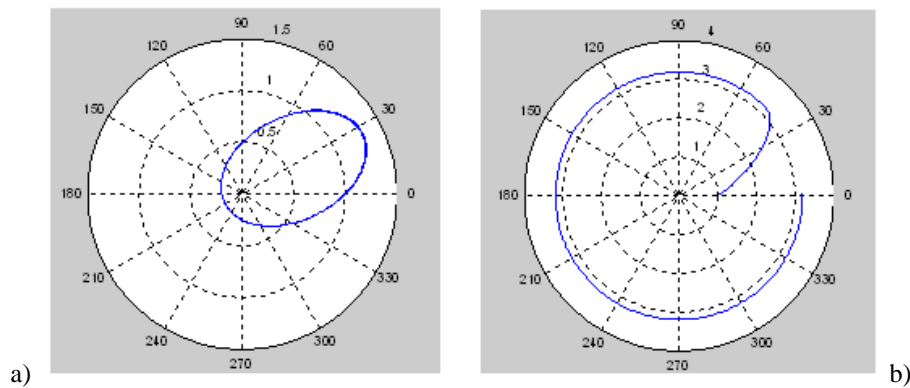


Fig. 4. Comparison of polar plots produced by conventional NL-DE and the traditional invariants.

While for the same elliptical orbit as shown in part a) of Fig. 4 the two conventional nonlinear solutions produce rather different behaviors of the so-called integration invariants (highly time-varying L and E , and constant L and steadily

decreasing E , respectively), in both cases the trajectory produced by the reused initial values for L and E tend to produce circular path, part b).

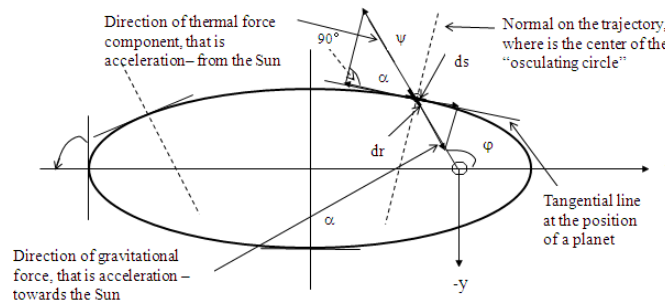
3. Orbital motion as a dynamical equilibrium – Thermo-Gravitational Oscillator approach

The following considerations are based (in the phenomenological sense) on dynamical equilibrium between the Le Sage-like gravitational and the postulated thermal components of the effective ‘force’ driving the planet around the Sun over certain path (by the second author of [4]). In essence, the gravitational component itself is thermal, and what is exposed here is more like an outline of ultimately thermo-dynamical theory of orbital motion¹.

With the reference to Fig. 5, the work done on an elementary segment dr of a trajectory is the result of two components – gravitational, $dE = m(\gamma / r^2)dr$ (γ representing the gravitational, not necessary “universally valid” Newtonian constant) and the thermal one, $dQ = m \cdot \delta \cdot dT$, (δ - specific heat), with the Milanković’s temperature dependence on radius $T = f(r) \propto 1/r^2$, becomes $dQ = -m\xi(1/r^3)dr$, so that work integral takes the form given by the expres-

$$\oint \left\{ \left[-\frac{\gamma}{r^2(t)} + \frac{\xi}{r^3(t)} \right] \cdot \cos[\alpha(t)] \right\} \frac{dr(t)}{dt} \cdot dt ;$$

$$\pi/2 - \alpha(t) = \psi(t) = \arctg \left(\frac{dr(\varphi(t)) / d\varphi(t)}{r(\varphi(t))} \right) \quad (10)$$



¹ The truly physical cause of gravitational ‘attraction’ in the Atshukovsky’s etherodynamics [7] being the gradient in pressure in the range of the ‘attracted’ body induced by the temperature gradient created by the attracting body, thus reciprocally, the heat received from the central body acts anti-gravitationally in the sense of equalizing the reduced temperature and pressure on the side facing the central body, i.e. the Sun.

Fig. 5. Illustration of thermo-gravitational equilibrium for motion of a planet around the Sun.

An evaluation of the work done over the closed trajectories produced by vertical scaling of a Keplerian ellipse with eccentricity $\varepsilon=0.25$ reveals (non-negative!) minimum (the positive energy-well!) at the scaling factor one (i.e. the nominal ellipse), as the plot(s) in Fig. 6 show.

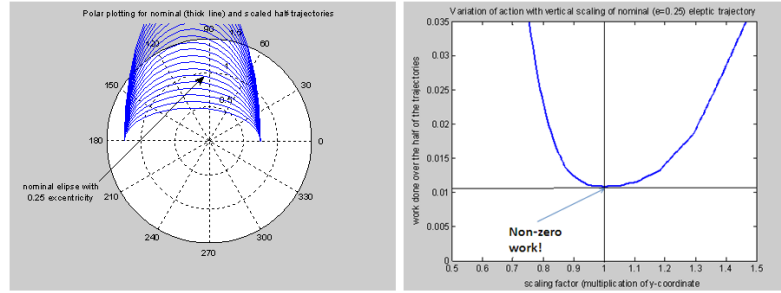


Fig. 6. Scaled nominal elliptic trajectories and the closed-path work scaling-factor dependence.

4. Formulation of orbital motion with direct modeling by non-linear differential equations

With reference to Fig. 5 and the related expressions in (10), the TGO NL-DE set-up becomes:

$$\text{differential equation for radial direction} \quad \frac{d^2 r}{dt^2} - r \cdot \left(\frac{d\varphi}{dt} \right)^2 = -\frac{a}{r^2} + \frac{b}{r^3} \quad (11)$$

and differential equation for transverse (lateral) direction

$$\frac{d}{dt} \left(r^2 \cdot \frac{d\varphi}{dt} \right) = r \cdot \left\{ \left(-\frac{a}{r^2} + \frac{b}{r^3} \right) \cdot \cos(\psi) \cdot \sin(\psi) \right\}, \quad (12)$$

the latter one in the form explicating the torque-force as projection of the radial driving force.

For comparison, the traditional Newtonian formulation (presuming alleged constancy of L) is

$$\frac{d^2 r}{dt^2} = -\frac{a}{r^2} + \frac{L^2}{r^3} \text{ (for radial}^1\text{), and } r^2 \cdot \frac{d\varphi}{dt} = L \text{ (for lateral, transverse direction)} \quad (13)$$

¹ It should be important to note that in the history of science this inverse proportionality to the distance on cube, commonly denoted as “virtual” centrifugal force (and the related

In the form which on the left-hand side has the original kinematical form, (12) and (13) are

$$r \cdot \frac{d^2\varphi}{dt^2} + 2 \cdot \left(\frac{dr}{dt} \frac{d\varphi}{dt} \right) = tFlag \cdot \left(-\frac{a}{r^2} + \frac{b}{r^3} \right) \cdot \cos(\psi) \cdot \sin(\psi),$$

(14)

with the tFlag-parameter equaling 1 and 0 for the TGO and standard forms, respectively.

For qualitative illustration of various orbital motion equations, in Fig. 7 are shown trajectories for the same initial conditions and the four combinations of the parameters a, b and tFlag.

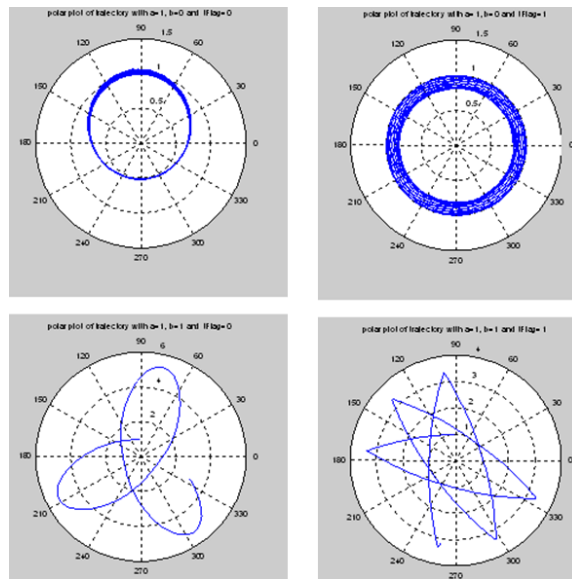


Fig. 7. Trajectories with particular sets of parameters and the resulting $\log_{10}(E)$ values:
 upper-left – 1,0,0 and 2.00;
 upper-right - 1,1,0 and 0.25;
 lower-left - 1,0,1 and 1.30;
 lower-right – 1,1,1 and 0.50.

These equations of motion bear strong resemblance to the so-called Kepler-Ermakov system of non-linear differential equation, the polar coordinate form of which has the following form, [6]

virtual potential as a part of the effective potential) has been mistakenly understood as either the Leibnitz's or Newton's explicit forces; this might also have been related to the apparently long-standing controversies over the CF-forces 'nature'.

$$\frac{d^2 r}{dt^2} - r \cdot \left(\frac{d\varphi}{dt} \right)^2 = -\frac{F(\varphi)}{r^2} + \frac{G(\varphi)}{r^3} \quad \text{and}$$

$$r \cdot \frac{d^2 \varphi}{dt^2} + 2 \cdot \left(\frac{dr}{dt} \frac{d\varphi}{dt} \right) = -\frac{dV(\varphi)/d\varphi}{r^3}, \quad (15) \text{ whereby, along the } \textit{exact}$$

(Lewis-Ray-Reid) invariant¹ $I = 0.5(r^2 \dot{\varphi})^2 + V(\varphi)$ and $\eta = 1/r$, the trajectory follows from the solution of the non-homogeneous differential equation

$$h^2(\varphi; I) \frac{d^2 \eta}{d\varphi^2} + h(\varphi; I) \frac{\partial h(\varphi; I)}{\partial \varphi} \frac{d\eta}{d\varphi} + (h^2(\varphi; I) + F(\varphi)) \eta = G(\varphi), \quad \text{with}$$

$$h(\varphi; I) = \sqrt{2(I - V(\varphi))}.$$

This opens the perspective to on one hand bring the physical substantiation to the equations of motion in domain of particle physics and the quantum mechanics, and on the other, to proceed with specializing and more appropriate parameterization of the TGO equation regarding the explicitly contributing non-central forces – through time-variability of parameters a and b , etc.

Of particular interest would be to extend and further specialize the pertaining first integrals towards possible revealing the Golden Ratio proportions along the lines of the two-centers configurations and the hyperbolic coordinates considerations and analysis conducted in [8].

5. Conclusions

As its main goal, this paper has brought up questioning of the basic conservation laws of total energy and angular momentum traditionally used in Newtonian dynamics of orbital motion and inherited in other areas of mechanics and physics as GRT, QM and Particles Physics. While in the contemporary mechanics and the mathematical physics the conservativeness of angular momentum and energy have been the foundational principles, their untenability has been demonstrated here by the arguments ranging from the point of view of non-uniqueness of the solution, over the unfulfilling conservation conditions in the context of Keplerian ellipse and elementary analytical evaluation involving the Kepler's equation, to numerical evaluations demonstrating the fact that the produced solutions either do not satisfy the initially formulated invariants or reproduce them by reverting from elliptical to the trivial, circular trajectories. Based on that, and the essentially present non-zero tangential acceleration, the currently ubiquitous characterization of natural orbital systems as conservative (zero-work closed paths) has been refuted, and physically motivated orbital motion formulated in the context of gravitational

¹ There exists, of course, possibility to upfront refute the principles of conservation of energy and angular momentum in the Kepler-Newton system configuration, since the insertion of the equation of motion $\ddot{r} - r\dot{\varphi}^2 = -k/r^2$ into the invariants defining equations (7) and $(d/dt)(r^2\dot{\varphi})$ non-zero result is produced.

and anti-gravitational components providing explicit non-central (external) driving forces.

Consequently, the quest for the non-accounted for (outside) forces/effect should be directed towards revealing the hidden resources and the structuring potential features of the very Ether substrate with commonality of the two constituent central forces $-a/r^2$ and b/r^3 with the attracting and repulsive forces related to electric and magnetic phenomena, respectively. Consequently, numerous gravitational anomalies, geostationary satellites “dancing”, Lunar paradox and in general three- and many-bodies’ problems appear to be readily solvable by adopting the principle formulation of TGO and the implied reliance on the Ether - the so-called Pioneer anomaly becomes solvable, and the conceived “dark matter” and “dark energy” largely obsoleted.

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Appendix A: On the issue that has been revealed in relation to the Kepler's Equation

Here is provided explanation regarding the discrepancy between results of analytical derivation and numerical evaluation of the time-dependence of the angular momentum for the closed (Keplerian) ellipse with the dependence of polar angle (θ , or φ in this paper's body) on the eccentric anomaly angle (E) given by

$$\theta = 2 \cdot \arctng \left[\sqrt{\frac{1+e}{1-e}} \cdot \text{tng} \left(\frac{E}{2} \right) \right] \text{ along the famous Kepler's equation}$$

$$\frac{2\pi}{T} t = E(t) - e \cdot \sin(E(t)) - \text{please see the Peter Colwell's book "Solving$$

Kepler's Equation over Three Centuries" (Willman-Bell, Inc., 1993 – in Introductory section; available on request from the author of this paper), produced therein by apparent erroneous equating – in (1.2) - of the two forms of an ellipse: the ellipse radius dependence $r(t) = a \cdot [1 - e \cdot \cos(E(t))]$ and the conventional expression of ellipse as function of the polar (true anomaly) angle

$$r(t) = \frac{a \cdot (1 - e^2)}{1 + e \cdot \cos(\theta(t))}. \text{ By the time-differentiating the Kepler's equation to}$$

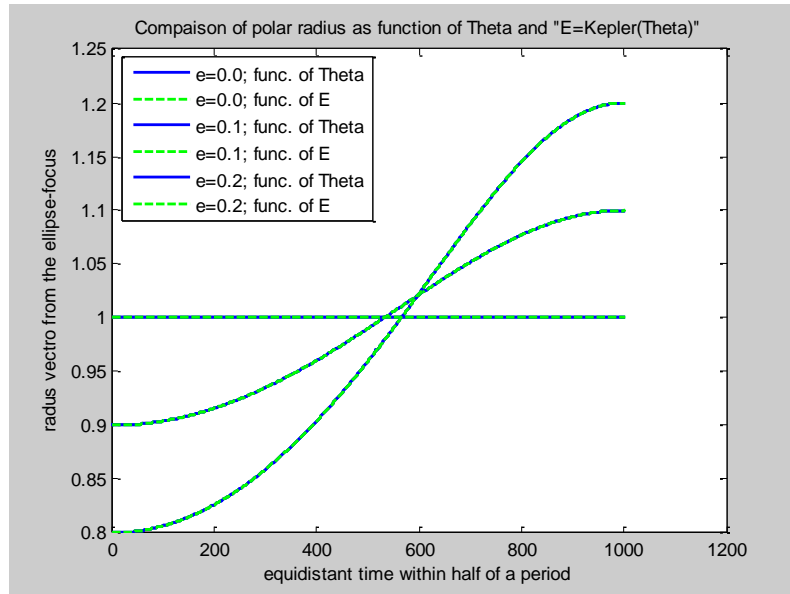
$$\text{produce } \frac{2\pi}{T} = \dot{E}(t) - e \cdot \cos(E(t)) \cdot \dot{E}(t), \text{ and further } \dot{E} = \frac{2\pi}{T} \frac{1}{1 - e \cdot \cos(E)},$$

$$\text{along with } \theta = 2 \cdot \arctng \left[\sqrt{\frac{1+e}{1-e}} \cdot \text{tng} \left(\frac{E}{2} \right) \right], \text{ the angular momentum (w/ con-}$$

veniently taking $a = 1 + e$) becomes

$$L = r^2 \cdot \dot{\theta} = (1+e)^2 \frac{2\pi}{T} \sqrt{\frac{1+e}{1-e}} \cdot \frac{1 - e \cdot \cos(E)}{\cos^2\left(\frac{E}{2}\right) + \frac{1+e}{1-e} \cdot \sin^2\left(\frac{E}{2}\right)}, \text{ revealing the}$$

proportionality of the expressions in the numerator and denominator, thus the constant values. The cause I have found is not in the incorrectness if the above identity - the MATLAB simulation confirms that:



Quite some time ago and just recently I had also indicated that the second Kepler's (swept-areas) law is not holding in the whole range of the elliptical trajectory, and just recently I have derived (the small notebook – account of January 26-27, 2018) relationship between eccentric anomaly and time – both hinting to inadequacy of the Kepler equation and its very development. It can be expected that the reported discrepancies between predicted and observed planetary ephemerides can be traceable to this issue ...

```
% Comparative evaluation of an ellipse plots as function of
% equidistant %polar ang and by the Keplerian equivalent ex-
% pression of polar angle as %function of the eccentric anom-
% ally, E; towards finall resolution of the %ang-mom. issue
```

```
% by . Nedic - November 27, 2017; CORRECTED ON JANUARY 29,
2018: '))*'
```

```
clear all;
```

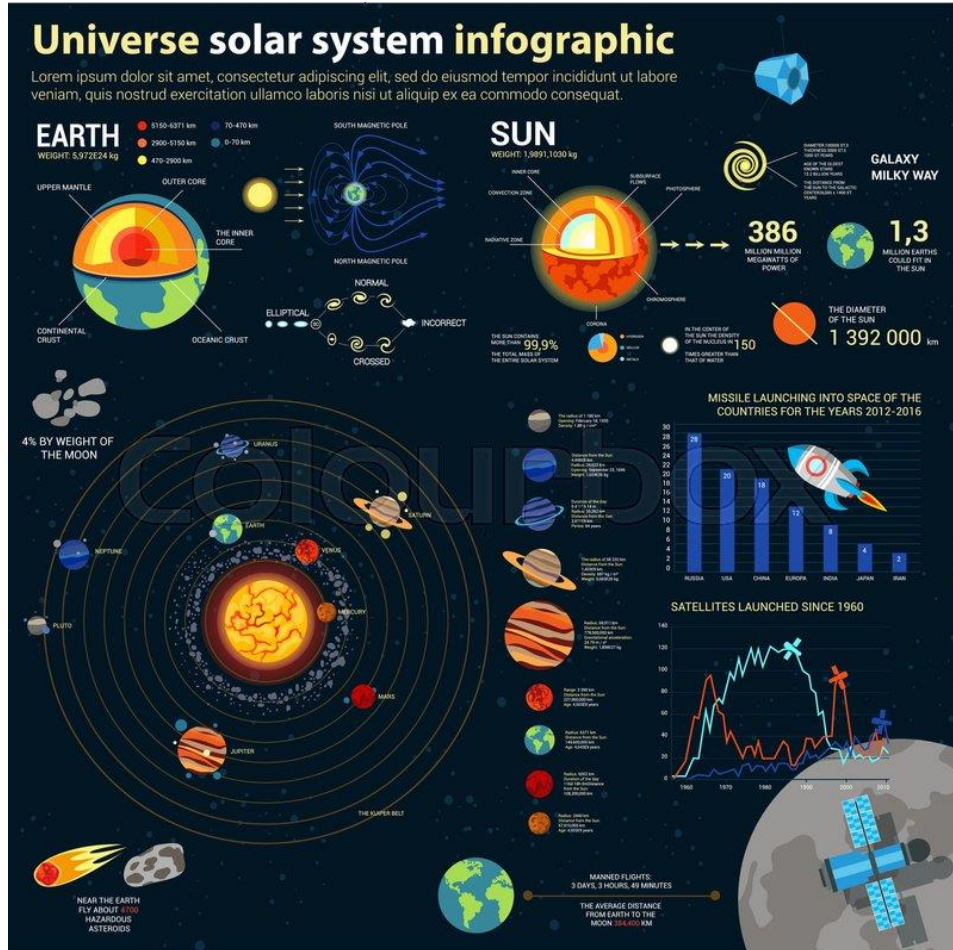
```
e=0.0:0.1:0.2; %0125; %eccentricity
a=1; % semi-major axis
```

```
for i=1:3
```

```
Tetha=0:pi/1000:1*pi;
%pi/2; % polar angle equidistant values (in my paper de-
noted Phi)
```

```
ElConvR=(a*(1-(e(i))^2))./(1+e(i)*cos(Tetha));
% conventional parametric form of radius
```

```
E=zeros(1,length(Tetha));  
% initialization of the eccentric anomaly samples  
  
E=2*atan(tan((Tetha/2))*(sqrt((1-e(i))/(1+e(i))))));  
% Keplerian dependence of E on Theta  
  
ElKeplR=(a*(1-e(i)*cos(E))); % conventional parametric form  
of radius  
  
figure(110)  
plot(ElConvR, 'LineWidth',2)  
hold on  
plot(ElKeplR, 'g--', 'LineWidth',2)  
hold on  
  
end
```



V. Christianto, F. Smarandache & Y. Umniyati

Chapter 15

On Cantorian Superfluid Vortex Cosmology: 14 years later and still in progress

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ABSTRACT

Around 14 years ago, one of these authors's early paper was published in *Apeiron Journal*. The complete paper appeared on January 2004 edition, while a condensed version of CSV has been published earlier at July 2003. Among key ideas in those two papers are: (a) a nonlinear cosmology model based on Navier-Stokes turbulence equations, which then they are connected to superfluid turbulence, and (b) the superfluid turbulence can lead to superfluid quantized vortices, which can be viewed as large scale version of Bohr's quantization rule, and (c) this superfluid quantized vortice interpretation of Bohr's rule allow us to predict quantization of planetary orbits in solar system including new possible orbits beyond Pluto. This paper is intended as a retrospect of what happened after the publication of those papers, and also some related ideas we have developed since that time. The first author (VC) would like to express sincere gratitude to the late Prof. Robert M. Kiehn for spending precious time to read and suggest corrections to our first paper on Cantorian Superfluid Vortex model, during 2002-2003. And also to Mr. Roy Keys from *Apeiron* for publishing our three papers describing CSV model. It is our hope that the new proposed view will inspire younger physicists and cosmologists to develop more realistic nonlinear cosmology models, and we also hope the ideas presented here can be verified with observation data.

Keywords: nonlinear cosmology, Newtonian cosmology, vortex dynamics, superfluid turbulence, Navier-Stokes equations, spiral galaxy, Ermakov-type equation.

PACS 2010: 96, 97, 98

1. Introduction

Around 14 years ago, one of these authors (VC)'s first paper was published in *Apeiron Journal*, January 2004, while a condensed version of the ideas has been published earlier at July 2003. [6][7] Among key ideas in those two papers are (a) a nonlinear cosmology model based on Navier-Stokes turbulence equations, which then they are connected to superfluid turbulence, and (b) the superfluid turbulence can lead to superfluid quantized vortices, which can be viewed as large scale version of Bohr's quantization rule, and (c) this superfluid quantized vortices interpretation of Bohr's rule allow us to predict quantization of planetary orbits in solar system including new possible orbits beyond Pluto. Then a follow-up paper was published in July 2004, because VC read about recent discovery of Sedna, which at the time it was the first discovered planetoid at the outer side of Pluto.

The discovery by Mike Brown-Trujillo team from Caltech was quite a big news back then. Other discoveries of new planetoids beyond Pluto have been reported since then, which seem to cause IAU to admit in a conference held around 2005: Pluto is no longer the edge of our solar system. Mike Brown also made a hit with his book, depicting himself as “Pluto killer.”

As with ourselves, the truth was that one of these authors (VC) was refused to publish more papers in Apeiron. So he decided to send subsequent papers to other journals, like *Annales de la Fondation Louis de Broglie* [8], after kind help by Dr. Valery Dvoeglazov, editor of Apeiron Journal.

After bouncing back and forth with other topics in astrophysics and quantum mechanics, finally VC found back his early interest on Cantorian Vortex turbulence cosmology. In a series of papers published in *Prespacetime Journal* (thanks to Dr. Huping Hu), since 2010 up to 2017, we explored topics like Primordial Rotation of Universe and also Cantorian Navier-Stokes cosmology (minus the superfluid term in 2004 paper), see [18]-[20].

Now, in this paper allow us to summarize a few new findings related to that topic.

In this paper we will discuss a novel Newtonian cosmology model with vortex, which offers wide implications from solar system, galaxy modeling up to large scale structures of the Universe, where we include the vortical-rotational effect of the whole Universe. We review an Ermakov-type equation obtained by Nurgaliev [1][2], and solve the equation numerically with Mathematica 11.

It is our hope that the new proposed view will lead to more rigorous nonlinear cosmology models, and we also hope the ideas presented here can be verified with observation data.

2. A few theoretical backgrounds

Some years ago, Matt Visser asked the following interesting questions: How much of modern cosmology is really cosmography? How much of modern cosmology is independent of the Einstein equations? (Independent of the Friedmann equations?) These questions are becoming increasingly germane — as the models cosmologists use for the stress-energy content of the universe become increasingly *baroque*. [5]

In this regard, academician Isaak Khalatnikov mentioned at the 13th Marcel Grossman Conference¹, that Lev Landau suggesting that something is too symmetric in the models yielding singularities, and that this problem is one of the three most important problems of modern physics. The aim of this report is to show that singularities are, indeed, consequences of such an overly “symmetrical approach” in building non-robust (i.e. without structural stability) toy models with singularities. Such models typically apply a synchronous system of reference and “Hubble’s law”, neglecting not-to-be-averaged-out quadratic terms of perturbations (specifically, differentially rotational velocities, vortexes).[1]

Only by accounting the overlooked factors instead of Einstein’s ad hoc introduction of a new entity, which was later declared by him as his “biggest blunder”, can we correctly interpret accelerated cosmological expansion, as well as provide possibility of static solution. The common perception of the observed accelerated expansion is that there is need either in modifying the General Relativity or discover new particles with unusual properties. Interestingly enough, both ways are possible depending on what kind of system

¹ <http://www.icra.it/mg/mg13/>

of reference and corresponding interpretation are chosen, a decision which is usually made depending on the level of “*geometrization*.”[1]

Local rotations (vortices) play a role in radical stabilization of the cosmological singularity in the retrospective extrapolation, making possible a static or steady-state

(on the average) Universe or local region. Therefore Einstein could “permit” the galaxies to rotate instead of postulating a cosmological constant *ad hoc* in his general-relativistic consideration of a static Universe. Though, it does not necessarily mean that the cosmological constant is not necessary for other arguments.[2]

3. A few historical notes

Since long time ago, there were numerous models of the Universe, dating back to Ptolemaic geocentric model, which was subsequently replaced by Nicolas Copernicus discovery. Copernicus model then was brought into fame after Isaac Newton published his book. But other than Newton, there was a model of Universe as a turbulent fluid (hurricane) brought by a French philosopher

and mathematician, R. Descartes. But, this model was almost forgotten. Many physicists rejected Descartes' model because it stood against Newtonian model, but the truth is turbulence model can be expressed in Navier-Stokes equations, and Navier-Stokes equations can be considered as the rigorous formulation of Newtonian laws, especially for fluid dynamics. In other words, we can say that Newtonian turbulence Universe is not in direct contradiction with Newtonian laws. Therefore, in this paper we submit wholeheartedly a proposal that the Universe can be modelled as Newtonian-Vortex based on 3D Navier-Stokes equations. We shall show some implications of this new model in the following sections.

4. Solar System model

In this section, we will review the work which was carried out by VC and FS during the past ten years or so. The basic assumption here is that the Solar System's planetary orbits are quantized. But how do their orbits behave? Do they follow Titius-Bode's law? Our answer can be summarized as follows:[6][7][8]

Navier-Stokes equations → superfluid quantized vortices

→ Bohr's quantization

Our predictive model based on that scheme has yielded some interesting results which may be comparable with the observed orbits of planetoids beyond Pluto, including what is dubbed as Sedna.[9] And it seems that the proposed model is slightly better compared to Nottale-Schumacher's gravitational Schrödinger model and also Titius-Bode's empirical law.

5. Spiral Galaxy model

In this section, we discuss a simple model of galaxies based on a postulate of turbulence vortices which govern the galaxy dynamics. Abstract of Vatistas' paper told clearly:[10]

Expanding our previous work on turbulent whirls [1] we have uncovered a similarity with the similarity shared by intense vortices. Using the new information we compress the tangential velocity profiles of a diverse set of vortices into one and thus identify those that belong to the same genus. Examining the Laser Doppler Anemometer (LDA) results for mechanically produced vortices and radar data of several tropical cyclones, we find that the uplift and flattening effect of tangential velocity is a consequence of turbulence. Reasoning by analogy we conclude that turbulence in the interstellar medium could indeed introduce a flattening effect in the galactic rotation curves.

The result of his model equation can yield prediction which is close to observation (without invoking dark matter hypothesis), as shown in the following diagram:

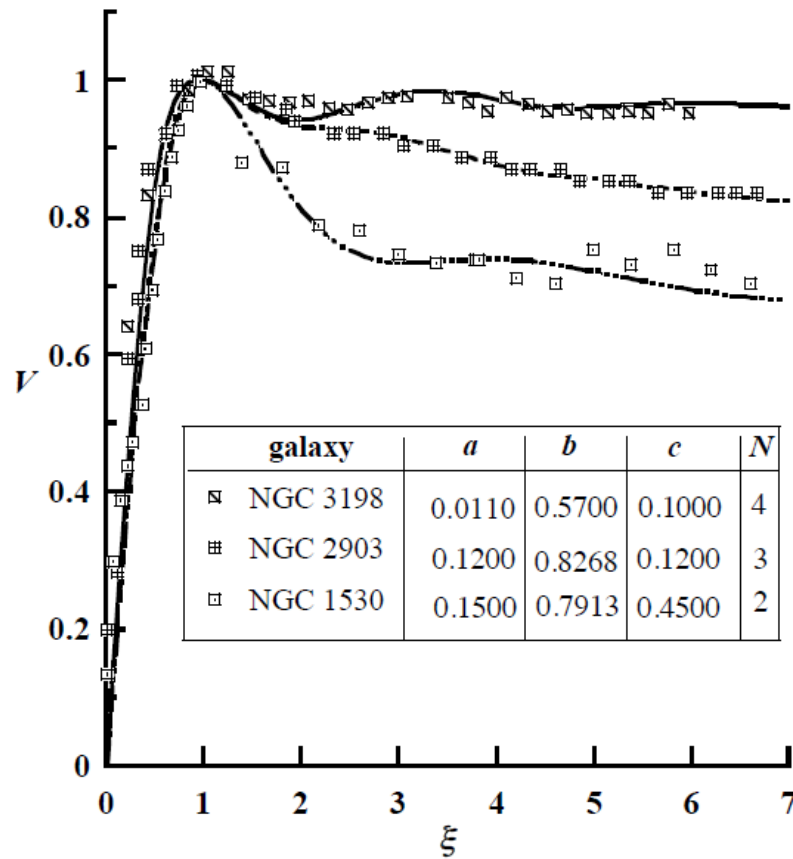


Diagram 1. From Vatisas [10]

Therefore it appears possible to model galaxies without invoking numerous *ad hoc* assumptions, once we accept the existence of turbulent interstellar medium. The model is also governed by Navier-Stokes equations.[10]

6. Deriving Ermakov-type equation for Newtonian Universe with vortex

It has been known for long time that most of the existing cosmology models have *singularity* problem. Cosmological singularity has been a consequence of excessive symmetry of flow, such as “Hubble’s law”. A more realistic one is suggested, based on Newtonian cosmology model but here we include the vortical-rotational effect of the whole Universe.

In this section, we will derive an Ermakov-type equation following Nurgaliev [1]. Then we will solve it numerically using Mathematica 11.

After he proceeds with some initial assumptions, Nurgaliev obtained a new simple local cosmological equation:[2]

$$\dot{H} + H^2 = \omega^2 + \frac{4\pi G}{3} \rho,$$

(1)

where $\dot{H} = dH / dt$. Here, H, G, ω and ρ stand for Hubble constant, Newtonian gravitational constant, angular speed, and density, respectively.

The angular momentum conservation law $\omega R^2 = \text{const} = K$ and the mass conservation law $(4\pi/3)\rho R^3 = \text{const} = M$ makes equation (1) solvable:[2]

$$\dot{H} + H^2 = \frac{K^2}{R^4} - \frac{GM}{R^3},$$

(2)

or

$$\ddot{R} = \frac{K^2}{R^3} - \frac{GM}{R^2}.$$

(3)

Equation (3) may be written as Ermakov-type nonlinear equation as follows;

$$\ddot{R} + \frac{GM}{R^2} = \frac{K^2}{R^3}.$$

(4)

Nurgaliev tried to integrate equation (3), but now we will solve the above equation with Mathematica 11. First, we will rewrite this equation by replacing $GM=A$, $K^2=B$, so we get:

$$\ddot{R} + \frac{A}{R^2} = \frac{B}{R^3}.$$

(5)

As with what Nurgaliev did in [1][2], we also tried different sets of A and B values, as follows:

a. A and B < 0

```
A=-10;
B=-10;
ODE=x''[t]+A/x[t]^2-B/x[t]^3==0;
sol=NDSolve[{ODE,x[0]==1,x'[0]==1},x[t],{t,-10,10}]
Plot[x[t]/.sol,{t,-10,10}]
```

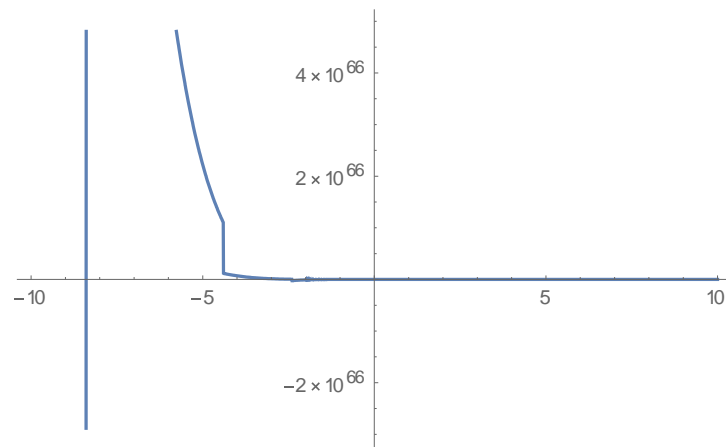


Diagram 2. Plot of numerical solution of Ermakov-type equation for A < 0, B < 0

b. A > 0, B < 0

```
A=1;
B=-10;
ODE=x''[t]+A/x[t]^2-B/x[t]^3==0;
sol=NDSolve[{ODE,x[0]==1,x'[0]==1},x[t],{t,-10,10}]
Plot[x[t]/.sol,{t,-10,10}]
```

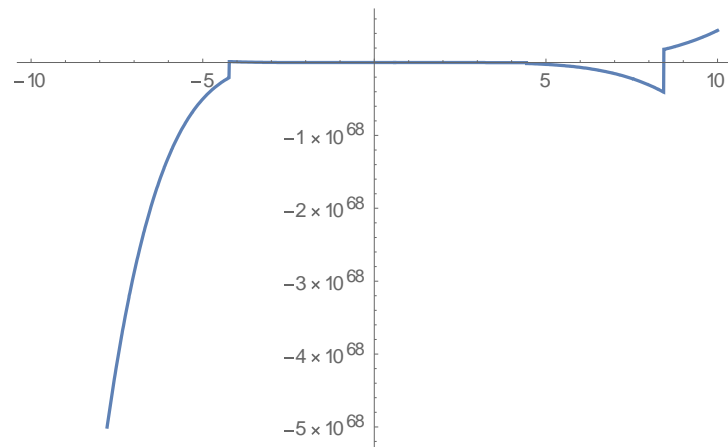



Diagram 3. Plot of numerical solution of Ermakov-type equation for $A>0$, $B<0$

From the above numerical experiments, we conclude that the evolution of the Universe depends on the constants involved, especially on the rotational-vortex structure of the Universe. This needs to be investigated in more detailed for sure.

One conclusion that we may derive especially from Diagram 3, is that our computational simulation suggests that it is possible to consider that the Universe has existed for long time in prolonged stagnation period, then suddenly it burst out from *empty and formless* (Gen. 1:2), to take its current shape with observed “accelerated expansion.”

As an implication, we may arrive at a precise model of flattening velocity of galaxies without having to invoke *ad-hoc* assumptions such as dark matter.

Therefore, it is perhaps noteworthy to discuss briefly a simple model of galaxies based on a postulate of turbulence vortices which govern the galaxy dynamics. The result of Vattistas' model equation can yield prediction which is close to observation, see section 5 above.

7. Plausible medicine application: modelling virus with 3D Navier-Stokes equations

Although virus is widely known to significantly affect many biological form of life, its physical model is quite rare. In a paper, L.H. Ford wrote:

“Two simple models for the particle are treated, a liquid drop model and an elastic sphere model. Some estimates for the lowest vibrational frequency are given for each model. It is concluded that this frequency is likely to be of the order of a few GHz for particles with a radius of the order of 50nm.” [21]

Such an investigation on acoustic vibration of virus particles may resonate with other reports by Prof. Luc Montagnier [23][24] and

also our own hypothesis [25][26], on *wave character of biological entities* such as DNA, virus, water etc.

In this regard, there are studies on the mechanical properties of (biology) materials based on experiments on the acoustic vibrations of elastic nanostructures in fluid media, where the medium surrounding the nanostructure is typically modeled as a Newtonian fluid.

In this section we will also discuss a Newtonian fluid, i.e. 3D Navier-Stokes equations.

It is our hope that the new proposed method can be verified with experiments.

In 2015, Vahe Galstyan, On Shun Pak and Howard A. Stone published a paper where they discuss breathing mode of an elastic sphere in Newtonian and complex fluids.[22] They consider the radial vibration of an elastic sphere in a compressible viscous fluid, where the displacement field of the elastic fluid medium is governed by the Navier equation in elasticity. This spherically symmetric motion is also called the *breathing mode*.

They use a linearized version of Navier-Stokes equations, as follows:[22]

$$\rho_v \frac{\partial v}{\partial t} = -\nabla p + \eta \nabla^2 v + \left(\kappa + \frac{\eta}{3} \right) \nabla,$$

(1)

where ρ_v is the density of the fluid, η is the shear viscosity, κ is the bulk viscosity, and p is the thermodynamic pressure.

There are other authors who work on linearized NS problem, here we mention a few of them: Foias and Saut [27]; Thomann & Guenther [28]; A. Leonard [29].

In fluid mechanics, there is an essential deficiency of the analytical solutions of non-stationary 3D Navier–Stokes equations. Now, instead of using linearized NS equations as above, we will discuss a numerical solution of 3D Navier-Stokes equations based on Sergey Erhskov's papers [13][14].

The Navier-Stokes system of equations for incompressible flow of Newtonian fluids can be written in the Cartesian coordinates as below (under the proper initial conditions):[13]

$$\nabla \cdot \vec{u} = 0,$$

(2)

$$\frac{\partial \vec{u}}{\partial t} + (\vec{u} \cdot \nabla) \vec{u} = -\frac{\nabla p}{\rho} + \nu \cdot \nabla^2 \vec{u} + \vec{F}.$$

(3)

Where u is the flow velocity, a vector field, ρ is the fluid density, p is the pressure, ν is the kinematic viscosity, and F represents external force (per unit mass of volume) acting on the fluid.[13]

In ref. [13], Ershkov explores new ansatz of derivation of non-stationary solution for the Navier–Stokes equations in the case of incompressible flow, where his results can be written in general case as a mixed system of 2 coupled-Riccati ODEs (in regard to the time-parameter t). But instead of solving the problem analytically, we will try to find a numerical solution with the help of computer algebra package of Mathematica 11.

The coupled Riccati ODEs read as follows:[13]

$$a' = \frac{w_y}{2} \cdot a^2 - (w_x \cdot b) \cdot a - \frac{w_y}{2} (b^2 - 1) + w_z \cdot b, \quad (4)$$

$$b' = -\frac{w_x}{2} \cdot b^2 + (w_y \cdot a) \cdot b + \frac{w_x}{2} (a^2 - 1) - w_z \cdot a. \quad (5)$$

First, equations (4) and (5) can be rewritten in the form as follows:

$$x(t)' = \frac{v}{2} \cdot x(t)^2 - (u \cdot y(t)) \cdot x(t) - \frac{v}{2} (y(t)^2 - 1) + w \cdot y(t), \quad (6)$$

$$y(t)' = -\frac{u}{2} \cdot y(t)^2 + (v \cdot x(t)) \cdot y(t) + \frac{u}{2} (x(t)^2 - 1) - w \cdot x(t). \quad (7)$$

Then we can put the above equations into Mathematica expression:[3]

```
v=1;
u=1;
w=1;
{xans6[t_], vans6[t_]}=
{x[t],y[t]}/.Flatten[NDSolve[{x'[t]==(v/2)*x[t]^2-(u*y[t])*x[t]-(v/2)*(y[t]^2-
1)+w*y[t], y'[t]==-(u/2)*y[t]^2+(v*x[t])*y[t]+(u/2)*(x[t]^2-1)-w*x[t],
x[0]==1,y[0]==0}, {x[t],y[t]},{t,0,10}]]

graphx6 = Plot[xans6[t],{t,0,10}, AxesLabel->{"t","x"},PlotStyle->Dash-
ing[{0.02,0.02}]];
Show[graphx6,graphx6]
```

The result is as shown below:[3]

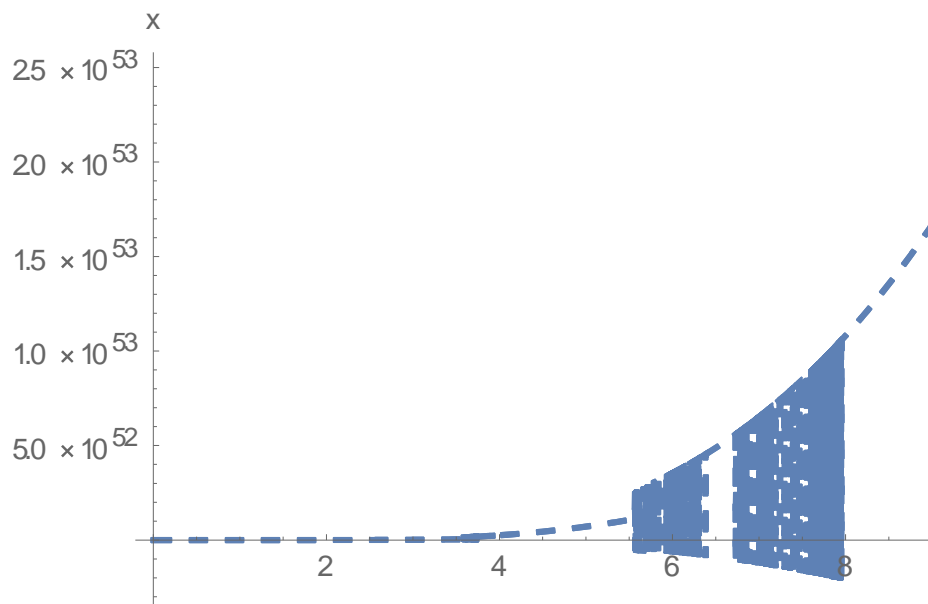


DIAGRAM 4. Graphical plot of solution for case $v=u=w=1$. See [3]

Concluding remarks

Around 14 years ago, one of these authors's early paper was published in Apeiron Journal. The complete paper appeared on January 2004 edition, while a condensed version of CSV has been published earlier at July 2003. This paper is intended as a retrospect of what happened after the publication of those papers, and also a number of new findings that we have developed since that time.

In the meantime, it has been known for long time that most of the existing cosmology models have singularity problem. Cosmological singularity has been a consequence of excessive symmetry of flow, such as "Hubble's law". More realistic one is suggested, based on Newtonian cosmology model but here we include the vortical-rotational effect of the whole Universe. We discuss a plausible model for describing planetary quantization in Solar system and also flattening velocity observed in numerous galaxies. We also review a Riccati-type equation obtained by Nurgaliev, and solve the equation numerically with Mathematica 11.

We also discuss medicine application of this approach for virus modelling, i.e. how to solve 3D Navier-Stokes equations numeri-

cally. It is our hope that the above numerical solution of 3D Navier-Stokes equations can be found useful, especially in computational nanomedicine.

The solutions obtained here opens up new ways to interpret existing solutions of known 3D Navier-Stokes problem in physics, astrophysics, cosmology and engineering/medicine fields, especially those associated with nonlinear hydrodynamics and turbulence modelling.

It is our hope that the new proposed Newtonian Cosmology model with vortex can be verified with more extensive observation data.

Acknowledgment

The first author (VC) dedicates this paper to the late Prof. Robert M. Kiehn for spending precious time to read and suggest corrections to early draft of his paper on Cantorian Superfluid Vortex model, back in 2002-2003. And also to Dr. Valery Dvoeglazov and Mr. Roy Keys from Apeiron Journal for publishing our 3 papers on CSV.

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- version 1.0: 6 March 2018, pk. 12:11

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Chapter 16

Remark on vacuum fluctuation as the cause of Universe creation:¹

(Or How Neutrosophic Logic and Material Point Method may Resolve
Dispute on the Origin of the Universe through re-reading Gen. 1:1-2)

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Abstract

Questions regarding the formation of the Universe and what was there before the existence of Early Universe have been great interest to mankind of all times. In recent decades, the Big Bang as described by the Lambda CDM-Standard Model Cosmology has become widely accepted by majority of physics and cosmology communities. Among other things, we can cite A.A. Grib & Pavlov who pointed out some problems of heavy particles creation out of vacuum and also other proposal of *Creatio ex nihilo* theory (CET). But the philosophical problems remain, as Vaas pointed out: Did the universe have a beginning or does it exist forever, i.e. is it eternal at least in relation to the past? This fundamental question was a main topic in ancient philosophy of nature and the Middle Ages, and still has its revival in modern physical cosmology both in the controversy between the big bang and steady state models some decades ago and in the contemporary attempts to explain the big bang within a quantum cosmological (*vacuum fluctuation*) framework. In this paper we argue that Neutrosophic Logic offers a resolution to the long standing disputes between beginning and eternity of the Universe. In other words, in this respect we agree with Vaas,

¹ A more complete version of this paper has been accepted and published by *Asia Mathematica J.* vol. 3 no. 1, April 2019, url: <http://www.asiamath.org/archives.html>

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i.e. it can be shown: “how a conceptual and perhaps physical solution of the temporal aspect of Immanuel Kant’s „*first antinomy of pure reason*“ is possible, i.e. how our universe in some respect could have both a beginning and an eternal existence. Therefore, paradoxically, there might have been a time before time or a beginning of time in time.” By the help of computational simulation, we also show how a model of early Universe with rotation can fit this new picture. Further observations are recommended.

Keywords: Big Bang, Steady state, rotating universe, fluid, singularity-free, cosmology model, early Universe, Genesis, Spirit, Creation.

1. Introduction

Questions regarding the formation of the Universe and what was there before the existence of Early Universe have been great interest to mankind of all times. In recent decades, the Big Bang as described by the Lambda CDM-Standard Model Cosmology has become widely accepted by majority of physics and cosmology communities. Among other things, we can cite A.A. Grib & Pavlov who pointed possible heavy particles creation out of vacuum and also other proposal such as Creatio Ex-Nihilo theory (CEN).[36-37]

But the philosophical problems remain, as Vaas pointed out: Did the universe have a beginning or does it exist forever, i.e. is it eternal at least in relation to the past? This fundamental question was a main topic in ancient philosophy of nature and the Middle Ages. Philosophically it was more or less banished then by Immanuel Kant’s *Critique of Pure Reason*. But it used to have and still has its revival in modern physical cosmology both in the controversy between the big bang and steady state models some decades ago and in the contemporary attempts to explain the big bang within a quantum cosmological framework.

Interestingly, Vaas also noted that Immanuel Kant, in his *Critique of Pure Reason* (1781/1787), argued that it is possible to prove both that the world has a beginning and that it is eternal (first antinomy of pure reason, A426f/B454f). As Kant believed he could overcome this „self-contradiction of reason“ („*Widerspruch der Vernunft mit ihr selbst*“, A740)

by what he called „*transcendental idealism*“, the question whether the cosmos exists forever or not has almost vanished in philosophical discussions. [3]

Further problems also remain with the BB theories, such as: a) what force was responsible to trigger the first creation of heavy particles out of vacuum?, b) if we take the statistical approach, i.e. the vacuum fluctuation alone was responsible for first creation, then one can ask how much is probability of such statistical chance to create all regularities as we observe of the Universe? (such as Tiftt’s quantized redshift data)

In this paper we will take a closer look at Genesis 1:2 to see whether the widely-accepted notion of *creation ex-nihilo* is supported by Hebrew Bible or not. It turns out that Neutrosophic Logic is in agreement with Kant and Vaas’s position, it offers a resolution to the long standing disputes between beginning and eternity of the Universe. In other words, in this respect we agree with Vaas: “how a conceptual and perhaps physical solution of the temporal aspect of Immanuel Kant’s „*first antinomy of pure reason*“ is possible, i.e. how our universe in some respect could have both a beginning and an eternal existence. Therefore, paradoxically, there might have been a time before time or a beginning of time in time.”[3]

In the subsequent chapter we will discuss how to answer this question by the lens of hermeneutics of Sherlock Holmes. This is a tool of mind which we think to be a better way compared to critical hermeneutics.

- What is *Hermeneutics of Sherlock Holmes*?

One article suggests:¹

Holmes: “I have no data yet. It is a capital mistake to theorize before one has data. Insensibly one begins to twist facts to suit theories, instead of theories to suit facts.”

Far too often students of the Bible (and cosmology folks as well) twist verses to suit interpretations instead of formulating interpretations to suit what the verses say.

Guide: Don’t approach your passage assuming you know what it means. Rather, use the data in the passage – the words that are

¹ <https://www.str.org/blog/learning-hermeneutics-from-holmes>

used and how they fit together – to point you toward the correct interpretation.

2. A closer look at Genesis 1:1-2 & implications

One of the biggest mysteries in cosmogony and cosmology studies is perhaps: *How to interpret properly Genesis chapter 1:2*. Traditionally, philosophers proposed that God created the Universe out of nothingness (from reading “empty and formless” and “*bara*” words; this contention is called “*creatio ex nihilo*.”). Understandably, such a model can lead to various interpretations, including the notorious “cosmic egg” (primeval atom) model as suggested by Georges Lemaitre, which then led to Big Bang model.[18-20] Subsequently, many cosmologists accept it without asking, that Big Bang stands as the most faithful and nearest theory to Biblical account of creation. But we can ask: Is that primeval atom model the true and faithful reading of Genesis 1:2?

Let us start our discussion with examining key biblical words of Hebrew Bible, especially Genesis 1:1-2. It can be shown that the widely accepted creation ex nihilo is a *post-biblical invention*, rather than as faithful reading of the verses. To quote Ian Barbour: “*Creation out of nothing is not a biblical concept.*”[4]

Let us consider some biblical passages:

- The literal meaning of Gen. 1:1, “bareishit bara Elohim.” This very first statement of the book of Genesis literally reads: ‘first’ and ‘beginning’ are reasonable alternatives for the Hebrew noun, *reishit*. Also note that in Hebrew, subjects and verbs are usually ordered verb-first (unlike English in which the subject is written first). If the verb and subject of this verse are reordered according to natural English grammar we read: [1]
 {In, When} {first, beginning} Elohim created...
reishit: The noun, reishit, has as its root the letters, ראש (Resh - Aleph-Shin). Words derived from this root often carry the meaning of ‘primary’, ‘chief’, ‘begin’, ‘first’ or “first-in-line”, “head

of”, and so forth. Harris’s Theological Wordbook of the Old Testament (TWOT) is more specific, namely, *reishit* means^[1]

“...*first, beginning, choicest, first or best of a group. [Reishit is] a feminine noun derived from the root [Resh-Aleph-Shin], it appears fifty times in nearly all parts of the [Old Testament]. [Its] primary meaning is “first” or “beginning” of a series.*”

Accordingly, we can now retranslate *bāreishit bara Elohim* as “When first created Elohim”, or as we would render in English,^[1]

When Elohim first created...

- Gen. 1:2, “And the earth had been.” In English this is easily handled by the past perfect tense (also called the pluperfect or the “flashback” tense). Likewise, if *haytah* in v 1:2 is translated as a past perfect verb, then verses 1:1-2 would read,^[1]

When Elohim first created the heavens and the earth, the earth had been ...

In this translation the universe, in some form or other, was already in existence when God executed His first creative act, the creation of light.

- A re-reading of Gen. 2:7 with Hermeneutics of Sherlock Holmes¹

If we glance at Gen. 2: 7, we see at a glance that man is made up of the dust of the ground (*adamah*) which is breathed by the breath of life by God (*nephesh*). Here we can ask, does this text really support the Cartesian dualism view?

We do not think so, because the Hebrew concept of man and life is integral. The bottom line: it is not the spirit trapped in the body (Platonic), but the body is flowing in the ocean of spirit.

- Let's look at three more texts:

¹ Check Eric McKiddie’s article: <https://www.thegospelcoalition.org/blogs/trevin-wax/10-tips-on-solving-mysterious-bible-passages-from-sherlock-holmes/>

a. Gen. 1: 2, "*The earth is without form and void, darkness over the deep, and the Spirit of God hovering over the waters.*" Patterns such as Adam's creation can also be encountered in the creation story of the universe. Earth and the oceans already exist (similar to *adamah*), but still empty and formless. Then the Spirit of God hovered over it, in the original text "*ruach*" can be interpreted as a strong wind (storm). So we can imagine there is wind/hurricane, then in the storm that God said, and there was the creation of the universe. See also Amos Yong [6], also Hildebrandt [15]. From a scientific point of view, it is well known in aerodynamics that turbulence can cause sound (*turbulence-generated sound*). And primordial sound waves are indeed observed by astronomers.

b. Ps. 107: 25, "*He said, he raised up a storm that lifted up his waves.*" The relation between the word (sound) and the storm (turbulence) is interactive. Which one can cause other. That is, God can speak and then storms, or the Spirit of God causes a storm. Then came the voice.

c. Ezekiel. 37: 7, "*Then I prophesy as I am commanded, and as soon as I prophesy, it sounds, indeed, a crackling sound, and the bones meet with one another.*" In Ezekiel it appears that the story of the creation of Adam is repeated, that the Spirit of God is blowing (storm), then the sound of the dead bones arises.

The conclusion of the three verses above seems to be that man is made up of *adamah* which is animated by the breath or Spirit of God. He is not matter, more accurately referred to as spirit in matter.

In other words, a close reading of Hebrew Bible seems to suggest that *creation ex-nihilo* is a post-biblical invention. Other scholars have suggested an alternative concept, called *creatio ex-materia*, but many orthodox Christian scholars have raised objection to this notion, partly because the term seems to undermine God's ultimate power and control of the Universe. Besides, the notion of creation ex-materia has been advocated by Mormon preachers.

To overcome this problem, and based on what we learned recently, allow us now to come up with a new term: **creation ex-rotatione** (rotatione is a Latin word for "rotation"). As we shall see in the next chapter, it is possible to come up with a physical model of early Universe with rotation, where

the raw materials have been existed for long period of time, but suddenly it burst out into creation. And it seems to fit with Kant's idea to resolve the dichotomy between finite past or eternal Universe. Furthermore, it can be shown that the model naturally leads to accelerated expansion, without having to invoke ad hoc assumption like dark energy or cosmological constant.

3. A physical model of turbulence-generated sound for early Universe

Our discussion starts from the fundamental question: how can we include the rotation in early Universe model? After answering that question, we will discuss how "turbulence-generated sound" can be put into a mathematical model for the early Universe. We are aware that the notion of turbulence-generated sound is not new term at all especially in aerodynamics, but the term is rarely used in cosmology until now. We shall show that 3D Navier-Stokes will lead to non-linear acoustics models, which means that a turbulence/storm can generate sound wave.

a. How can we include rotation in early Universe model?

It has been known for long time that most of the existing cosmology models have singularity problem. Cosmological singularity has been a consequence of excessive symmetry of flow, such as "Hubble's law". More realistic one is suggested, based on Newtonian cosmology model but here we include the vortical-rotational effect of the whole Universe.

In this section, we will derive an Ermakov-type equation following Nurgaliev [8]. Then we will solve it numerically using Mathematica 11.

After he proceeds with some initial assumptions, Nurgaliev obtained a new simple local cosmological equation:[8][9]

$$\dot{H} + H^2 = \omega^2 + \frac{4\pi G}{3} \rho,$$

(1)

Where $\dot{H} = dH / dt$.

The angular momentum conservation law $\omega R^2 = \text{const} = K$ and the mass conservation law $(4\pi/3)\rho R^3 = \text{const} = M$ makes equation (5) solvable:[9]

$$\dot{H} + H^2 = \frac{K^2}{R^4} - \frac{GM}{R^3},$$

(2)

Or

$$\ddot{R} = \frac{K^2}{R^3} - \frac{GM}{R^2}.$$

(3)

Equation (3) may be written as Ermakov-type nonlinear equation as follows;

$$\ddot{R} + \frac{GM}{R^2} = \frac{K^2}{R^3}.$$

(4)

Nurgaliev tried to integrate equation (3), but now we will solve the above equation with Mathematica 11. First, we will rewrite this equation by replacing $GM=A$, $K^2=B$, so we get:

$$\ddot{R} + \frac{A}{R^2} = \frac{B}{R^3}.$$

(5)

As with what Nurgaliev did in [8][9], we also tried different sets of A and B values, as follows:

c. A and $B < 0$

$A=-10$;

$B=-10$;

$\text{ODE}=\text{x}''[\text{t}]+A/\text{x}[\text{t}]^2-B/\text{x}[\text{t}]^3==0$;

$\text{sol}=\text{NDSolve}[\{\text{ODE},\text{x}[0]==1,\text{x}'[0]==1\},\text{x}[\text{t}],\{\text{t},-10,10\}]$

$\text{Plot}[\text{x}[\text{t}]/.\text{sol},\{\text{t},-10,10\}]$

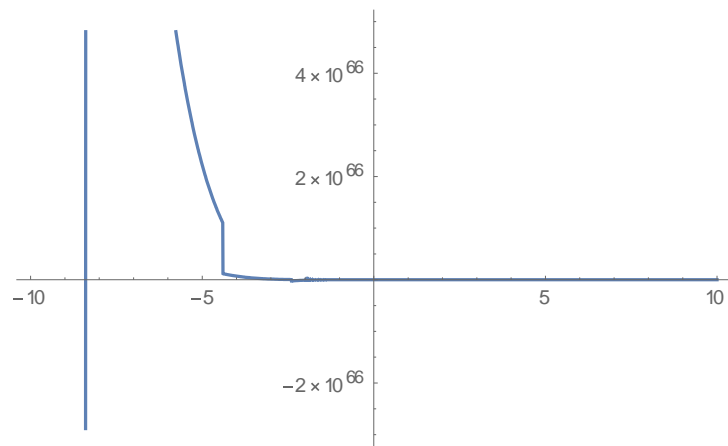


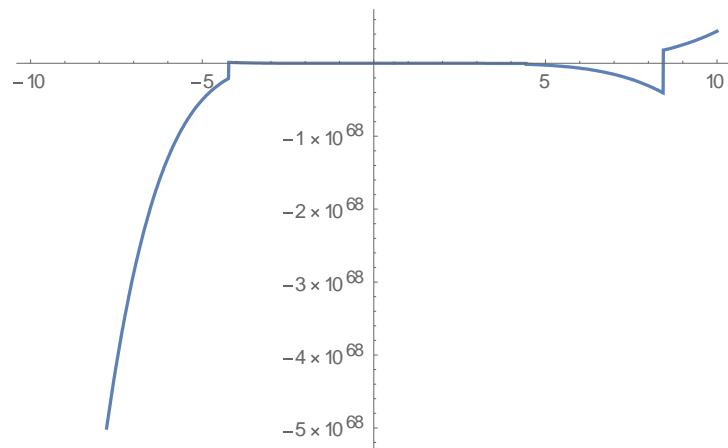
Figure 1. Plot of Ermakov-type solution for $A=-10$, $B=-10$

d. $A > 0$, $B < 0$

```

A=1;
B=-10;
ODE=x''[t]+A/x[t]^2-B/x[t]^3==0;
sol=NDSolve[{ODE,x[0]==1,x'[0]==1},x[t],{t,-10,10}]
Plot[x[t]/.sol,{t,-10,10}]

```

Figure 2. Plot of Ermakov-type solution for $A=1$, $B=-10$

From the above numerical experiments, we conclude that the evolution of the Universe depends on the constants involved, especially on the rotational-vortex structure of the Universe. This needs to be investigated in more detailed for sure.

One conclusion that we may derive especially from Figure 2, is that our computational simulation suggests that it is possible to

consider that the Universe has existed for long time in prolonged stagnation period, then suddenly it burst out from *empty and formless* (Gen. 1:2), to take its current shape with accelerated expansion.

As an implication, we may arrive at a precise model of flattening velocity of galaxies without having to invoke *ad-hoc* assumptions such as dark matter.

Therefore, it is perhaps noteworthy to discuss briefly a simple model of galaxies based on a postulate of turbulence vortices which govern the galaxy dynamics. The result of Vastistas' model equation can yield prediction which is close to observation, as shown in the following diagram:[14]

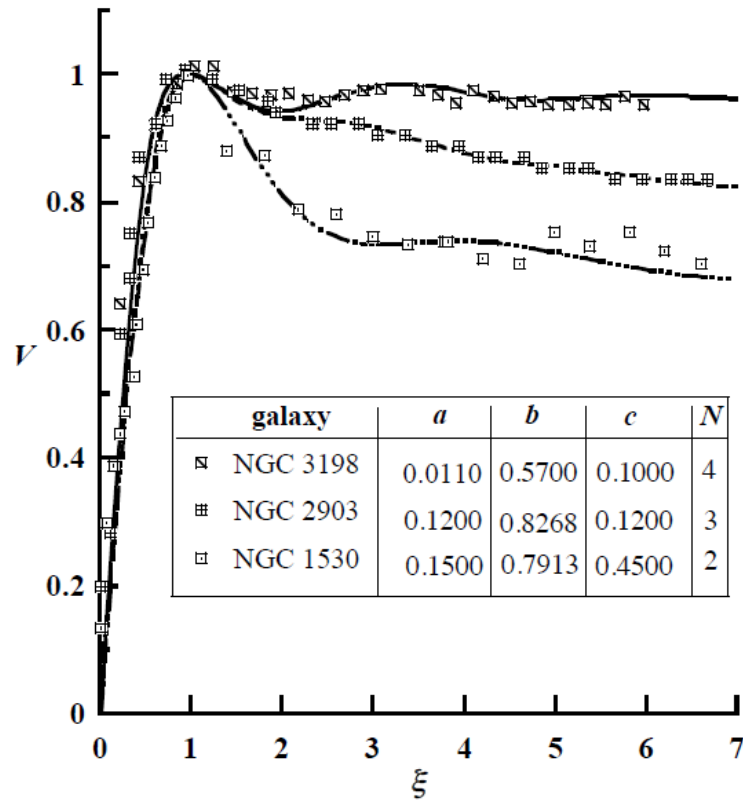


Figure 3. From Vattistas [14]

Therefore it appears possible to model galaxies without invoking numerous *ad hoc* assumptions such as *dark matter*, once we accept the existence of turbulent interstellar medium. The Vattistas model is also governed by Navier-Stokes equations, see for instance [14].

- b. How “turbulence-generated sound” can be put into a mathematical model for the early Universe

We are aware that the notion of turbulence-generated sound is not new term at all especially in aerodynamics, but the term is rarely used in cosmology until now. We will consider some papers where it can be shown that 3D Navier-Stokes will lead to non-linear acoustics models, which means that a turbulence/storm can generate sound wave.

In this section we consider only two approaches:

- Shugaev-Cherkasov-Solenaya's model: They investigate acoustic radiation emitted by three-dimensional (3D) vortex rings in air on the basis of the unsteady Navier–Stokes equations. Power series expansions of the unknown functions with respect to the initial vorticity which is supposed to be small are used. In such a manner the system of the Navier–Stokes equations is reduced to a parabolic system with constant coefficients at high derivatives. [16]
- Rozanova-Pierrat's Kuznetsov equation: she analysed the existing derivation of the models of non-linear acoustics such as the Kuznetsov equation, the NPE equation and the KZK equation. The technique of introducing a corrector in the derivation ansatz allows to consider the solutions of these equations as approximations of the solution of the initial system (a compressible Navier-Stokes/Euler system). The direct derivation shows that the Kuznetsov equation is the first order approximation of the Navier-Stokes system, the KZK and NPE equations are the first order approximations of the Kuznetsov equation and the second order approximations of the Navier-Stokes system. [17]

4. Vortex-sound theory and fluidic Maxwell equations

There are a number of proposals to revise Maxwell equations. But few has considered a fresh starting point with regards to the (sub) structure of aether. It is very interesting to note that Prof. T. Kambe from University of Tokyo has made a connection between the equation of vortex-sound theory and its analogue fluid Maxwell equations. He wrote that it would be no exaggeration to say that any vortex motion excites *acoustic* waves. [30]

He considers the equation of vortex sound of the form: [30]

$$\frac{1}{c^2} \partial_t^2 p - \nabla^2 p = \rho_0 \nabla \cdot L = \rho_0 \text{div}(\omega \times v)$$

(6)

He also wrote that dipolar emission by the vortex-body interaction is:[30]

$$p_F(x, t) = -\frac{P_0}{4\pi c} \ddot{\Pi}_i(t - \frac{x}{c}) \frac{x_i}{x^2}$$

(7)

Then he obtained an expression of fluid Maxwell equations as follows [30]:

$$\begin{aligned} \nabla \cdot H &= 0 \\ \nabla \cdot E &= q \\ \nabla \times E + \partial_t H &= 0 \\ a_0^2 \nabla \times H - \partial_t E &= J \end{aligned}$$

(8)

Where [30]:

$$\begin{aligned} a_0 &\text{ denotes the sound speed, and} \\ q &= -\partial_t(\nabla \cdot v) - \nabla \cdot \dot{h}, \\ J &= \partial_t^2 v + \nabla \partial_t h + a_0^2 \nabla \times (\nabla \times v) \end{aligned}$$

(9)

In our opinion, this new expression of fluid Maxwell equations suggests that there is a deep connection between vortex sound and electromagnetic fields.

However, it should be noted that the above expressions based on fluid dynamics need to be verified with experiments. We should note also that in

(8) and (9), the speed of sound a_0 is analogous of the speed of light in Maxwell equations, whereas in equation (6), the speed of sound is designated "c" (as analogous to the light speed in EM wave equation).

As an added note, we can mention here that elsewhere Wang [33] was able to derive Coulomb law from the source-sink approach. We are wondering if it is also possible to re-derive Maxwell equations including displacement current from the same approach. If yes, then it may offer another fresh starting point to understand the physical meaning of displacement current.

5. Neutrosophic Logic perspective and implications

In the previous sections we have discussed how closer look at Gen. 1:1-2 leads to different scenario than the widely accepted creation ex-nihilo. This new scenario is quite in agreement with Kant's idea that it is possible that the Universe has both finite history in the past and also eternal background. We also discussed how such a mixed view can be modelled by introducing rotation in the early universe.

Now there is an immediate question: Is this new look at the origin of Universe justifiable logically, or is it merely a compromised solution?

So, in this chapter we will review Neutrosophic Logic, a new theory developed in recent decades by one of these authors (FS).

Vern Poythress argues that sometimes we need a modification of basic philosophy of mathematics, in order to re-define the redeemed mathematics; see [21]. In this context, allow us to argue in favor of Neutrosophic logic as one basic postulate, in lieu of the Aristotle logic which creates many problems in real world.

In Neutrosophy, we can connect an idea with its opposite idea and with its neutral idea and get common parts, i.e. $\langle A \rangle \wedge \langle \text{non}A \rangle = \text{nonempty set}$.

The common part of the uncommon things! It is true/real... paradox. From neutrosophy, all started: neutrosophic logic, neutrosophic set, neutrosophic probability, neutrosophic statistics, neutrosophic measure, neutrosophic physics, neutrosophic algebraic structures etc.

It is true in restricted case, i.e. the Hegelian dialectics considers only the dynamics of opposites ($\langle A \rangle$ and $\langle \text{anti}A \rangle$), but in our everyday life, not only the opposites interact, but the neutrals $\langle \text{neut}A \rangle$ between them too.

For example: you fight with a man (so you both are the opposites). But

neutral people around both of you (especially the police) interfere to reconcile both of you. Neutrosophy considers the dynamics of opposites and their neutrals.

So, neutrosophy means that: $\langle A \rangle$, $\langle \text{anti}A \rangle$ (the opposite of $\langle A \rangle$), and $\langle \text{neut}A \rangle$ (the neutrals between $\langle A \rangle$ and $\langle \text{anti}A \rangle$) interact among themselves. A neutrosophic set is characterized by a truth-membership function (T), an indeterminacy-membership function (I), and a falsity-membership function (F), where T, I, F are subsets of the unit interval [0, 1].

As particular cases we have: single-valued neutrosophic set {when T, I, F are crisp numbers in [0, 1]}, and interval-valued neutrosophic set {when T, I, F are intervals included in [0, 1]}.

Neutrosophic Set is a powerful structure in expressing indeterminate, vague, incomplete *and* inconsistent information. See also [22]-[24].

To summarize, Neutrosophic Logic study the dynamics of neutralities.

And from this viewpoint, we can understand that it is indeed a real possibility that the Universe has both initial start (creation) but with eternal background. This is exactly the picture we got after our closer look at Gen. 1:1-2 as discussed in the above section.

In other words, our proposed term of “*creatio ex-rotatione*” has sufficient logical background.

6. Advantages of “*creatio ex-rotatione*” concept

In the preceding section, we have discussed on how our proposed term of “*creatio ex-rotatione*” has sufficient logical background.

Now, allow us to discuss some advantages of the proposed “*creatio ex-rotatione*” cosmology view over the Lemaitre’s primeval atom (which is the basis of Standard Model Cosmology).

a. Avoid inflationary scheme.

It is known that inflationary models were proposed by Alan Guth et al. (see [25][26]), in order to explain certain difficulties in the Big Bang scenario. But some cosmology experts such as Hollands & Wald has raised some difficulties with inflationary model, as follows:

“We argue that the explanations provided by inflation for the homogeneity, isotropy, and flatness of our universe are not satisfactory, and that a proper explanation of these features will require a much deeper understanding of the initial state of our universe.”[27]

In our diagram plot above, it is clear that an early rotation model can explain why the Universe can burst out into creation in a very short period, without invoking ad hoc postulate such as inflation model.

b. Explain the observed late accelerated expansion.

As far as we know, one of the earliest models which gave prediction of accelerated expanding Universe is Carmeli’s Cosmological General Relativity.[29]

But it has been shown by Green & Wald that for the large scale structures of the Universe, Newtonian model can give similar results compared to general relativity picture.[28]

Furthermore, it seems that there is no quite clear arguments why we should accept Carmeli use of 5D metric model (space-time-velocity metric). In the meantime, in our rotating Universe model, we do not invoke ad hoc dimension into the metric.

c. Explain inhomogeneity, breeding galaxies etc.

Astronomers have known for long time, that the Universe is not homogeneous and isotropic as in the usual model. It contains of inhomogeneity, irregularity, clumpiness, voids, filaments etc, which indicate complex structures. Such inhomogeneous structures may be better modelled in terms of turbulence model such as Navier-Stokes equations, see also our early papers [11][12].

Furthermore, observations clearly suggest that matter ejected continuously in galaxy centers, which view is difficult to reconcile with Big Bang scenario of galaxy creation.

7. Note on Methods

In this paper, basically we use two methods: (a) a new material point for fluid model; (b) logically, we use Neutrosophic logic.

As with the material point assumption, allow us to quote from Nurgaliev:

“The method used in this article is nonlinear mathematical modeling. The concept of the nonlinear reaction-advection-diffusion equation along with the second type material point harmoniously provides a bridge between classical and quantum physics and explains why matter is organized discretely with different levels of organization (from clusters of galaxies to atoms and elementary particles). We may expect that system of evolutionary equations (*called advection-diffusion-reaction equations*)....

describe arbitrary amount of material components with densities ρ_i , Hubble parameters H_i and coefficients of the effective diffusion D_i , generalized and adopted when needed. It may also provide nonlinear evolution scenarios for evolution of the cosmological perturbations in the multi-component cosmologic reacting media. The nonlinear term f stands for mutation of the components (i.e., nuclear and chemical reactions, gravitational clustering, and cosmologic morphogenesis). A linear consideration of the cosmological perturbations within demonstrated method for the arbitrary amount of components done in the form of exact analytical solutions in terms of higher transcendental G-functions of Majer. This method in the frame Einstein-Cartan theory gave static cosmological solution. The last remark is: so, sometimes, more complicated theories help understand simpler ones.”

Conclusions

In this paper we argue that Neutrosophic Logic offers a resolution to the long standing disputes between beginning and eternity of the Universe. In other words, in this respect we agree with Vaas, i.e. it can be shown: “how a conceptual and perhaps physical solution of the temporal aspect of Immanuel Kant’s „*first antinomy of pure reason*“ is possible, i.e. how our universe in some respect could have both a beginning and an eternal existence. Therefore, paradoxically, there might have been a time before time or a beginning of time in time.”

We argue that a re-reading of Genesis 1:2 will lead us to another viable story, albeit the alternative has not been developed rigorously as LCDM theories. It took around three years before now we have been thinking this problem out loud, and here our answer can be summarized as follows: “*The relic sound wave in early creation is a faithful interpretation of John 1:1, but we can come up with a more complete picture if we combine it with Gen. 1:2, that is the Holy Spirit came to hovering over the primordial fluid, then a kind of hurricane/storm started which created perfect medium where God spoke (Logos).*”

And one conclusion that we may derive especially from Figure 2, is that our computational simulation suggests that it is possible to consider that the Universe has existed for long time in prolonged stagnation period, then suddenly it burst out from *empty and formless (Gen. 1:2)*, to take its current shape which is accelerating. Such a possibility has never been considered before in cosmology literatures.

We also briefly discuss a plausible extension of Maxwell equations based on vortex sound theory of Prof. Tsutomu Kambe.

It is our hope that our exploration will lead to nonlinear cosmology theories which are better in terms of observations, and also more faithful to Biblical account of creation.

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Chapter 17

A few calculations of receding planetary orbits from spherical kinetic dynamics and the quantization of celestial motions¹

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Abstract

The present article discusses some interesting phenomena including the Lense-Thirring type anomalous precession, using a known spherical kinetic dynamics approach. Other implications include a plausible revised version of the celestial quantization equation described by Nottale and Rubcic & Rubcic. If the proposition described herein corresponds to the facts, then this kinetic dynamics interpretation of ‘*frame-dragging*’ effect could be viewed as a step to unification between GTR-type phenomena and QM. Further observation to verify or refute this conjecture is recommended, plausibly using LAGEOS-type satellites.

Keywords: Lense-Thirring effect, celestial quantization, LAGEOS satellite, boson condensation, gravitation

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Introduction

It is known, that the use of Bohr radius formula to predict celestial quantization has led to numerous verified observations [1]. This approach was based on Bohr-Sommerfeld quantization rules [2][3]. While this kind of approach is not widely accepted yet, this could be related to wave mechanics equation to describe large-scale structure of the Universe [4], and also a recent suggestion to reconsider Sommerfeld's conjectures in Quantum Mechanics [5]. Some implications of this quantum-like approach include exoplanet prediction, which becomes a rapidly developing subject in recent years [6][7].

Rubicic & Rubcic's approach [2] is particularly interesting in this regard, because they begin with a conjecture that Planck mass ($m_p = \sqrt{\hbar c / 2\pi G}$) is the basic entity of Nature, which apparently corresponds to Winterberg's assertion of superfluid Planckian aether comprised of phonon-roton pairs [8]. In each of these pairs, superfluid vortices can form with circulation quantized according to $\oint v_{\pm} dx = n\hbar / m_p$. This condition implies the Helmholtz vortex theorem, $d / dt \oint v_{\pm} dx = 0$. This relationship seems conceivable, at least from the viewpoint of likely neat linkage between cosmology phenomena and various low-temperature condensed matter physics [9][10][11]. In effect, celestial objects at various scales could be regarded as spinning Bose-Einstein condensate; which method has been used for neutron stars [32].

Despite these aforementioned advantages, it is also known that all of the existing celestial quantization methods [1][2][3] thus far have similarity that they assume a circular motion, while the actual celestial orbits (and also molecular orbits) are elliptical. Historically, this was the basis of Sommerfeld's argument in contrast to Bohr's model, which also first suggested that any excess gravitational-type force would induce a precessed orbit. This is the starting premise of the present article, albeit for brevity we will not introduce elliptical effect yet [12].

Using a known spherical kinetic dynamics approach, some interesting phenomena are explained, including the receding Moon, the receding Earth from the Sun, and also anomalous precession of the first planet (Lense-Thirring effect). Despite some recent attempts to rule out the gravitational quadrupole moment (J_2) contribution to this effect [13][14][15][16][17], it seems that the role of spherical kinetic dynamics [12] to Lense-Thirring effect has not been taken into consideration thus far, at least to this author's knowledge.

After deriving prediction for some known observed phenomena, this article will also present a revised version of quantization equation of L. Nottale [1] in

order to take into consideration this spherical kinetic dynamics effect. If the proposition as described here corresponds to the facts, then this approach could be viewed as a step to unification of GTR-type phenomena and Quantum Mechanics.

Spherical kinetic dynamics, Earth bulging effect

In this section we start with some basic equations that will be used throughout the present article. It is

assumed that the solar nebula is disk-shaped and is in hydrostatic equilibrium in the vertical direction. Let

suppose that the disk has approximately Keplerian rotation, ω ; then the half-thickness of the disk is given by

[4d; p.4-5]:

$$d = c_s / \omega \quad (1)$$

and

$$c_s \approx \sqrt{kT/m} \quad (1a)$$

where d and c_s represents half-thickness of the disk and sound velocity, respectively.

In order to find the spherical kinetic dynamics contribution to Lense-Thirring effect, we begin with the spinning dynamics of solid sphere with mass M . Using the known expression [12; p.6, p.8]:

$$E_{kinetic} = -I_{zz} \omega^2 / 2 \quad (2)$$

$$I_{sphere} = 2MR^2 / 5 \quad (2a)$$

where I_{zz} , ω , M , R represents angular momentum, angular velocity, spinning mass of the spherical body, and radius of the spherical body, respectively. Inserting equation (2a) into (2) yields:

$$E_{kinetic} = -MR^2 \omega^2 / 5 \quad (3)$$

This known equation is normally interpreted as the amount of energy required by a spherical body to do its axial rotation. But if instead we conjecture that ‘galaxies get their angular momentum from the global rotation of the Universe due to the conservation of the angular momentum’ [34], and likewise the solar system rotates because of the corresponding galaxy rotates, then this equation implies that the rotation itself exhibits extra kinetic energy. Furthermore, it has been argued that the global rotation gives a natural explanation of the empirical relation between the angular momentum and mass of galaxies:

$J \approx \alpha M^{5/3}$ [34]. This conjecture is also relevant in the context of Cartan torsion description of the Universe [18]. For reference purpose, it is worth noting in this regard that sometime ago R. Forward has used an argument of non-Newtonian gravitation force of this kind, though in the framework of GTR (*Amer.J.Phys.* **31** No. 3, 166, 1963).

Let suppose this kind of extra kinetic energy could be transformed into mass using a known expression in condensed-matter physics [10b; p.4], with exception that c_s is used here instead of v to represent the sound velocity:

$$E_{kinetic}(n, p) = c_s \cdot p = m_s \cdot c_s^2 \quad (4)$$

where the sound velocity obeying [10b; p.4]:

$$c_s^2(n) = (n/m)(d^2 \in / dn^2) \quad (4a)$$

Physical mechanism of this kind of mass-energy transformation is beyond the scope of the present article, albeit there are some recent articles suggesting that such a condensed-matter radiation is permitted [35]. Now inserting this equation (4) into (3), and by dividing both sides of equation (3) by Δt , then we get the incremental mass-energy equivalent relation of the spinning mass:

$$\Delta m_s / \Delta t = -\omega \cdot (\Delta \omega / \Delta t) \cdot MR^2 / (5 \cdot c_s^2) \quad (5)$$

By denoting $\dot{\omega} = \Delta \omega / \Delta t$, then this equation (5) can be rewritten as:

$$\Delta M / \Delta t = -\dot{\omega} \cdot MR^2 \omega / (5 \cdot c_s^2) \quad (5a)$$

For $\dot{\omega} = 0$ the equation (5a) shall equal to zero, therefore this equation (5a) essentially says that a linear change of angular velocity observed at the *surface* of the spinning mass corresponds to mass flux, albeit this effect is almost negligible in daily experience. But for celestial mechanics, this effect could be measurable.

If, for instance, we use the observed anomalous *decceleration rate* [30] of angular velocity of the Earth as noted by Kip Thorne [19]:

$$|\omega| / |\dot{\omega}| = 6 \times 10^{11} \text{ years} \quad (6)$$

And using values as described in Table 1 for other parameters:

Table 1. Parameter values to compute kinetic expansion of the Earth

Parameter	Value	Unit
R_e	6.38×10^6	m
M_e	5.98×10^{24}	kg
T_e	2.07×10^6	sec
ω_e	3.04×10^{-6}	rad/s
c_s	4000	m/s

It is perhaps worth noting that the only free parameter here is $c_s = 4000$ m/sec. This value is approximately within the range of S-wave or bulk sound as observed in Earth mantle. Alternatively, the sound velocity could be calculated using equation (1a), but this obviously introduces another kind of uncertainty in the form of determining temperature (T) inside the center of the Earth; therefore this method is not used here.

Then inserting these values from equation (6) and Table 1 into equation (5a) yields:

$$\Delta M / \Delta t \approx 46.86 \times 10^6 \text{ kg / year} \quad (7)$$

Perhaps this effect could be related to a recent Earth bulging data, which phenomenon lacks a coherent explanation thus far [36].

Prediction of the receding planets from the Sun

Now let suppose this predicted value (7) is fully conserved to become inertial mass, and then we could rewrite Nottale's method of celestial quantization [1]. Alternatively, we could begin with the known Bohr-Sommerfeld quantization rule [3]:

$$\oint p_j \cdot dq_j = n_j \cdot 2\pi \cdot e^2 / (\alpha_e \cdot c) \quad (8a)$$

Then, supposing that the following substitution is plausible [3]:

$$e^2 / \alpha_e \rightarrow GMm / \alpha_g \quad (8b)$$

where e, α_e, α_g represents electron charge, Sommerfeld's fine structure constant, and gravitational-analogue of fine structure constant, respectively. This corresponds to Nottale's basic equations $v_n = \alpha_g \cdot c / n = v_o / n$ and $v_o = 144$ km/sec [1]. And by introducing the gravitational potential energy [12]:

$$\Phi(r, \vartheta) = -GM / r \cdot [1 - J_2 \cdot (a/r)^2 \cdot (3 \cos^2 \vartheta - 1) / 2] \quad (8c)$$

where ϑ is the polar angle (collatude) in spherical coordinate, M the total mass, and a the equatorial radius of the solid.

Neglecting higher order effects of the gravitational quadrupole moment J_2 [13][14][15][16][17], then we get the known Newtonian gravitational potential:

$$\Phi = -GM / r \quad (8d)$$

Then it follows that the semi-major axes of the celestial orbits are given by [1][3]:

$$r_n = GMn^2 / v_o^2 \quad (8e) \text{ where}$$

$n=1,2,\dots$ is the principal quantum number.

It could be shown, that equation (8a) also corresponds to the conjecture of quantization of circulation [4b].

By reexpressing equation (8e) for mass flux effect (5) by defining $M_{n+1} = M_n + \Delta M_n / \Delta t_n$, then the total equation of motion becomes:

$$(M + \Delta M / \Delta t) = (r + \Delta r / \Delta t) \cdot v_0^2 / (G \cdot n^2) \quad (8f)$$

For $\Delta \rightarrow 0$, equation (8f) can be rewritten as:

$$dM / dt - \chi \cdot dr / dt + M - r \cdot \chi = 0 \quad (8g)$$

where

$$\chi = v_0^2 / (G \cdot n^2) \quad (8h)$$

Now inserting (5a) into equation (8g), and dividing both sides by χ , yields:

$$dr / dt - M / \chi + r + \dot{\omega} \cdot MR^2 \omega / (\chi \cdot 5 \cdot c_s^2) = 0 \quad (8i)$$

This equation (8i) can be rewritten in the form:

$$\dot{r} + r + \varphi = 0 \quad (8j)$$

by denoting $\dot{r} = dr / dt$ and

$$\varphi = -M / \chi \cdot [1 - \dot{\omega} \cdot R^2 \omega / (5 \cdot c_s^2)] \quad (8k)$$

if we suppose a linear deceleration at the surface of the spinning mass. Equation (8j) and (8k) is obviously a first-order linear ODE equation [26], which admits exponential solution. In effect, this implies that the revised equation for celestial quantization [1][2] takes the form of spiral motion. This could also be interpreted as a plausible solution of diffusion equation in *dissipative* medium [33], which perhaps may also correspond to the origin of spiral galaxies formation [28]. And if this corresponds to the fact, then it could be expected that the spiral galaxies and other gravitational clustering phenomena [22b] could also be modeled using the same quantization method [39], as described by Nottale [1] and Rubcic & Rubcic [2].

To this author's knowledge these equations (8j) and (8k) have not been presented before elsewhere, at least in the context of celestial quantization.

Although initially we wish to come up with calculation of receding moon, inserting result in equation (7) into (8e) by using $n=23$ and $v_0=23.71$ km/sec for the Moon [2] yields quite the same lunar distance from what is known, therefore this method still cannot account for the observed value ~ 0.04 m/year [20].

In this regard, it is interesting to note that Sidharth has argued in favor of varying G [21]. From this starting point, he was able to explain –among other things-- anomalous precession (Lense-Thirring effect) of the first planet and also anomalous Pioneer acceleration. This will be discussed in the subsequent section. In principle, Sidharth's basic assertion is [21]:

$$G = G_{\otimes} \cdot (1 + t/t_{\otimes}) \quad (9)$$

It is worth noting here that Barrow [40c] has also considered a somewhat similar argument in the context of varying constants:

$$G = G_{\otimes} \cdot t_{\otimes} / (t - c) \quad (9a)$$

However, in this article we will use (9) instead of (9a), partly because it will lead to more consistent predictions with observation data. Alternatively, we could also hypothesize using Maclaurin formula:

$$G = G_{\otimes} \cdot e^{t/t_{\otimes}} = G_{\otimes} \cdot (1 + t/t_{\otimes} + (t/t_{\otimes})^2 / 2! + (t/t_{\otimes})^3 / 3! + \dots) \quad (9b)$$

This expression is a bit more consistent with the exponential solution of equation (8j) and (8k). Therefore, from this viewpoint equation (9) could be viewed as first-order approximation of (9b), by neglecting second and higher orders in the series. It will be shown in subsequent sections, that equation (9) is more convenient for deriving predictions.

If we conjecture that instead of varying G, the spinning mass M varies, then it would result in the same effect as explained by Sidharth [21], because for Keplerian dynamics we could assert $k=GM$, where k represents the stiffness coefficient of the system. Accordingly, Gibson [22] has derived similar conjecture of exponential mass flux from Navier-Stokes gravitational equation, which can be rewritten in the form:

$$M = G_{\otimes} \cdot e^{t/t_{\otimes}} = M_{\otimes} \cdot (1 + t/t_{\otimes} + (t/t_{\otimes})^2 / 2! + (t/t_{\otimes})^3 / 3! + \dots) \quad (9c)$$

provided we denote for consistency [22]:

$$t_{\otimes} = \tau_g / 2\pi \quad (9d)$$

Using the above argument of Maclaurin series, equation (9c) could be rewritten in the similar form with (9) by neglecting higher order effects:

$$M = M_{\otimes} \cdot (1 + t/t_{\otimes}) \quad (10)$$

In a recent article Gibson & Schild [23] argue that their gravitational Navier-Stokes approach results in better explanation than what is offered by Jeans instability. Furthermore, R.M. Kiehn has also shown that the Navier-Stokes equation corresponds exactly to Schroedinger equation [27], which seems to support the idea of quantization of celestial motion [1][2][3]. A plausible extension of Euler equation and Jeans instability to describe gravitational clustering has been discussed in [22b], which corresponds to viscosity term and also turbulence phenomena [22c,22d] described by Gibson. Therefore, apparently equation (10) is more consistent with kinematical gravitational instability consideration than (9).

From equation (10) we could write for M at time difference $\Delta t = t_2 - t_1$:

$$M_2 = M_{\otimes} \cdot (1 + t_2 / t_{\otimes}) \quad (11)$$

$$M_1 = M_{\otimes} \cdot (1 + t_1 / t_{\otimes}) \quad (12)$$

from which we get:

$$\Delta M = (M_{\otimes} / t_{\otimes}) \cdot (t_2 - t_1) \quad (13)$$

Inserting our definition $\Delta t = t_2 - t_1$ yields:

$$\Delta M / \Delta t = (M_{\otimes} / t_{\otimes}) = k \quad (14)$$

For verification of this assertion, we could use equation (14) instead of (5a) to predict mass flux of the Earth. Inserting the present mass of the Earth from Table 1 and a known estimate of Earth epoch of 2.2×10^9 years, we get $k = 0.272 \times 10^{16}$ kg/year, which is approximately at the same order of magnitude (ratio=13.83) with equation (7).

Inserting equation (14) into equation (5a), we get:

$$M_{\otimes} / t_{\otimes} \approx -\dot{\omega} \cdot MR^2 \omega / (5 \cdot c^2) \quad (15)$$

which is the basic conjecture of the present article. From this viewpoint we could rewrite equation (8j) and (8k):

$$dr / dt = M / \chi \cdot [1 - \dot{\omega} \cdot R^2 \omega / (5 \cdot c_s^2)] - r \quad (15a)$$

and inserting equation (15), we get:

$$dr / dt = M / \chi \cdot [1 + M_{\otimes} / (t_{\otimes} \cdot M)] - r \quad (15b)$$

A plausible test of this conjecture could be made by inserting this result (14) into equation (8e) and using $M_{\otimes} = 1.9895 \times 10^{33}$ g and $t_{\otimes} = 2 \times 10^{10}$ year as the epoch of the solar system [21], and specific velocity $v_0 = 144$ km/sec [1], then from equation (15b) we get a receding orbit radius for Earth at the order of:

$$\Delta r_{Earth} / \Delta t = 6.03 \text{ m/year} \quad (16)$$

Interestingly, there is an article [24] hypothesizing that there is a tad effect of *receding Earth orbit from the Sun at the order of 7.5 m/year*, supposing Earth orbit radius has been expanding as large as 93×10^6 miles since the beginning of the solar epoch at $t_{\otimes} = 2 \times 10^{10}$ year ago (in the quoted article, it was assumed that the epoch is 4.5×10^9 years). Of course, it shall be noted that there is large uncertainty of the estimate of solar epoch, for instance Gibson prefers 4.6×10^{17} sec (or 1.46×10^{10} year, see [22]). Therefore, it is suggested here to verify this assumption of solar epoch using the same tad effect for other planets. For observation purposes, some estimate values were presented in Table 2 using the same approach with (15b).

Table 2. Prediction of planetary orbit radii (r) increment

Celestial object	Quantum number (n)	Orbit increment (m/yr)
Mercury	3	2.17
Venus	4	3.86
Earth	5	6.03

Mars	6	8.68

Quantization of anomalous celestial precession

It is known that the Newtonian gravitation potential equation (8d) is only weak-field approximation, and that GTR makes a basic assertion that this equation is *exact*. And if the gravitation could be related to boson condensation phenomena [9][10][11], then it seems worth to quote a remark by Consoli [9b; p.2]: “*for weak gravitational fields, the classical tests of general relativity would be fulfilled in any theory that incorporates the Equivalence Principle.*” And also [9b; p.18]: “Einstein had to start from the peculiar properties of Newtonian gravity to get the basic idea of transforming the classical effects of this type of interaction into a metric structure. For this reason, classical general relativity cannot be considered a *dynamical* explanation of the origin of gravitational forces.” Furthermore, Consoli also argued that the classical GTR effects other than anomalous precession could be explained without introducing non-flat metric, as described by Schiff [9b; p.19], therefore it seems that the only remarkable observational ‘proof’ of GTR is anomalous precession of the first planet [37]. Therefore, it seems reasonable to expect that the anomalous precession effect could be predicted without invoking non-flat metric, which suggestion is particularly attributed to R. Feynman, who ‘believed that the geometric interpretation of gravity beyond what is necessary for special relativity is not essential in physics.’ [9d] It will be shown that a consistent approach with equation (10) will yield not only the anomalous celestial precession, but also a conjecture that such an anomalous precession is quantized.

By using the same method as described by Sidharth [21], except that we assert varying mass M instead of varying G – in accordance with Gibson’s solution [22]--, and denoting the average angular velocity of the planet by

$$\dot{\Omega} \equiv 2\pi / T \tag{17}$$

and period T, according to Kepler’s Third Law:

$$T = 2\pi.a^{3/2} / \sqrt{GM} \tag{18}$$

Then from equation (10), (17), (18) we get:

$$\dot{\Omega} - \dot{\Omega}_o = -\dot{\Omega}_o.t / t_{\otimes} \tag{19}$$

Integrating equation (19) yields:

$$\varpi(t) = \Omega - \Omega_o = -(\pi / T).t^2 / t_{\otimes} \tag{20}$$

which is average precession at time ‘t’. Therefore the anomalous precession corresponds to the epoch of the corresponding system. For Mercury, with

T=0.25 year, equation (20) yields the average precession per year at time 't':

$$\varpi(t)_{Mercury} = \Omega - \Omega_0 = -4\pi.t^2 / t_{\otimes} \quad (21)$$

Using again $t_{\otimes} = 2 \times 10^{10}$ year as the epoch of the solar system and integrating for years $n=1 \dots 100$, equation (21) will result in total anomalous precession in a century:

$$\varpi(n) = \sum_{n=1}^{n=100} \varpi(n) = 43.86'' \text{ per century} \quad (22)$$

It would be more interesting in this regard if we also get prediction of this effect for other planets using the same method (20), and then compare the results with GTR-Lense-Thirring prediction. Table 3 presents the result, in contrast with observation by Hall and also prediction by Newcomb, which are supposed to be the same [25].

Table 3. Comparison of prediction and observed anomalous precession

Celestial Object	Period, T (year)	$\omega_{prediction}$ (arcsec/cy)	Hall/Newcomb (arcsec/cy)	Diff. (%)	GTR/Thirring (arcsec/cy)	Diff. (%)
Mercury	0.25	43.86	43.00	2.03	42.99	-0.05
Venus	0.57	19.24	16.80	14.54	0.8	-95.2
Earth	1.00	10.96	10.40	5.46	3.84	-63.1
Mars	1.88	5.83	5.50	6.02	1.36	-76.0
Jupiter	4346.5	2.52×10^{-3}				
Saturn	10774.9	1.02×10^{-3}				
Uranus	30681.0	3.57×10^{-4}				
Neptune	60193.2	1.82×10^{-4}				
Pluto	90472.4	1.21×10^{-4}				

It is obvious from Table 3 above that the result of equation (20) appears near to GTR and observation by Hall for the first planet, but there is substantial difference between GTR and observation for other planets particularly Venus. In the mean time, average percentage of error from prediction using equation (20) and observation (Hall) is 7.01%. The numerical prediction for Jovian planets is negligible; though perhaps they could be observed provided there will be more sensitive observation methods in the near future.

It is perhaps also worth noting here, that if we use the expression of quantization of period [3]:

$$T = 2\pi.GM.n^3 / v_0^3 \quad (23)$$

where $v_0 = \alpha_g.c = 144km/s$ in accordance with Nottale [1]. Inserting this equation (23) into (20), yields:

$$\varpi(t)_{precess} = \Omega - \Omega_0 = -(v_0^3 / 2GMn^3)t^2 / t_{\otimes} \quad (24)$$

or

$$T_{precess} = 2\pi / \varpi(t)_{precess} = -4\pi.t_{\otimes}GMn^3 / v_0^3t^2 \quad (24a)$$

This equation (24) and (24a) imply that the anomalous precession of Lense-Thirring type is also *quantized*. Apparently no such an assertion has been made before in the literature. It would be interesting therefore, to verify this assertion for giant planets and exoplanets, but this is beyond the scope of the present article.

A plausible test using LAGEOS-type satellites

In this regard, one of the most obvious methods to observe those tad effects as described in this article is using LAGEOS-type satellites, which have already been used to verify Lense-Thirring effect of Earth. What is presented here is merely an approximation, neglecting higher order effects [12][16][31].

Using equation (8c) we could find the rotational effect to satellite orbiting the Earth. Supposed we want to measure the precessional period of the inclined orbit period. Then the best way to measure quadrupole moment (J_2) effect would be to measure the \mathcal{G} component of the gravity force (8c):

$$g = 1/r.\partial V / \partial \mathcal{G} = -3GM.a^2J_2.\sin \mathcal{G}.\cos \mathcal{G} / r^4 \quad (25)$$

This component of force will apply a torque to the orbital angular momentum and it should be averaged over the orbit. This yields a known equation, which is often used in satellite observation:

$$\omega_p / \omega_s = -3a^2J_2.\cos i / 2r^2 \quad (26)$$

where i is the inclination of the satellite orbit with respect to the equatorial plane, a is Earth radius, r is orbit radius of the satellite, ω_s is the orbit frequency of the satellite, and ω_p is the precession frequency of the orbit plane in inertial space. Now using LAGEOS satellite data [31] as presented in Table 4:

Table 4. LAGEOS satellite parameters

Parameter	Value	Unit
R_{LAGEOS}	12.265×10^6	M
i_{LAGEOS}	109.8	°
T_{LAGEOS}	13673.4	sec
ω_s	4.595×10^{-4}	rad/s
J_2	1.08×10^{-3}	

Inserting this data into equation (26) yields a known value:

$$\omega_p = 0.337561^\circ / day \quad (27)$$

which is near enough to the observed LAGEOS precession = 0.343°/day.

Now let suppose we want to get an estimate of the effect of Earth kinetic expansion to LAGEOS precession. Assuming a solid sphere, we start with a known equation [34]:

$$M = 4\pi \cdot \rho_{sphere} \cdot r^3 / 3 \quad (28)$$

where ρ_{sphere} is the average density of the ‘equivalent’ solid sphere. For Earth data (Table 1), we get $\rho_{sphere} = 5.50 \times 10^6 \text{ gr/m}^3$. Using the same method with equation (8f), equation (28) could be rewritten as:

$$M + \Delta M / \Delta t = 4\pi \cdot \rho_{sphere} \cdot (r + \Delta r / \Delta t)^3 / 3 \quad (29)$$

or

$$\Delta r / \Delta t = \sqrt[3]{(M + \Delta M / \Delta t) \cdot 3 / (4\pi \cdot \rho_{sphere})} - r \quad (30)$$

From equation (30) we get $dr/dt = 13.36 \text{ mm/year}$ for Earth. Inserting this value ($r + dr/dt$) to compute back equation (26) yields:

$$\Delta \omega_p = \omega_{p,n+1} - \omega_{p,n} = 1.41 \times 10^{-9} \text{ }^\circ / \text{day} = 2.558 \text{ arc sec / year} \quad (31)$$

Therefore, provided the aforementioned propositions correspond to the facts, it could be expected to find a tad extra precession of LAGEOS-satellite around 2.558 arcsecond/year. To this author’s knowledge this tad effect has not been presented before elsewhere. And also thus far there is no coherent explanation of those aforementioned phenomena altogether, except perhaps in [21] and [30].

As an alternative to this method, it could be expected to observe Earth gravitational acceleration change due to its radius increment. By using equation (28):

$$\ddot{r}(t) = GM / r^2 = 4\pi \cdot G \cdot \rho_{sphere} \cdot r / 3 \quad (32)$$

From this equation, supposing there is linear radius increment, then we get an expression of the rate of change of the gravitational acceleration:

$$\ddot{r}(t) = \Delta \dot{r} / \Delta t = 4\pi \cdot G \cdot \rho_{sphere} \cdot (r + \Delta r / \Delta t) / 3 - \ddot{r}(t) \quad (33) \quad \text{It}$$

would be interesting to find observation data to verify or refute this equation.

Constraint of varying α

In recent years there is suggestion that unification of the fundamental interactions requires cosmological solutions in which low-energy limits of fundamental physical constants vary with time, including α [40][41][42]. This assertion began with Dirac’s remark: “*the constancy of the fundamental physical constants should be checked in an experiment*” [42, p.439]. While this has

not been widely accepted yet, a plausible way to verify this proposition is using celestial quantization method: “offers a possibility to check the variability of the constants by studying, for example, lunar and Earth’s secular accelerations, which has been done using satellite data, tidal records, and ancient eclipses” [42, p. 441].

In this regard, instead of using Nottale’s celestial quantization method [1], alternatively we use Rubcic & Rubcic’s assertion [2] that the celestial quantization equation could be related to Planck constant and Planck mass, by introducing:

$$H' / M = fA \quad (34)$$

$$r_n = (fA)^2 \cdot Mn^2 / G \quad (35)$$

where

$$A = \hbar / (\alpha \cdot m_p^2) \quad (36)$$

therefore

$$r_n = (f\hbar / \alpha m_p^2)^2 \cdot Mn^2 / G \quad (37)$$

where f , \hbar , α , $m_p = 2.177 \times 10^{-8}$ kg represents a specific ratio for given system [2], Planck constant, fine structure constant ($\sim 1/137$), and Planck mass, respectively. This alternative expression is quite interesting, particularly if compared to Winterberg’s argument of superfluid Planckian phonon-roton as the basic entity of Nature [8].

From equation (34) and (36) we get:

$$\alpha = f\hbar M / (H' \cdot m_p^2) \quad (38)$$

Using the same method with equation (8f) we get:

$$\alpha + \dot{\alpha} = (M + \dot{M}) \cdot f\hbar / (H' \cdot m_p^2) \quad (39)$$

Now dividing both sides of equation (39) with M and α , we get:

$$1 + \dot{\alpha} / \alpha = (1 + \dot{M} / M) \cdot [f\hbar M / (H' \cdot m_p^2 \cdot \alpha)] \quad (40)$$

From equation (34) and (36) we know that components in the square bracket of the right side of equation (40) equals to unity, therefore we conclude by using equation (14):

$$\dot{\alpha} / \alpha \approx \dot{M} / M = (M_{\otimes} / t_{\otimes}) / M_{\otimes} = 1 / t_{\otimes} \quad (41)$$

From this viewpoint, we argue that α varies corresponding to inverse of the epoch of the system in question. Supposing the epoch of the Universe is 1.09 Tyr (larger than epoch of the solar system in the previous section, 2×10^{10} year), and then from equation (41) we get an estimate of varying α :

$$\dot{\alpha} / \alpha \approx 9.2 \times 10^{-13} \text{ year}^{-1} \quad (42)$$

For comparison, other values for varying α as proposed in the literature are presented in Table 5. Alternatively, we could use Sidharth's original assertion (9) and (14), and by using an equation described in [43]:

$$\dot{G}/G = t_{\otimes}^{-1} = 78.2x\dot{\alpha}/\alpha \quad (43)$$

and supposing epoch of the Universe =13.9 Gyr [40d], then we get estimate of $\dot{\alpha}/\alpha = 9.2x10^{-13} \text{ year}^{-1}$, which is near to Bahcall *et al*'s prediction [40b]. Of course, this subject of varying α is not conclusive yet, partly because of large uncertainty in determining the epoch of the Universe, but at least equation (42) could be viewed as an alternative constraint based on the celestial quantization method. However, it seems that this proposition of varying α from Rubcic & Rubcic's celestial quantization approach [2] is quite conceivable, particularly from the viewpoint of recent suggestion of the *invariance* and possible time variation of the Planck mass [2b][2c].

Table 5. Range of values of varying α

Ref.	$\dot{\alpha}/\alpha$	Unit
Prestage <i>et al.</i> [40, p.31]	$3.7x10^{-14}$	year ⁻¹
Moffat [40d, p.5]	$3.8x10^{-16}$	year ⁻¹
Ivanchik <i>et al.</i> [42, p.439]	$1.9x10^{-14}$	year ⁻¹
Slyakhter [42a, p.2]	10^{-19}	year ⁻¹
Bahcall <i>et al.</i> [40b,p.520]	$2x10^{-13}$	year ⁻¹
Bahcall <i>et al.</i> [40b,p.530]	$6x10^{-12}$	year ⁻¹
Nguyen [40e,p.1]	$1.2x10^{-18}$	year ⁻¹

Discussion

Allow us to make some more remarks: one of the most relevant being the inconstancy of the "constants". Following Dirac's suggestion, the various constants should be validated at period intervals, with no assumption that the values will remain exactly the same as they were at the last measurement.

The fine structure "constant" α , is the most vulnerable to changes in other physical parameters, because it is relational. Instrumented observations of the *fine structure constant have recorded changes* in the value starting during the 1980s, and with divergences becoming larger than the original value at the time of its inception by Sommerfeld, as time passes.

The fine structure "constant" is a variable, G is a variable, c is a variable, and if e is variable, the normal understandings of the standard physics will be soon be demolished.

Variations in a are directly related to quantized red-shift, as first pointed to by astrophysicist *Halton Arp*. He also points at quantized changes in gravitation and mass, as related to quasars and active galaxies. It has been verified by astrophysical observations, that all galaxies and quasars exhibit quantized red shift.

But what causes quantized red shift?

At the core of every galaxy and quasar, there lives an enormous and very complex **plasmoid**, which exhibits periodic episodes of powerful radiations spanning the entire of the E/M spectrum. (There are no black holes, anywhere. Those figments are cartoon fantasies produced by Hollywood science to support ongoing systematic frauds.)

E/M sources are also aether sources, and act superluminally. The explosive events of galactic core plasmoids produce expanding shells of aether, with abnormal aether density. The various constants, and the laws of physics which rely on those "constants" are changed as each aether-density shell expands from the center of the galaxy, to the outer edges, changing the local "constants" along the way.

Where we live, the laws of physics **are changing** in a gradient manner, along with many of the "constants". This gradient of changing values will continue until the entire of the aether shell has passed through our solar system. At that point, the constants will remain stable in value, and the physics will change in a reliable manner, until the next episode of galactic core-plasma aether ejection occurs and passes through where we live.

The entire process of changing "constants" will start again, and continue until the shell has passed through our location, when the values will once more stabilize and the local physics will again be reliable. Until the next galactic core-plasmoid event.

This is based on current observations of variations in the constants and on quantized red shift, seen in all galaxies, as correlated with the SQ originations of all things physical. We are reaching a crescendo of change, including changes of Consciousness and the appearance, ab initio, of new

life forms, specially constructed to take full advantage of the new conditions which will comprise their environment. (The "*morphogenic field*" of Sheldrake could be relevant here.)

Concluding note

If physical theories could be regarded as a *continuing search* to find systematic methods to reduce the entropy required to do calculations to minimum; then the fewer free parameters, the better is the method. Accordingly, it is shown in this article that some twelve phenomena can be explained using only few free parameters, including:

- ❑ The Moon is receding from the Earth [20];
- ❑ Earth's angular velocity decrease (K. Thorne) [19];
- ❑ Planets are receding from the Sun [24];
- ❑ Lense-Thirring effect for inner planets, corresponding to Hall/Newcomb's observation;
- ❑ Celestial orbit prediction in solar system [1][2][3];
- ❑ Exoplanets orbit prediction [1][3];
- ❑ Pioneer-type anomalous acceleration [21];
- ❑ A plausible origin of volcanoes eruption;
- ❑ A plausible origin of continental drift effect [29];
- ❑ A plausible origin of spiral motion in spiral nebulae [22];
- ❑ Prediction of extra precession of LAGEOS satellite [31];
- ❑ Prediction of angular velocity decrease of other planets.
- ❑

As a plausible observation test of the propositions described here, it is recommended to measure the following phenomena:

- ❑ Lense-Thirring effect of inner planets, compared to spherical kinetic dynamics prediction derived herein;
- ❑ Annual extra precession of Earth-orbiting LAGEOS-type satellites;
- ❑ Receding planets from the Sun;
- ❑ Receding satellites from their planets, similar to receding Moon from the Earth;
- ❑ Angular velocity decrease of the planets;
- ❑ Angular velocity decrease of the Sun.

It appears that some existing spacecrafts are already available to do this kind of observation, for instance LAGEOS-type satellites [31]. Further refinement of the method as described here could be expected, including using ellipsoidal kinetic dynamics [12] or using analogy with neutron star dynamics [32]. Further extensions to cosmological scale could also be expected, for instance using some versions of Cartan-Newton theory [38]; or to find refinement in predictions related to varying constants.

All in all, the present article is not intended to rule out the existing methods in the literature to predict Lense-Thirring effect, but instead to argue that perhaps the notion of ‘*frame dragging*’ in GTR [14][16] could be explained in terms of dynamical interpretation, through invoking the spherical kinetic dynamics. In this context, the dragging effect is induced by the spinning spherical mass to its nearby celestial objects.

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Three ways to describe self-similar Turbulence Cosmology: From Navier-Stokes to Burgers Equation to Golden Ratio etc.

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Abstract

In recent years, there is growing interest to describe the Universe we live in from the perspective of scale-invariant turbulence approach. Such an approach is not limited to hydrodynamics Universe model a la Gibson & Schild, but also from Kolmogorov turbulence approach as well as from String theory approach (some researcher began to explore String-Turbulence). In this article, we hope to bring out some correspondence among existing models, so we discuss shortly: the topological vortice approach, Burgers equation in the light of KAM theory and Golden Mean, and the Cantorian Navier-Stokes approach. Of course, this short article is far from being complete. We hope further investigation can be done around this line of approach.

Introduction

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From time to time, astronomy and astrophysics discoveries have opened our eyes that the Universe is much more complicated than what it seemed in 100-200 years ago. And despite all pervading popularity of General Relativistic treatment of Cosmology, it seems still worthy to remind us to old concepts of Cosmos, for instance the Hydron theory of Thales (“that water is the essential element in the Cosmos”), and also Heracleitus (“panta rhei”). So we can ask: does it mean that the Ultimate theory that we try to find should correspond to hydrodynamics or some kind of turbulence theory?

An indicator of complex turbulence phenomena in Our Universe is the Web like structure. The Cosmic Web is the fundamental spatial organization of matter on scales of a few up to a hundred Megaparsec. Galaxies and intergalactic gas matter exist in a wispy weblike arrangement of dense compact clusters, elongated filaments, and sheetlike walls, amidst large near-empty void regions. The filaments are the transport channels along which matter and galaxies flow into massive high-density cluster located at the nodes of the web. The weblike network is shaped by the tidal force field accompanying the inhomogeneous matter distribution.

May be part of that reason that in recent years, there is growing interest to describe the Universe we live in from the perspective of scale-invariant turbulence approach. Such an approach is not limited to hydrodynamics Universe model a la Gibson & Schild, but also from Kolmogorov turbulence approach as well as from String theory approach (some researcher began to explore String-Turbulence). In this article, we hope to bring out some correspondence among existing models, so we discuss shortly: the topological vortice approach, Burgers equation in the light of KAM theory and Golden Mean, and the Cantorian Navier-Stokes approach. Of course, this short article is far from being complete. We hope further investigation can be done around this line of approach.

A. Topological vortice approach

Two recent papers by Sivaram & Arun, one in *The Open Astronomy Journal* 2012, 5, 7-11 [1], and one in arXiv [2] are found very interesting. They are able to arrive at the observed value of effective cosmological constant by considering background torsion in the teleparallel gravity. According to them, “the background torsion due to a universal spin density not only gives rise to angular momenta of all structures but also provides a background centrifugal term acting as a repulsive gravity accelerating the universe, with spin density acting as effective cosmological constant.” [1] The torsion is given by [1, p.10]:

$$Q = \frac{4\pi G\sigma}{c^3} \approx 10^{-28} \text{ cm}^{-1},$$

(1)

And the background curvature [1, p.10] is given by:

$$Q^2 \approx 10^{-56} \text{ cm}^{-2}.$$

(2)

In the meantime, a recent review of dark energy theories in the literature (including teleparallel gravity) has been given in [4], and present problems in the standard model general relativistic cosmology are discussed by Starkman [5]. These seem to suggest that a torsion model of effective cosmological constant based on teleparallel gravity as suggested by Sivaram and Arun (2012) seems very promising as a description of phenomena related to accelerated expansion of the Universe usually attributed to ‘dark energy’ (as alternative to cosmological constant explanation).

However, Sivaram & Arun do not make further proposition concerning the connection between quantized vortices (Onsager-Feynman’s rule) and the torsion vector. It will be shown here, that such a connection appears possible.

Here we present Bohr-Sommerfeld quantization rules for planetary orbit distances, which results in a good quantitative description of planetary orbit distance in the solar system

[6][6b][7]. Then we find an expression which relates the torsion vector and quantized vortices from the viewpoint of Bohr-Sommerfeld quantization rules [3].

Further observation of the proposed quantized vortices of superfluid helium in astro-physical objects is recommended.

Bohr-Sommerfeld quantization rules and quantized vortices

The quantization of circulation for nonrelativistic superfluid is given by [1][3]:

$$\oint v dr = N \frac{\hbar}{m_s}$$

(3)

Where N, \hbar, m_s represents winding number, reduced Planck constant, and superfluid particle's mass, respectively [3]. And the total number of vortices is given by [1]:

$$N = \frac{\omega \cdot 2\pi r^2 m}{\hbar}$$

(4)

And based on the above equation (4), Sivaram & Arun [1] are able to give an estimate of the number of galaxies in the universe, along with an estimate of the number stars in a galaxy.

However, they do not give explanation between the quantization of circulation (3) and the quantization of angular momentum. According to Fischer [3], the quantization of angular momentum is a relativistic extension of quantization of circulation, and therefore it yields Bohr-Sommerfeld quantization rules.

Furthermore, it was suggested in [6] and [7] that Bohr-Sommerfeld quantization rules can yield an explanation of planetary orbit distances of the solar system and exoplanets. Here, we begin with Bohr-Sommerfeld's conjecture of quantization of angular momentum. As we know, for the wavefunction to be well defined and unique, the momenta must satisfy Bohr-Sommerfeld's quantization condition:

$$\oint_{\Gamma} p \cdot dx = 2\pi \cdot n\hbar, \quad (5)$$

for any closed classical orbit Γ . For the free particle of unit mass on the unit sphere the left-hand side is:

$$\int_0^T v^2 \cdot d\tau = \omega^2 \cdot T = 2\pi \cdot \omega, \quad (6)$$

Where $T = \frac{2\pi}{\omega}$ is the period of the orbit. Hence the quantization rule amounts to quantization of the rotation frequency (the angular momentum): $\omega = n\hbar$. Then we can write the force balance relation of Newton's equation of motion:

$$\frac{GMm}{r^2} = \frac{mv^2}{r}. \quad (7)$$

Using Bohr-Sommerfeld's hypothesis of quantization of angular momentum (6), a new constant g was introduced:

$$mvr = \frac{ng}{2\pi}. \quad (8)$$

Just like in the elementary Bohr theory (just before Schrodinger), this pair of equations yields a known simple solution for the orbit radius for any quantum number of the form:

$$r = \frac{n^2 \cdot g^2}{4\pi^2 \cdot GMm^2}, \quad (9)$$

or

$$r = \frac{n^2 \cdot GM}{v_o^2}, \quad (10)$$

Where r , n , G , M , v_o represents orbit radii (semimajor axes), quantum number ($n=1,2,3,\dots$), Newton gravitation constant,

and mass of the nucleus of orbit, and specific velocity, respectively. In equation (10), we denote:

$$v_0 = \frac{2\pi}{g} GMm.$$

(11)

The value of m and g in equation (11) are adjustable parameters.

Interestingly, we can remark here that equation (10) is exactly the same with what is obtained by Nottale using his Schrodinger-Newton formula [8]. Therefore here we can verify that the result is the same, either one uses Bohr-Sommerfeld quantization rules or Schrodinger-Newton equation. The applicability of equation (10) includes that one can predict new exoplanets (extrasolar planets) with remarkable result.

Therefore, one can find a neat correspondence between Bohr-Sommerfeld quantization rules and motion of quantized vortice in condensed-matter systems, especially in superfluid helium [3]. Here we propose a conjecture that Bohr-Sommerfeld quantization rules also provide a good description for the motion of galaxies, therefore they should be included in the expression of torsion vector.

There are numerous other models to describe alternative or modified gravitation theories, for instance Wang is able to derive Newton's second law and Schrodinger equation from fluid mechanical dynamics. [10][11]

In the mean time, for discussion of galaxy disk formation, see [12]. And [13] gives alternative vortices argument for dark matter.

B. Golden ratio is directly related to KAM turbulence via Burgers equation

The Cosmic Web is the fundamental spatial organization of matter on scales of a few up to a hundred Megaparsec. Galaxies and intergalactic gas matter exist in a wispy weblike arrangement of dense compact clusters, elongated filaments, and sheetlike walls, amidst large near-empty void regions. The filaments are the transport channels along which matter and galaxies flow into massive high-density cluster located at the nodes of the web. The weblike network is shaped by the tidal force field accompanying the inhomogeneous matter distribution.[1]

Structure in the Universe has risen out of tiny primordial (Gaussian) density and velocity perturbations by means of gravitational instability. The large-scale anisotropic force field induces anisotropic gravitational collapse, resulting in the emergence of elongated or flattened matter configurations. The simplest model that describes the emergence of structure and complex patterns in the Universe is the Zeldovich Approximation (ZA).[1]

It is our hope that the new approach of CA Adhesion model of the Universe can be verified either with lab experiments, computer simulation, or by large-scale astronomy observation data.

From Zeldovich Approximation to Burgers' equation to Cellular Automaton model

In this section, we will outline a route from ZA to Burgers' equation and then to CA model.

The simplest model that describes the emergence of structure and complex patterns in the Universe is the Zeldovich Approximation (ZA). In essence, it describes a ballistic flow, driven by a constant (gravitational) potential. The resulting Eulerian position $x(t)$ at some cosmic epoch t is specified by the expression:[15]

$$x(t) = q + D(t)u_o(q),$$

(16)

where q is the initial ‘‘Lagrangian’’ position of a particle, $D(t)$ the time-dependent structure growth factor and

$$u_o = -\nabla_q \Phi_o$$

(17)

its velocity. The nature of this approximation may be appreciated by the corresponding source-free equation of motion,

$$\frac{\partial u}{\partial D} + (u \cdot \nabla_x)u = 0.$$

(18)

The use of ZA is ubiquitous in cosmology. One major application is its key role in setting up initial conditions in cosmological N-body simulations. Of importance here is its nonlinear extension in terms of *Adhesion Model*. [15]

The ZA breaks down as soon as self-gravity of the forming structures becomes important. To ‘simulate’ the effects of self-gravity, Gurbatov *et al.* included an artificial viscosity. This results in the Burgers’ equation as follows: [15]

$$\frac{\partial u}{\partial D} + (u \cdot \nabla_x)u = \nu \cdot \nabla_x^2 u,$$

(19)

a well known PDE from fluid mechanics. This equation has an exact analytical solution, which in the limit of $\nu \rightarrow 0$, the solution is: [15]

$$\phi(x, D) = \max_q \left[\Phi_o(q) - \frac{(x - q)^2}{2D} \right].$$

(20)

This leads to a geometric interpretation of the Adhesion Model. The solution follows from the evaluation of the convex hull of the velocity potential modified by a quadratic term. We found that the solution can also be found by computing the weighted Voronoi diagram of a mesh weighted with

the velocity potential. For more detailed discussion on Adhesion Model of the Universe, see for example [18].

Now, let us consider another routes to solve Burgers equation: (a) by numerical computation with *Mathematica*, see [17]; and (b) by virtue of CA approach. Let us skip route (a), and discuss less known approach of cellular automata.

We start with the Burgers' equation with Gaussian white noise which can be rewritten as follows:[16]

$$\frac{\partial u}{\partial t} + \xi = 2u \frac{\partial u}{\partial x} + \frac{\partial^2 u}{\partial x^2} + \eta.$$

(21)

By introducing new variables and after straightforward calculations, we have the automata rule:[16]

$$\begin{aligned} \phi_i^{t+1} = & \phi_{i-1}^t + \max[0, \phi_i^t - A, \phi_i^t + \phi_{i+1}^t - B, \Psi_i^t - \phi_{i-1}^t] \\ & - \max[0, \phi_{i-1}^t - A, \phi_{i-1}^t + \phi_i^t - B, \Phi_i^t + \phi_{i-1}^t] \end{aligned}$$

(22)

In other words, in this section we give an outline of a plausible route from ZA to Burgers' equation then to CA model, which suggests that it appears possible –at least in theory- to consider a nonlinear cosmology based on CA Adhesion model.

From KAM theory to Golden section

Another possible way to describe the complex structure of Universe, is the Kolmogorov-Arnold-Moser (KAM) theorem states that if the system is subjected to a weak nonlinear perturbation, some of the invariant tori are deformed and survive, while others are destroyed. The ones that survive are those that have “sufficiently irrational frequencies” (the non-resonance condition, so they do not interfere with one another). The golden ratio being the most irrational number is often evident in such systems of oscillators. It is also physically significant in that circles with golden mean frequencies are the last to break up in a perturbed dynamical system, so the motion continues to be quasi-periodic, i.e., recurrent but not strictly

periodic or predictable.

An important consequence of the KAM theorem is that for a large set of initial conditions, the motion remains perpetually quasi-periodic, and hence stable. KAM theory has been extended to non-Hamiltonian systems and to systems with fast and slow frequencies.

The KAM theorem become increasingly difficult to satisfy for complex systems with more degrees of freedom; as the number of dimensions of the system increases, the volume occupied by the tori decreases. Those KAM tori that are not destroyed by perturbation become invariant Cantor sets, or "Cantori". The frequencies of the invariant Cantori approximate the golden ratio.

The golden ratio effectively enables multiple oscillators within a complex system to co-exist without blowing up the system. But it also leaves the oscillators within the system free to interact globally (by resonance), as observed in the coherence potentials that turn up frequently when the brain is processing information.

Obviously, this can be tied in to the creation of subatomic particles such as electrons and positrons. At a certain scale of smallness, the media in the local volume becomes isotropic, while larger volumes exhibit occupation by ever-larger turbulence formations and exhibit extremes of **anisotropy** in the media.

The Kolmogorov Limit is $10e^{-58}$ m, which is the smallest vortex that can exist in the aether media. Entities smaller than this, down to the SubQuantum infinitesimals (Bhutatmas) (vortex lines) are the primary cause of gravitation (a "sink" model of gravitation caused by superluminal infinitesimals). [See: LaPlace].



Figure 1 Turbulent flow generated by the tip vortex of the aeroplane wing shown up by red agricultural dye. (after Mae Wan-Ho, [38]).

Shadow gravity is valid in the situation of gravitational interaction between two discrete masses that divert the ambient gravitational flux-density away from each other. This happens due to absorption (rare), scattering (more common), and refraction (most of the time) of gravitational infinitesimals. Gravitational flux density is a variable depending on stellar, interstellar, and intergalactic events.

A simplified model of vorticity fields in large scale structures of the Universe is depicted below:

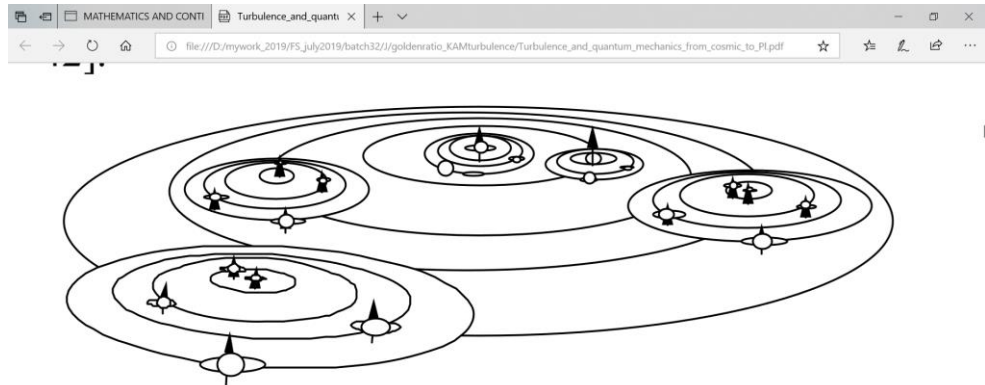


Fig.2 Description of internal (iso-spin) versus external vorticity fields in cosmology [41].

Figure 2. Vorticity fields in cosmology (after [34])

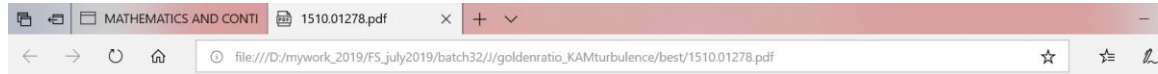
What is more interesting here, is that it can be shown that there is correspondence between Golden section and in coupled oscillators and KAM Theorem, but also between Golden section and Burgers equation. [35]

Meanwhile, Négadi has shown that there is Fibonacci series (related to Golden mean) which can explain genetic code pattern.

[36][37]

For more discussion, on Golden Mean and its ramifications, see for instance [39][40][41].

Table 1. Standard Genetic Code pattern (after [37])



UUU F	UUC F	UCU S	UCC S	CUU L	CUC L	CCU P	CCC P
UUA L	UUG L	UCA S	UCG S	CUA L	CUG L	CCA P	CCG P
UAU Y	UAC Y	UGU C	UGC C	CAU H	CAC H	CGU R	CGC R
UAA stop	UAG stop	UGA stop	UGG W	CAA Q	CAG Q	CGA R	CGG R
AUU I	AUC I	ACU T	ACC T	GUU V	GUC V	GCU A	GCC A
AUA I	AUG M	ACA T	ACG T	GUA V	GUG V	GCA A	GCG A
AAU N	AAC N	AGU S	AGC S	GAU D	GAC D	GGU G	GGC G
AAA K	AAG K	AGA R	AGG R	GAA E	GAG E	GGA G	GGG G

C. Cantorian Navier-Stokes approach

Vorticity as the driver of Accelerated Expansion

According to Ildus Nurgaliev [26], velocity vector V_α of the material point is projected onto coordinate space by the tensor of the second rank $H_{\alpha\beta}$:

$$V_\alpha = H_{\alpha\beta} R^\beta \quad (23)$$

Where the Hubble matrix can be defined as follows for a homogeneous and isotropic universe:

$$H_{\alpha\beta} = \begin{pmatrix} H & \pm\omega & \pm\omega \\ \mp\omega & H & \pm\omega \\ \mp\omega & \mp\omega & H \end{pmatrix}$$

(24)

Where the global average vorticity may be zero, though not necessarily [7]. Here the Hubble law is extended to 3x3 matrix.

Now we will use Newtonian equations to emphasize that cosmological singularity is consequence of the too simple model of the flow, and has nothing to do with special or general relativity as a cause [26]. Standard equations of Newtonian hydrodynamics in standard notations read:

$$\frac{d\vec{v}}{dt} = \frac{\partial\vec{v}}{\partial t} + \vec{v}\nabla\vec{v} = -\nabla\phi + \frac{1}{\rho}\nabla\rho + \frac{\mu}{\rho}\Delta\vec{v} + \dots,$$

(25)

$$\frac{\partial\rho}{\partial t} + \nabla\rho\vec{v} = 0,$$

(26)

$$\Delta\phi = 4\pi G\rho$$

(27)

Procedure of separating of diagonal H , trace-free symmetrical σ , and anti-symmetrical ω elements of velocity gradient was used by Indian theoretician Amal Kumar Raychaudhury (1923-2005). The equation for expansion θ , sum of the diagonal elements of [7]

$$\dot{\theta} + \frac{1}{3}\theta^2 + \sigma^2 - \omega^2 = -4\pi G\rho + \text{div}\left(\frac{1}{\rho}\sum f\right)$$

(28)

is most instrumental in the analysis of singularity and bears the name of its author. [26]

System of (25)-(27) gets simplified up to two equations [26]:

$$\dot{\theta} + \frac{1}{3}\theta^2 - \omega^2 = 0,$$

(29)

$$\dot{\omega} + \frac{2}{3}\theta\omega = 0.$$

(30)

Recalling $\theta = 3H$, the integral of (30) takes the form [26]

$$H^2 = H_\infty^2 - \frac{3\omega_0^2 R_0^4}{R^4}.$$

(31)

How to write down Navier-Stokes equations on Cantor Sets

Now we can extend further the Navier-Stokes equations to Cantor Sets, by keeping in mind their possible applications in cosmology.

By defining some operators as follows:

1. In Cantor coordinates [28]:

$$\nabla^\alpha \cdot u = \text{div}^\alpha u = \frac{\partial^\alpha u_1}{\partial x_1^\alpha} + \frac{\partial^\alpha u_2}{\partial x_2^\alpha} + \frac{\partial^\alpha u_3}{\partial x_3^\alpha},$$

(32)

$$\nabla^\alpha \times u = \text{curl}^\alpha u = \left(\frac{\partial^\alpha u_3}{\partial x_2^\alpha} - \frac{\partial^\alpha u_2}{\partial x_3^\alpha} \right) e_1^\alpha + \left(\frac{\partial^\alpha u_1}{\partial x_3^\alpha} - \frac{\partial^\alpha u_3}{\partial x_1^\alpha} \right) e_2^\alpha + \left(\frac{\partial^\alpha u_2}{\partial x_1^\alpha} - \frac{\partial^\alpha u_1}{\partial x_2^\alpha} \right) e_3^\alpha$$

(33)

2. In Cantor-type cylindrical coordinates [29, p.4]:

$$\nabla^\alpha \cdot r = \frac{\partial^\alpha r_R}{\partial R^\alpha} + \frac{1}{R^\alpha} \frac{\partial^\alpha r_\theta}{\partial \theta^\alpha} + \frac{r_R}{R^\alpha} + \frac{\partial^\alpha r_z}{\partial z^\alpha},$$

(34)

$$\nabla^\alpha \times r = \left(\frac{1}{R^\alpha} \frac{\partial^\alpha r_\theta}{\partial \theta^\alpha} - \frac{\partial^\alpha r_\theta}{\partial z^\alpha} \right) e_R^\alpha + \left(\frac{\partial^\alpha r_R}{\partial z^\alpha} - \frac{\partial^\alpha r_z}{\partial R^\alpha} \right) e_\theta^\alpha + \left(\frac{\partial^\alpha r_\theta}{\partial R^\alpha} + \frac{r_R}{R^\alpha} - \frac{1}{R^\alpha} \frac{\partial^\alpha r_R}{\partial \theta^\alpha} \right) e_z^\alpha$$

(35)

Then Yang, Baleanu and Machado are able to obtain a general form of the Navier-Stokes equations on Cantor Sets as follows [28, p.6]:

$$\rho \frac{D^\alpha v}{Dt^\alpha} = -\nabla^\alpha \cdot (pI) + \nabla^\alpha \left[2\mu(\nabla^\alpha \cdot v + v \cdot \nabla^\alpha) - \frac{2}{3}\mu(\nabla^\alpha \cdot v)I \right] + \rho b$$

(36)

The next task is how to find observational cosmology and astrophysical implications. This will be the subject of future research.

Concluding remarks

In this article, we hope to bring out some correspondence among existing Turbulence Cosmology models, so we discuss shortly: the topological vortice approach, Burgers equation in the light of KAM theory and Golden Mean, and the Cantorian Navier-Stokes approach. Of course, this short article is far from being complete. We hope further investigation can be done around this line of approach.

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Remark on Unified Vortical Singularity (UVS) model in Comparison with Navier-Stokes Cosmology

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Abstract

In this paper , we review shortly UVS model of the Universe, based on information in their website. Universal Vortical Singularity (UVS) is a postulated cosmic archetype of a nested vortical hypersphere system. All sorts of its torus transformed hypersphere structures, are perceivable to be ubiquitously manifested in the observable universe throughout macrocosms and microcosms. We also discuss briefly a new model that we call Navier-Stokes cosmology, because we realize that the Cosmic Web of large scale structure of the Universe can only be approached using turbulence/NS theory. This short review is of course not complete, and therefore more research is needed.

Introduction

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In this paper, we review shortly UVS model of the Universe, based on information in their website. Universal Vortical Singularity (UVS) is a postulated cosmic archetype of a nested vortical hypersphere system. All sorts of its torus transformed hypersphere structures, are perceivable to be ubiquitously manifested in the observable universe throughout macrocosms and microcosms. We also discuss briefly a new model that we call Navier-Stokes cosmology, because we realize that the Cosmic Web of large scale structure of the Universe can only be approached using turbulence/NS theory. In a separate paper, we review 3 ways to describe scale invariant turbulence Cosmology model as we discuss how to connect from Burgers equation, KAM theory and Golden ratio too.

UVS model

According to its website:¹

“Universal Vortical Singularity (UVS) is a postulated cosmic archetype of a nested vortical hypersphere system. All sorts of its torus transformed hypersphere structures, are perceivable to be ubiquitously manifested in the observable universe throughout macrocosms and microcosms.

¹ <http://www.uvs-model.com>

In the reality paradigm shift of the UVS model, it can systematically postulate the underlying structures and mechanisms for the observed natural phenomena that demonstrate hyperspheric vortical characteristics.

And with the epistemological paradigm shift to the epistemic process and methodology of the UVS research, it can invoke the perspectivism of the UVS worldview with its transcendental perceptions to perceive these natural phenomena in its conceptual framework.

Heuristically, the observable universe is vortically formed in the closed system of a hyperspheric vortice as an aetheric nested 3-vortice; the observable universe is in a torus transformed nested hypersphere structure formed by aether vortical motion.

The hyperspheric vortical universe with the precession effects in its grand vortical motion, harmonically spawns elementary particles that are vortically impelled and resonated in an almost all-pervasive me-

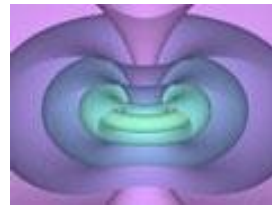


Fig.1. A nested torus structure.

dium of aether. In the grand vortical motion, the elementary particles that inherit the forms and characteristics of the hypersphere system in the hyperspheric vortical universe, are thus vortically coalesced as subatomic and atomic particles in their nested vortical structures.

In the harmonics of the nested spheroidal unisonal vortex that encapsulates the observable universe, all sorts of compound that are vortically coalesced from atomic particles in the microcosms, are thus resonated in the macrocosms to vortically form and transform as a unisonal system of planetary systems, star systems, globular clusters, satellite galaxies, galaxies, galaxy group, galaxy clusters, and superclusters.

The structure of the observable universe is a nested spheroidal vortical formation that has formed and transformed in the torus paradigm of a nested spheroidal unisonal vortex. “

Among other things, in their website they also present an alternative to Mendeleev periodic table of elements, described in Klein bottle scheme.

The UVS periodic table model of a Klein bottle topology

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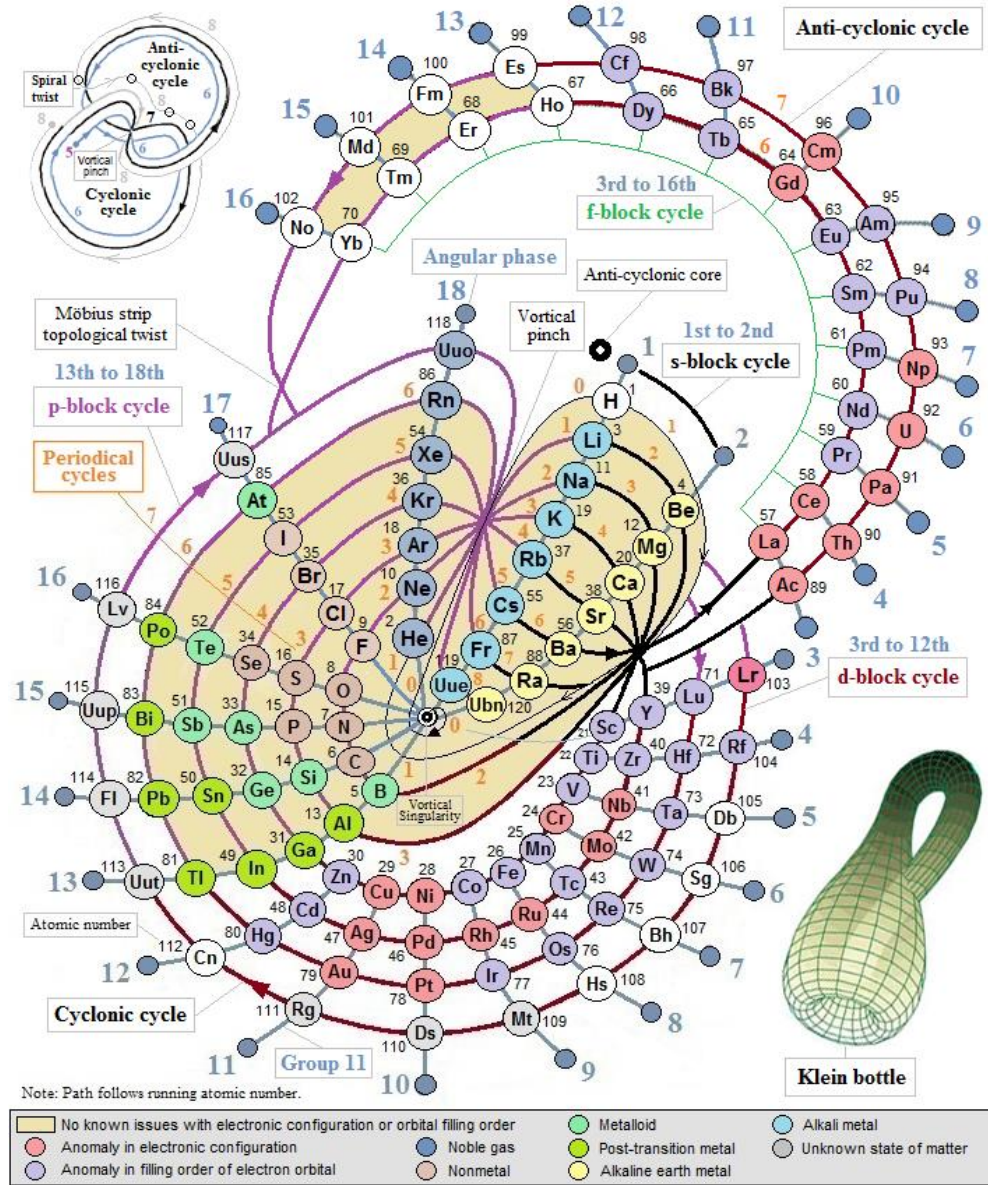


Figure 2. Klein-bottle inspired periodic table of elements (www.uvs-model.com)

Comments on UVS

UVS has a relationship to Maxwell's equations described by Maxwell, where Maxwell describes space as being filled with interconnected aether rotors. We appreciate it that UVS is based on nested vortices, related to the Helmholtz model of the electron we published recently. Galactic Plasmoids are also vortex formations. The nested vortex concept strikes me as scalable from the SubQuantum to the Macro-cosmic.

This UVS paradigm has a lot of things right, but they have left many things and behaviors out of the picture. Also, there are no "black holes". Black holes are a non-physical false artifact of E's version of relativity. The only location they can exist is in some peoples fevered imaginations. They are imaginary. Even if they were real in some way, by definition they could not be imaged.

Only plasmoids can make astronomical "jets" of matter. Plasmoids make jets of charged matter in the laboratory. At the core of each galaxy is a plasmoid vortex. Some of the more energetic plasmoids shoot out matter jets many light years long, at faster than light velocities.

These FTL jets have been observed and various excuses were made about the FTL, all of which wanted to find some artifice to somehow agree with the speed of light limit, which

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is a lie. 100 years of making excuses and lies to support previous lies, has been the majority of astrophysics during the past century.

Anyway, it is tied in to one of us (RNB)'s SubQuantum dynamics, but the UVS folks have not considered Bhutatmas.

These people want everything to be vortices, but observable facts demonstrate that concept is wrong, due to the fact that there are all manners of events and items that are not vortical, especially not at the scale we live in.

Certainly vortices are here to stay, but there people need to expand their horizons a bit and include all the rest of everything, and realize that there are limits and boundary conditions which are situation-dependent.

These folks have found a new tool, nested vortices. But they are acting like the man whose only tool is a hammer. To such a man, everything looks like a nail.

Maxwell, et al, examined such behaviors as streamlines and other fluidic and gas dynamic behaviors. However, the 5 phase state aether was never included in their investigations during the days of Weber and Maxwell.

If they do some more work on their paradigm and make it more complete by including items that are not entirely vortical, and including E and B, and the SQ, and then get rid of the "black hole" nonsense, some really good things can happen.

Turbulence exists at all scales, down to at least the Kolmogorov limit at $10e^{-58}$ m

However, rocks and trees and mountains and so on, are not observably turbulent. Solid phase state items are like that. And there are a lot of them about.

The most important thing they have neglected is polarity. All known Forces exhibit polarity.

Polarity arises as the SQ aether is displaced by some activity. Then the aether acts to generate an equal and opposite force to bring the local condition back to equilibrium, so it can go back to hanging out and taking it easy.

If there is any delay between action and reaction, due to vast volumes of displaced discomfited aether, the reaction will be produced from the entire displaced volume, which can be up to light years across and take up to months to generate the compensating force and return it to the origin of the disturbance. The larger the affected volume, the larger is the equilibrating force. Reaction forces are volumetricly additive.

Without forces, their UVS can't make whirlpools or vortices. We hope they fix it.

By the way, the measurable forces are always preceded by aether streaming events, known as vector potentials. Some think that vector potentials cause the known forces, rather than the forces causing vector potentials.

Comparison with Navier-Stokes equations and fluid crowd cosmology

Navier-Stokes turbulence equations can exhibit crowd model, and it seems these equations can go for cosmology too. Therefore, in the past few years we sought a consistent cosmology inspired by turbulence approach. Two papers have been presented earlier this year (2019), see [1][2]. In this section, we will discuss four possible applications of the proposed Navier-Stokes-Cosmology:

- a. Active Galactic Nuclei;
- b. Oceanography; and
- c. Vortex model of elementary particles.

While we quoted most of these applications from some existing literatures, but to my present knowledge there is no attempt so far to view these applications under a unified theme of Navier-Stokes cosmology. It is interesting to note here that some features of this framework may gave similarities with the fractal vortex universe model of Patrick Driessen, who also mentioned similarity between galaxies and particles [3].

a. Dipole toroidal vortex model in Active Galactic Nuclei

The 2D Navier-Stokes equation for a steady viscous flow can be written as follows:

$$\rho(\vec{v} \cdot \nabla)\vec{v} = -\nabla p + \rho\vec{f} + \mu\Delta\vec{v} \quad (1)$$

Argentini obtained a general exact solution of ODE version of 2D Navier-Stokes equation in Riccati form as follows [6]:

$$\dot{u}_1 - \alpha u_1^2 + \beta = 0, \quad (2)$$

where:

$$\alpha = \frac{1}{2\nu},$$

and

$$\beta = -\frac{1}{\nu} \left(\frac{\dot{q}}{\rho} - f_1 \right) s - \frac{c}{\nu}.$$

The solution of Riccati equation is notoriously difficult to find, so we decided to use Mathematica software in order to get an exact analytical solution. The result has been presented in a recent paper [6][7].

Another possible solution of Navier-Stokes equations comes in the form of vortex. For example, it is known that Serrin's swirling vortex is a solution of Navier-Stokes equations. In this regard, it is interesting to remark here that Bannikova and Kontorovich have proposed a dipole toroidal vortex model for Active Galactic Nuclei.[10][11]

They began their paper as follows:

“Starting with the Antonucci and Miller’s outstanding work, tori have been considered as a necessary element of the AGN-structures forming the basis of the AGN unified model. A brilliant achievement was the first direct observation of the obscuring tori described by Jaffe, Meisenheimer, Rottgering *et al.* (2004). Existence of tori was confirmed by observation with VLT optical interferometer equipped with MIDI IR-camera.”[12] They also suggested that “Since the preliminary observational data Jaffe, Meisenheimer, Rottgering *et al.* (2004) point at significantly larger torus sizes, it should be natural to suggest the “*matrjoshka*” scheme: *there are tori of smaller radii within the outer big torus.* In the case of Eddington luminosity, the mass of torus that replenishes the accretion disk is proportional to its big radius.” [10]

They also concluded that “A dipole–toroidal vortex can be an essential element of AGN-structure, which replenishes the accretion disk.” [10]

The figure below shows their concept [11]:

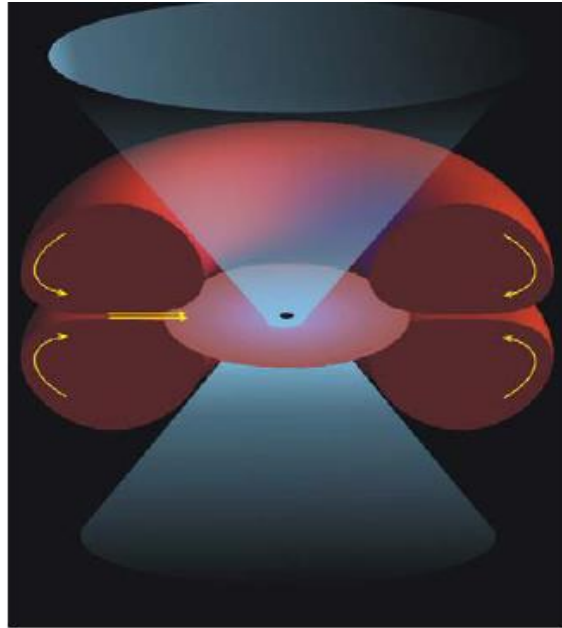


Fig. 1b. Dipole toroidal vortex in the AGN center: 3D picture.

Cones sketch out the wind and radiation.

The momentum is related with circulation and mass, and it is given by [11]:

$$\Gamma = \oint v \cdot dr = 2\pi r \cdot v_{\varphi} \quad (3)$$

According to Patrick Driessen, Bohr's quantization condition also holds at galaxies scale where the cosmic Bohr radius can be estimated and it yields value: $A_0=41.8$ Mpc [6].

b. Atmospheric flow and Oceanography

The use of dipole vortex in atmospheric flow has been discussed by Snyder, Plougonven and Muraki [12]. Their paper investigates the generation mechanisms for the stationary in-

ertia-gravity waves embedded within a larger-scale dipole vortex. Similarly, various applications of vortical flows can be observed in oceanography field. [13] Atmospheric and oceanographic fields are few of applications of Navier-Stokes equations.

c. Vortex model of elementary particles

Now we extend it further to vortex model of elementary particles as proposed by Rockenbauer [19].

According to Rockenbauer, the Dirac equation describes the motion of electrons in electromagnetic field, but it considers spin as intrinsic property without any real motion. Despite the fact that customarily applied point charge models avoid clarifying whether spin is related to any physical motion, there were efforts to relate certain motion to spin [16].

He argues that spin kinetic energy can be written as [16]:

$$E_{spin} = \frac{3}{2} I \omega_{spin}^2 = m a^2 \cdot \omega_{spin}^2 = m c^2. \quad (9)$$

In other words, the rest energy can be produced in full by the spinning motion of elementary particles if the peripheral speed is equal to the velocity of light. Furthermore, according to Rockenbauer, when the self-system is considered, the elementary particles behave like empty space (vacuum), and we can postulate the elementary particles as vortices defined as spinning confinements of the space.[16]

While surely his model is not complete yet, it can give an outline of vortex model of elementary particles, including equations for quarks and neutrino [16]. In short, it is quite promising alternative framework to understand spinning behavior of elementary particles.

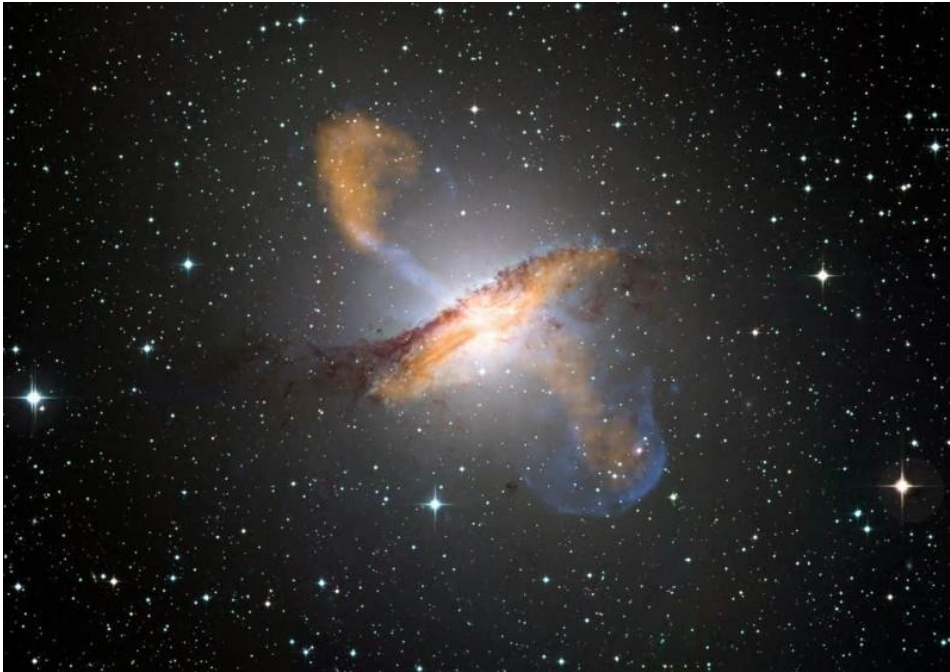
In another perspective, Tkalya has calculated cyclo-toroid nuclear moment of particles, which may indicate the vortical structure of elementary particles [17]. It seems worth to investigate further plausibility of her approach.

Meanwhile, an alternative vortex model of elementary particles has been proposed for instance by James Tassano [18].

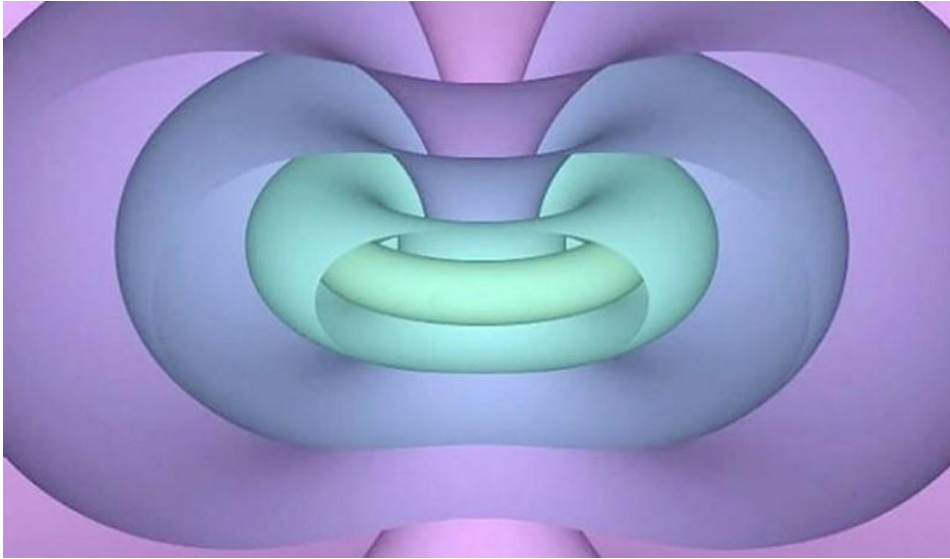
Other possible similarities between Helmholtz-Kelvin vortex and galaxies

It seems that the Kelvin-Helmholtz model of the electron is scalable to galaxies.

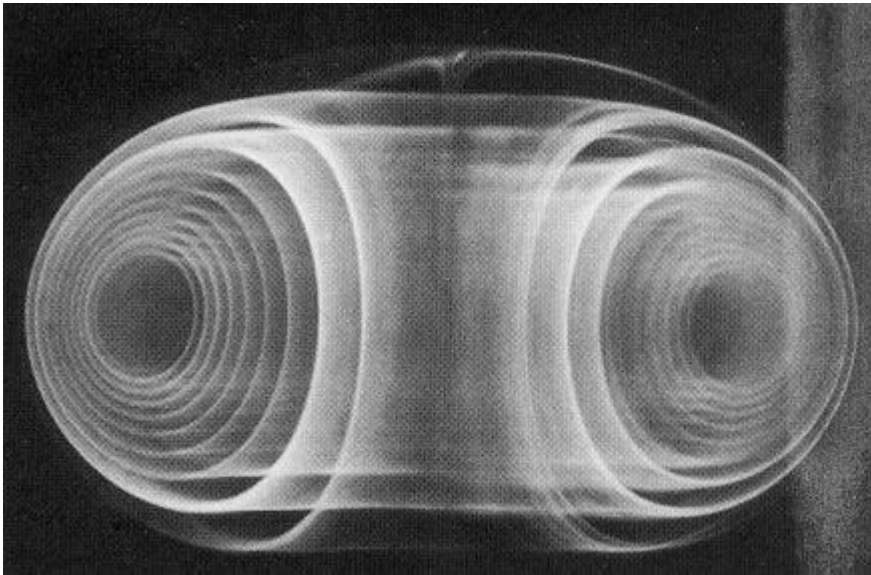
Let us look at the following picture:



Which looks similar to:

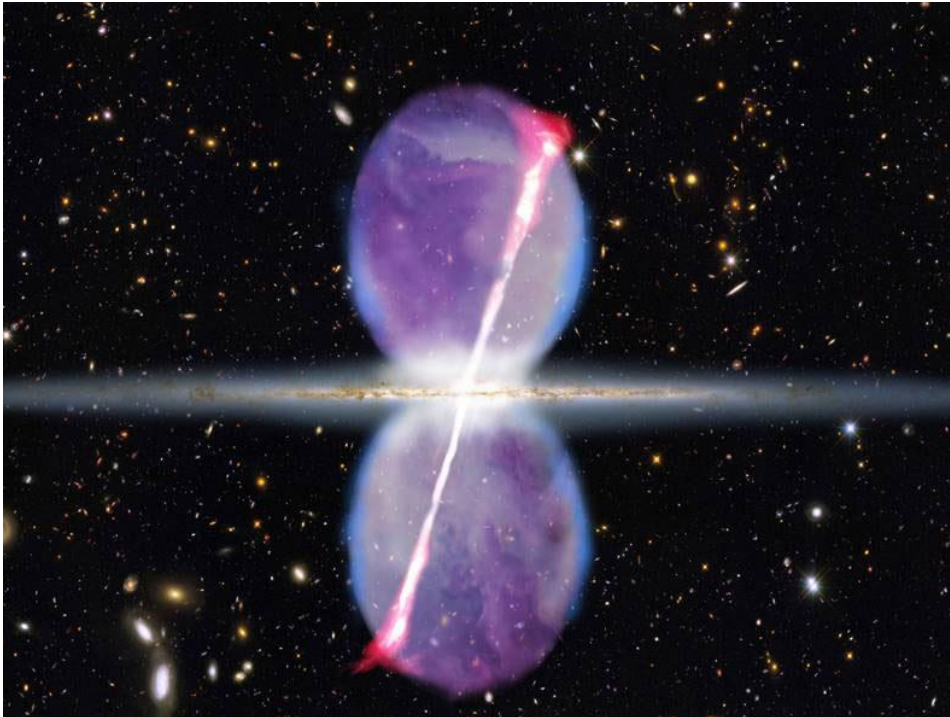


Which looks similar to:



The difference is that there are different nonlinearities at various scales of size.

In the last view of Alfvén's homopolar motor model of the galaxy, it looks like this:



Does it mean that: the Kelvin-Helmholtz model of the electron is scalable to galaxies?
(the above picture is used as this book's cover image)

Concluding remarks

This paper reviews UVS model of the Universe. But that is just a review that there is coherent hydrodynamics picture for everything in this Universe, from smallest scales to galaxies and beyond.

We also review three applications of the proposed Navier-Stokes-Cosmology:

- a. Active Galactic Nuclei;
- b. Oceanography;
- and
- c. Vortex model of elementary particles.

While we cited most of these applications from existing literatures, but to our present knowledge there is no attempt so far to view these applications under a unified theme of Navier-

Stokes cosmology. It is interesting to note here that some features of this framework may have similarities with the fractal vortex universe model of Patrick Driessen, who also mentioned similarity between galaxies and particles.

It should be noted that the above presentation is not conclusive yet. However, all of these three applications seem to be intriguing enough to be investigated, therefore allow me to suggest further research and experiments.

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VC, RNB, FS, DC

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Remark on Lehnert's Revised Quantum Electrodynamics (RQED) as an Alternative to Francesco Celani's et al's Maxwell-Clifford equations: with an Outline of Chiral Cosmology model and its role to CMNS

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Abstract

In a recent paper published in *JCMNS* 2017, Francesco Celani, Di Tommaso & Vassalo argued that Maxwell equations rewritten in Clifford algebra are sufficient to describe electron and also ultra-dense deuterium reaction process as proposed by Homlid et al. Apparently, Celani *et al.* believed that their Maxwell-Clifford equations are quite excellent candidate to surpass both Classical Electromagnetic and *Zitterbewegung* QM.

Meanwhile, in a series of papers, Bo Lehnert proposed a novel and revised version of Quantum Electrodynamics (RQED) based on Proca equations. Therefore, in this paper, we gave an outline of Lehnert's RQED, as an alternative framework to Celani et al's *Zitterbewegung*-Classical EM.. Moreover, in a rather old paper, Mario Liu described a hydrodynamic Maxwell equations. While he also discussed potential implications of these new approaches to superconductors, such a discussion of electrodynamics of superconductors is made only after Tajmar's paper. Therefore, in this paper we present for the first time a derivation of fluidic Maxwell-Proca equations. The name of fluidic Maxwell-Proca is proposed because the equations were based on modifying Maxwell-Proca and Hirsch's theory of electrodynamics of superconductor. It is hoped that this paper may stimulate further investigations and experiments in superconductor. It may be expected to have some impact to cosmology modeling

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too, for instance we consider a hypothetical argument that photon mass can be origin of gravitation. Then, after combining with the so-called chiral modification of Maxwell equations (after Sprössig), then we consider chiral Maxwell-Proca equations as possible alternative of gravitation theory. Such a hypothesis has never considered in literature to the best of our knowledge. In the last section, we discuss plausible role of chiral Maxwell-Proca (RQED) in CMNS process. It is hoped that this paper may stimulate further investigations and experiments in particular for finding physics of LENR and UDD reaction from classical electromagnetics.

Key Words: Maxwell equations, Proca equations, LENR, Revised QED, Hirsch theory, London equations, hydrodynamics Maxwell equations, Proca equations, electrodynamics of superconductor, chiral medium, chiral gravitation theory.

1. Introduction

In a recent paper published in *JCMNS* 2017, Francesco Celani, Di Tommaso & Vassalo argued that Maxwell equations rewritten in Clifford algebra are sufficient to describe electron and also ultra-dense deuterium reaction process as proposed by Homlid et al. Apparently, Celani et al. believed that their Maxwell-Clifford equations are quite excellent candidate to surpass both Classical Electromagnetics theory and *Zitterbewegung* QM.[1]

In the meantime, it is known that conventional electromagnetic theory based on Maxwell's equations and quantum mechanics has been successful in its applications in numerous problems in physics, and has sometimes manifested itself in a good agreement with experiments. Nevertheless, as already stated by Feynman, there are unsolved problems leading to difficulties with Maxwell's equations that are not removed by and not directly associated with quantum mechanics [17-20]. Therefore QED, which is an extension of Maxwell's equations, also becomes subject to the typical shortcomings of electromagnetic in its conventional form. This reasoning makes a way for Revised Quantum Electrodynamics as proposed by Bo Lehnert.[17-19]

Meanwhile, according to J.E. Hirsch, from the outset of superconductivity research it was assumed that no electrostatic fields could exist inside superconductors and this assumption was incorporated into conventional London electrodynamics.[23] Hirsch suggests that there are difficulties with the two London equations. To summarize, London's equations together with Maxwell's equations lead to unphysical predictions.[22] Hirsch also proposes a new model for electrodynamics for superconductors. [22-23]

In this regard, in a rather old paper, Mario Liu described a hydrodynamic Maxwell equations.[25] While he also discussed potential implications of these new approaches to superconductors, such a discussion of electrodynamics of superconductors is made only after Tajmar's paper. Therefore, in this paper we present for the first time a derivation of fluidic Maxwell-Proca-Hirsch equations. The name of Maxwell-Proca-Hirsch is proposed because the equations were based on modifying Maxwell-Proca and Hirsch's theory of electrodynamics of superconductor. Therefore, the aim of the present paper is to propose a version of fluidic Maxwell-Proca model for electrodynamics of superconductor, along with an outline of chiral cosmology model.

It may be expected to have some impact to cosmology modeling too, which will be discussed in the last section. It is hoped that this paper may stimulate further investigations and experiments in particular for fractal superconductor.

2. Lehnert's Revised Quantum Electrodynamics

Conventional electromagnetic theory based on Maxwell's equations and quantum mechanics has been successful in its applications in numerous problems in physics, and has sometimes manifested itself in a good agreement with experiments. Nevertheless, as already stated by Feynman, there are unsolved problems leading to difficulties with Maxwell's equations that are not removed by and not directly associated with quantum mechanics [20]. Therefore QED, which is an extension of Maxwell's equations, also becomes subject to the typical shortcomings of electromagnetic in its conventional form. This reasoning makes a way for Revised Quantum Electrodynamics as proposed by Bo Lehnert. [17-19]

In a series of papers, Bo Lehnert proposed a novel and revised version of Quantum Electrodynamics, which he calls as RQED. His theory is based on the hypothesis of a nonzero electric charge density in the vacuum, and it is based on *Proca-type* field equations [20, p. 23]:

$$\left(\frac{1}{c^2} \frac{\partial^2}{\partial t^2} - \nabla^2 \right) A_\mu = \mu_0 J_\mu, \mu = 1, 2, 3, 4$$

(1)

Where

$$A_\mu = \left(A, \frac{i\phi}{c} \right),$$

(2)

With A and ϕ standing for the magnetic vector potential and the electrostatic potential in three-space. In three dimensions, we got [20, p.23]:

$$\frac{\text{curl}B}{\mu_0} = \varepsilon_0(\text{div}E)C + \frac{\varepsilon_0\partial E}{\partial t},$$

(3)

$$\text{curl}E = -\frac{\partial B}{\partial t},$$

(4)

$$B = \text{curl}A, \text{div}B = 0,$$

(5)

$$E = -\nabla\phi - \frac{\partial A}{\partial t},$$

(6)

$$\text{div}E = \frac{\bar{\rho}}{\varepsilon_0}.$$

(7)

These equations differ from the conventional form, by a nonzero electric field divergence equation (7) and by the additional space-charge current density in addition to displacement current at equation (3). The extended

field equations (3)-(7) are easily found also to become invariant to a gauge transformation.[20, p.23]

The main characteristic new features of the present theory can be summarized as follows [20, p.24]:

- a. The hypothesis of a nonzero electric field divergence in the vacuum introduces an additional degree of freedom, leading to new physical phenomena. The associated nonzero electric charge density thereby acts somewhat like a hidden variable.
- b. This also abolishes the symmetry between the electric and magnetic fields, and then the field equations obtain the character of intrinsic linear symmetry breaking.
- c. The theory is both Lorentz and gauge invariant.
- d. The velocity of light is no longer a scalar quantity, but is represented by a velocity vector of the modulus c .
- e. Additional results: Lehnert is also able to derive the mass of Z boson and Higgs-like boson.[21] These would pave an alternative way to new physics beyond Standard Model.

Now it should be clear that Lehnert's RQED is a good alternative theory to QM/QED, and therefore it is also interesting to ask whether this theory can also explain some phenomena related to LENR and UDD reaction of Homlid (as argued by Celani et al).[1]

It should be noted too, that Proca equations can be considered as an extension of Maxwell equations, and they have been derived in various ways. It can be shown that Proca equations can be derived from first principles, and also that Proca equations may have link with Klein-Gordon equation.[6][7]

One persistent question concerning these Proca equations is how to measure the mass of the photon. This question has been discussed in lengthy by Tu, Luo & Gillies [12]. According to their report, there are various methods to estimate the upper bound limits of photon mass. In Table 1 below, some of upper bound limits of photon mass based on dispersion of speed of light are summarized.

Table 1. *Upper bound on the dispersion of the speed of light in different ranges of the electromagnetic spectrum, and the corresponding limits on the photon mass. [12, p.94]*

Author (year)	Type of measurement	Limits on m_γ (g)
Ross et al. (1937)	Radio waves transmission overland	5.9×10^{-42}
Mandelstam & Papalexi (1944)	Radio waves transmission over sea	5.0×10^{-43}
Al'pert et al. (1941)	Radio waves transmission over sea	2.5×10^{-43}
Florman (1955)	Radio-wave interferometer	5.7×10^{-42}
Lovell et al. (1964)	Pulsar observations on flour flare stars	1.6×10^{-42}
Frome (1958)	Radio-wave interferometer	4.3×10^{-40}
Warner et al. (1969)	Observations on Crab Nebula pulsar	5.2×10^{-41}
Brown et al. (1973)	Short pulses radiation	1.4×10^{-33}
Bay et al. (1972)	Pulsar emission	3.0×10^{-46}
Schaefer (1999)	Gamma ray bursts	4.2×10^{-44}
	Gamma ray bursts	6.1×10^{-39}

From this table and also from other results as reported in [12], it seems that we can expect that someday photon mass can be observed within experimental bound.

3. Hirsch's proposed revision of London's equations

According to J.E. Hirsch, from the outset of superconductivity research it was assumed that no electrostatic fields could exist inside superconductors and this assumption was incorporated into conventional London electrodynamics.[22] Hirsch suggests that there are difficulties with the two London equations. Therefore he concludes that London's equations together with Maxwell's equations lead to *unphysical* predictions.[1] However he still uses four- vectors J and A according to Maxwell's equations:

$$\square^2 A = -\frac{4\pi}{c} J, \quad (8)$$

and

$$J - J_0 = -\frac{c}{4\pi\lambda_L^2}(A - A_0). \quad (9)$$

Therefore, Hirsch proposes a new fundamental equation for electrodynamics for superconductors as follows: [22]

$$\square^2(A - A_0) = \frac{1}{\lambda_L^2}(A - A_0), \quad (10a)$$

where

- London penetration depth λ_L is defined as follows:[23]

$$\frac{1}{\lambda_L^2} = \frac{4\pi n_s e^2}{m_e c^2}, \quad (10b)$$

- And d'Alembertian operator is defined as: [22]
-

$$\square^2 = \nabla^2 - \frac{1}{c^2} \frac{\partial^2}{\partial t^2}. \quad (10c)$$

Then he proposes the following equations: [22]

$$\square^2(F - F_0) = \frac{1}{\lambda_L^2}(F - F_0), \quad (11)$$

and

$$\square^2(J - J_0) = \frac{1}{\lambda_L^2}(J - J_0), \quad (12)$$

where F is the usual electromagnetic field tensor and F_0 is the field tensor with entries \vec{E}_0 and 0 from \vec{E} and \vec{B} respectively when expressed in the reference frame at rest with respect to the ions.

In the meantime, it is known that Proca equations can also be used to describe electrodynamics of superconductors, see [25-33]. The difference between Proca and Maxwell equations is that Maxwell equations and Lagrangian are based on the hypothesis that the photon has zero mass, but the Proca's Lagrangian is obtained by adding mass term to Maxwell's Lagrangian.[33] Therefore, the Proca equation can be written as follows:[33]

$$\partial_\mu F^{\mu\nu} + m_\gamma^2 A_\nu = \frac{4\pi}{c} J^\nu, \quad (13a)$$

where $m_\gamma = \frac{\omega}{c}$ is the inverse of the Compton wavelength associated with photon mass. [38] In terms of the vector potentials, equation (13a) can be written as [33]:

$$(\square + m_\gamma)A_\mu = \frac{4\pi}{c}J_\mu. \quad (13b)$$

Similarly, according to Kruglov [31] the Proca equation for a free particle processing the mass m can be written as follows:

$$\partial_\nu \varphi_{\mu\nu}(x) + m^2 \varphi_\mu(x) = 0, \quad (14)$$

Now, the similarity between equations (8) and (13b) are remarkable with exception that equation (8) is in quadratic form. Therefore we propose to consider a modified form of Hirsch's model as follows:

$$(\square^2 - m_\gamma^2)(F - F_0) = \frac{1}{\lambda_L^2}(F - F_0), \quad (15a)$$

and

$$(\square^2 - m_\gamma^2)(J - J_0) = \frac{1}{\lambda_L^2}(J - J_0). \quad (15b)$$

The relevance of the proposed new equations in lieu of (11)-(14) should be verified by experiments with superconductors [37]. For convenience, the equations (15a)-(15b) can be given a name: *Maxwell-Proca-Hirsch equations*.

4. Fluidic Maxwell-Proca Equations

In this regard, in a rather old paper, Mario Liu described a hydrodynamic Maxwell equations.[24] While he also discussed potential implications of these new approaches to superconductors, such a discussion of electrodynamics of superconductors is made only after Tajmar's paper. Therefore, in this section we present for the first time a derivation of *fluidic* Maxwell-Proca-Hirsch equations.

According to Blackledge, Proca equations can be written as follows [7]:

$$\nabla \cdot \vec{E} = \frac{\rho}{\epsilon_0} - \kappa^2 \phi, \quad (16)$$

$$\nabla \cdot \vec{B} = 0, \quad (17)$$

$$\nabla \times \vec{E} = -\frac{\partial \vec{B}}{\partial t}, \quad (18)$$

$$\nabla \times \vec{B} = \mu_0 j + \varepsilon_0 \mu_0 \frac{\partial \vec{E}}{\partial t} + \kappa^2 \vec{A}, \quad (19)$$

where:

$$\nabla \phi = -\frac{\partial \vec{A}}{\partial t} - \vec{E}, \quad (20)$$

$$\vec{B} = \nabla \times \vec{A}, \quad (21)$$

$$\kappa = \frac{mc_0}{\hbar}. \quad (22)$$

Therefore, by using the definitions in equations (16)-(19), and by comparing with hydrodynamic Maxwell equations of Liu [24, eq. 2], now we can arrive at fluidic Maxwell-Proca equations, as follows:

$$\nabla \cdot \vec{E} = \frac{\rho}{\varepsilon_0} - \kappa^2 \phi, \quad (23)$$

$$\nabla \cdot \vec{B} = 0, \quad (24)$$

$$\dot{B} = -\nabla \times E - \nabla \times (\hat{\beta} \nabla \times H_0), \quad (25)$$

$$\varepsilon_0 \mu_0 \dot{E} = \nabla \times B - \mu_0 j - \kappa^2 A - (\hat{\sigma} E_0 + \rho_e v + \hat{\mathcal{N}} T) - \nabla \times (\hat{a} \nabla \times E_0), \quad (26)$$

where:

$$\nabla \phi = -\frac{\partial \vec{A}}{\partial t} - \vec{E}, \quad (27)$$

$$\vec{B} = \nabla \times \vec{A}, \quad (28)$$

$$\kappa = \frac{mc_0}{\hbar}. \quad (29)$$

Since according to Blackledge, the Proca equations can be viewed as a *unified wavefield* model of electromagnetic phenomena [7], therefore we can also regard the fluidic Maxwell-Proca equations as a *unified wavefield* model for electrodynamics of superconductor.

Now, having defined fluidic Maxwell-Proca equations, we are ready to write down fluidic Maxwell—Proca equations using the same definition, as follows:

$$(\square_\alpha^2 - \kappa^2)(F - F_0) = \frac{1}{\lambda_L^2}(F - F_0), \quad (30)$$

And

$$(\square_a^2 - \kappa^2)(J - J_0) = \frac{1}{\lambda_L^2}(J - J_0), \quad (31)$$

where

$$\square_a^2 = \nabla^{\alpha 2} - \frac{1}{c^2} \frac{\partial^{\alpha 2}}{\partial t^2}. \quad (32)$$

As far as we know, the above fluidic Maxwell-Proca equations have never been presented elsewhere before. Provided the above equations can be verified with experiments, they can be used to describe electrodynamics of superconductors.

As a last note, it seems interesting to remark here that Kruglov [31] has derived a square-root of Proca equations as a possible model for hadron mass spectrum, therefore perhaps equations (30)-(32) may be *factorized* too to find out a model for hadron masses. Nonetheless, we leave this problem for future investigations.

5. Towards Chiral Cosmology model

The Maxwell-Proca electrodynamics corresponding to a finite photon mass causes a substantial change of the Maxwell stress tensor and, under certain circumstances, may cause the electromagnetic stresses to act effectively as “*negative pressure*.” In a recent paper, Ryutov, Budker, Flambaum [34] suggest that such a negative pressure imitates gravitational pull, and may produce effect similar to gravitation. In the meantime, there are other papers by Longo, Shamir etc. discussing observations indicating handedness of spiral galaxies, which seem to suggest chiral medium at large scale. However, so far there is no derivation of Maxwell-Proca equations in chiral medium.

In a recent paper, Ryutov, Budker, Flambaum suggest that Maxwell-Proca equations may induce a negative pressure imitates gravitational pull, and may produce effect similar to gravitation.[34]

In the meantime, there are other papers by Longo, Shamir etc. discussing observations indicating handedness of spiral galaxies, which seem to suggest chiral medium at large scale. As Shamir reported:

“A morphological feature of spiral galaxies that can be easily identified by the human eye is the handedness—some spiral galaxies spin clockwise, while other spiral galaxies rotate counterclockwise. Previous studies suggest large-scale asymmetry between the number of galaxies that rotate clockwise and the number of galaxies that rotate counterclockwise, and a large-scale correlation between the galaxy handedness and other characteristics can indicate an asymmetry at a cosmological scale.”[40]

However, so far there is no derivation of Maxwell-Proca equations in chiral medium. Therefore, inspired by Ryutov et al.'s paper, in this paper, we present for the first time a possibility to extend Maxwell-Proca-type equations to chiral medium, which may be able to explain origin of handedness of spiral galaxies as reported by M. Longo et al.[39-40]

The present paper is intended to be a follow-up paper of our preceding paper, reviewing Shpenkov's interpretation of classical wave equation and its role to explain periodic table of elements and other phenomena [38].

6. Maxwell-Proca Equations in Chiral Medium

Proca equations can be considered as an extension of Maxwell equations, and they have been derived in various ways. It can be shown that Proca equations can be derived from first principles [6], and also that Proca equations may have link with Klein-Gordon equation [7].

It shall be noted, that the relations between flux densities and the electric and magnetic fields depend on the material. It is well-known that for instance all organic materials contain carbon and realize in this way some kind of optical activity. Therefore, Lord Kelvin introduced the notion of the chirality measure of a medium. This coefficient expresses the optical activity of the underlying material. The correspondent constitutive laws are the following:[35]

$$D = \epsilon E + \epsilon\beta \operatorname{rot} E \text{ (Drude-Born-Feodorov laws),} \quad (33)$$

$$B = \mu H + \mu\beta \operatorname{rot} H \quad (34)$$

where $\epsilon = \epsilon(t, x)$ is the electric permittivity, $j = p(t, x)$ is the magnetic permeability and the coefficient β describes the *chirality measure* of the material.[35]

Now, since we want to obtain Maxwell-Proca equations in chiral medium, then eq. (28) should be replaced with eq. (34). But such a hypothetical assertion should be investigated in more detailed.

Since according to Blackledge, the Proca equations can be viewed as a unified wavefield model of electromagnetic phenomena [7], then we can also regard the Maxwell-Proca equations in chiral medium as a further generalization of his *unified wavefield picture*.

7. Plausible role of chiral superconductor model to LENR/CMNS

According to R.M. Kiehn, chirality already arises in electromagnetic equations, i.e. Maxwell equations:[41]

“From a topological viewpoint, Maxwell’s electrodynamics indicates that the concept of Chirality is to be associated with a third rank tensor density of Topological Spin induced by the interaction of the 4 vector potentials $\{A, \varphi\}$ and the field excitations (D,H). The distinct concept of Helicity is to be associated with the third rank tensor field of Topological Torsion induced by the interaction of the 4 vector potentials and field intensities (E,B). ...

In the electromagnetic situation, the constitutive map is often considered to be (within a factor) a linear mapping between two six dimensional vector spaces. As such the constitutive map can have both a right- or a left-handed representation, implying that there are two topologically equivalent states that are not smoothly equivalent about the identity.”

Therefore, here we will review some models of chirality in superconductors and other contexts, in hope that we may elucidate the chirality origin of spiraling wave as considered by Celani et al. for explaining UDD reaction (cf. Homlid).

Here, we summarize some reports on chirality as observed in experiments:

- (a) F. Qin *et al.* reported “Superconductivity in a chiral nanotube.”[42] Their abstract goes as follows: “Chirality of materials are known to affect optical, magnetic and electric properties, causing a variety of nontrivial phenomena such as circular dichroism for chiral molecules, magnetic Skyrmions in chiral magnets and nonreciprocal carrier transport in chiral conductors. On the other hand, effect of chirality on superconducting transport has not been known. Here we report the nonreciprocity of superconductivity—unambiguous evidence of superconductivity reflecting chiral structure in which the forward and backward supercurrent flows are not equivalent because of inversion symmetry breaking. Such superconductivity is realized via ionic gating in individual chiral nanotubes of tungsten disulfide. The nonreciprocal signal is significantly enhanced in the superconducting state, being associated with unprecedented quantum Little-Parks oscillations originating from the interference of supercurrent along the circumference of the nanotube. The present results indicate that the nonreciprocity is a viable approach toward the superconductors with chiral or noncentrosymmetric structures.” In other words, chirality may play a significant role in electromagnetic character of superconductors.
- (b) In other paper, Kung et al. reported: “Using polarization-resolved resonant Raman spectroscopy, we explore collective spin excitations of the chiral surface states in a three dimensional topological

insulator, Bi₂Se₃. We observe a sharp peak at 150 meV in the pseudovector A₂ symmetry channel of the Raman spectra. By comparing the data with calculations, we identify this peak as the transverse *collective spin mode* of surface Dirac fermions. This mode, unlike a Dirac plasmon or a surface plasmon in the charge sector of excitations, is analogous to a spin wave in a partially polarized Fermi liquid, with spin-orbit coupling playing the role of an effective magnetic field.” [43] What we would emphasize here is that the collective spin mode may alter the Dirac fermions, see also [44].

- (c) Karimi et al. studied deviation from Larmor’s theorem, their abstract goes as follows: Larmor’s theorem holds for magnetic systems that are invariant under spin rotation. In the presence of spin-orbit coupling this invariance is lost and Larmor’s theorem is broken: for systems of interacting electrons, this gives rise to a subtle interplay between the spin-orbit coupling acting on individual single-particle states and *Coulomb many-body effects*.”[45] What we would emphasize here is possible observation of Coulomb many-body effects, and this seems to attract considerable interests recently, see also [45a].

Concluding remarks

In a series of papers, Bo Lehnert proposed a novel and revised version of Quantum Electrodynamics (RQED) based on Proca equations. We submit a viewpoint that Lehnert’s RQED is a good alternative theory to QM/QED, and therefore it is also interesting to ask: can this theory also explain some phenomena related to LENR and UDD reaction of Homlid (as argued by Celani et al)? We do not pretend to hold all the answers in this regard, we just gave an outline to Proca equations to electrodynamics of superconductors, then to chirality model.

It shall be noted that the present paper is not intended to be a complete description of physics of LENR and UDD reaction (Homlid et al).

Nonetheless, one of our aims with the present paper is to propose a combined version of London-Proca-Hirsch model for electrodynamics of superconductor. Considering that Proca equations may be used to explain electrodynamics in superconductor, the proposed fluidic London-Proca equations may be able to describe electromagnetic of superconductors. It is hoped that this paper may stimulate further investigations and experiments in particular for superconductor. It may be expected to have some impact to cosmology modeling too.

Another purpose is to submit a new model of gravitation based on a recent paper by Ryutov, Budker, Flambaum, who suggest that Maxwell-Proca equations may induce a negative pressure imitates gravitational pull, and may produce effect similar to gravitation. In the meantime, there are other papers by Longo, Shamir etc. discussing observations indicating handedness of spiral galaxies, which seem to suggest chiral medium at large scale.

However, so far there is no derivation of Maxwell-Proca equations in chiral medium. In this paper, we propose Maxwell-Proca-type equations in chiral medium, which may also explain (albeit hypothetically) origin of handedness of spiral galaxies as reported by M. Longo et al.

It may be expected that one can describe handedness of spiral galaxies by chiral Maxwell-Proca equations. This would need more investigations, both theoretically and empirically.

This paper is partly intended to stimulate further investigations and experiments of LENR inspired by classical electrodynamics, as a continuation with our previous report.

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Special thanks to Dr. George Shpenkov for sending his papers and books. Nonetheless, the ideas presented here are our sole responsibility. One of these authors (VC) dedicates this paper to Jesus Christ who always guide him through all valley of darkness (Ps. 23). He is the *Good Shepherd*.

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VC, FS, YU

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Wireless technologies (4G, 5G) are very harmful to human health and environment: A Preliminary Review

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Abstract

The intent of this article is to show that wireless technology is, without remedy other than termination, one of the most devastating environmental and health threats—and threats to personal liberty—ever created. It is becoming widely known that 4G and 5G technologies cause many harms to human health. Cancer is only one problem, and one that is easily solved. 4G and 5G cause 720! (factorial) different maladies in human beings, and can kill everything that lives but some forms of micro organisms. Some pathogens and certain parasites are made more virulent by selected frequencies of RF. Insects and birds are already being killed by the RF broadcasts. The broadcasts can be controlled to give selected individuals selected maladies. All this needs to be stopped. There are other ways to communicate that do not require radio waves, nor wires, which cause no damage to any form of life. We need to make those methods available to the public, while all the RF systems are being phased out.

Introduction

So many people are more and more accustomed to a wide variety of wireless technologies.

However, allow us to argue on 4 reasons why wireless technologies should be stopped:

- Wireless technologies disrupt family relations
- Wireless technologies induce 720! Different maladies, cancer included
- Wireless technologies especially 4G and 5G potentially damage environments
- Wireless technologies steal privacy from everyone using those technologies



Figure 1. Illustration, after Peter Tocci [1]

It is becoming widely known that 4G and 5G technologies cause many harms to human health. Cancer is only one problem, and one that is easily solved. 4G and 5G cause 720! (factorial) different maladies in human beings, and can kill everything that lives but some forms of micro organisms. Some pathogens and certain parasites are made more virulent by selected frequencies of RF. Insects and birds are already being killed by the RF broadcasts. The broadcasts can be controlled to give selected individuals selected maladies. All this needs to be stopped. There are other ways to communicate that do not require radio waves, nor wires, which cause no damage to any form of life. We need to make those methods available to the public, while all the RF systems are being phased out.

Potential harmful effects of wireless technology to human bodies, carcinogenic etc.

According to Peter Tocci:[1]

“By all appearance, world governments, world organizations such as the WHO and UN, and international agencies—even the *supposedly independent* International Commission on Non-Ionizing Radiation Protection (ICNIRP), which issued draft guidelines on 7/11/18 for exposure to electromagnetic fields (100 kHz to 300 GHz)—

knowingly participate in a dangerous deception based on scientific fraud: The arbitrary presumption and singleminded assertion as an operating principle that the only potential danger from ICMR is tissue heating. Included is the extreme effect, ‘electro-stimulation,’ comprising shocks and burns. As of this writing (December 2018), worldwide telecom exposure limits are based on the stultified parameter of tissue heating/electro-stimulation.”

Furthermore, Tocci also wrote:[1]

“Also, it’s not unusual to see argument to the effect that, “Some studies show harm, some don’t,” with the implication or assertion that wireless should continue, because the latter ‘cancels out’ the former, or makes the situation ‘inconclusive.’ This conflates scientific principles and ‘legal-speak.’ ‘Weight-of-evidence’ is foreign to science, and such rationalization is used for deception or out of ignorance.”

However, there was a testimony in Toronto, several years ago. From a presentation given at the Toronto Whole Life Expo 2009 by **Andrew Michrowski, PhD**:[1]; see also [2]

“It is not generally appreciated that the advanced nature of wireless gadgets being currently marketed is founded on devices that have been around since the 1940s. ... Precise, quality, straightforward medical

and scientific research since 1950s details radiofrequency and microwave effects – without influence of stocks, PR and lawyers. By 1970s, electromagnetic, electrochemical, cascade effect equations were well defined for tissues, cells, intracellular & extracellular fluids and macromolecular effects on living systems...

Analysis of 1950-1974 mortality of 40,000 Korean War veterans shows that *microwave exposure effect is cumulative* [emphasis added] it affects all deaths ... doubling to tripling cancers of eye, brain and central nervous system, lymphatic and hematopoietic [blood-cell/platelet-forming] and digestive systems. *This means that even 'weak' and short exposures from wireless systems accumulate over the years and decades to engender serious diseases* [emphasis added].

...[a] flow chart prepared [by] the National Research Council of Canada Control Systems Laboratory in 1973 [indicated] 22 non-thermal effects documented and generally understood by the scientific community more than 30 [40] years ago. Now, scientists daring to describe a part of such phenomena risk their career and income.”

Corroborating Michrowski, Trower asserts that the dangers were fully known by mid-1970's. A big reason, he says, is that telecom microwave technology was not originally developed for telecom, but, among other

things, as a military stealth weapon for inducing illness.[1] Trower presents proof that Government knew of the follicle-DNA threat before promoting WiFi in schools. In 20 to 25 years (2038-2043), we could easily have a generation with a high percentage of genetically damaged kids. [1]

Moreover, in a 3/17/15 phone conversation, Dr. Carlo shared with me his understanding about no-safe-dose, which arose from his WTR experience: Information (data) ‘riding’ on the microwave ‘carrier’ frequencies (called modulation) manifests as pulses. *These must exist at all power levels* to transmit any data. They are sensed by cell membranes. Carlo said that because cells don’t recognize the stimulus, pulses provoke, for one thing, a defensive and pathogenic membrane response: Transport channel shutdown, preventing exchange between cell and extracellular medium. It also interrupts intercellular communication, a very serious consequence.[1]

“...pulsed EMFs are, in most cases, much more biologically active than are non-pulsed (often called continuous wave) EMFs.” – **Professor Martin Pall, PhD** (Page 45, Chapter 6, first par.). See [3]

According to Peter Tocci, known ICMR effects include endocrine disruption (host of illnesses), breakdown of blood-brain barrier, DNA strand breaks, inhibition of DNA repair, reproductive problems, autism, Alzheimer's – and many more. Though not to be dismissed, cancer, the 'popular' concern, is actually a lesser one in the panoply of effects – as in, ecocide and eventual termination of reproduction.[1]

Possible solutions

Other than RF wireless technologies, which were actually a forbidden weapon grade method by international treaties, we can come up with alternative methods based on known electromagnetic theories.

We suppose we can give information regarding one of 3 ways to accomplish new communications technologies that do not require wires, nor RF.

The first one, one of us (RNB) already gave to the US government. That involves modulation of curl-free (CF) magnetic field lines which go in a line to infinity and penetrate all intervening matter. Detection of CF information is accomplished by Josephson-Atto-Weber switches (JAWS) which require cryogenic temperatures to operate properly. CF com-

munications are exceedingly directional. Any lack of accuracy between sending and receiving the CF line results in no information transfer. There is the advantage that CF communications exhibit faster than light propagation. However, these devices are not suited for use by the general public.

The other two methods, we are going to contemplate giving out. Maybe writing a paper would be a better way, because we can at least get credit for the idea and establish prior claim for legal purposes.

In a separate article, we describe basic principle of superluminal wave, that is quantum communication, as an alternative to RF based wireless communication technology.

This communications method can provide an infinite number of infinite bandwidth communications channels for each user. Communication using this method travels much faster than light. It does not use radio waves and does not need wires. It cannot be monitored nor tracked nor interfered with. It cannot be regulated due to the infinities involved, and due to the fact that it is unmonitorable. Each user benefits personally from the perfect information security provided by quantum communications.

Quantum communications does not harm any form of life, nor the environment, in any way, as quantum events are,

and always have been, constantly a part of the Natural Environment.

Concluding remarks

The intent of this article is to show that wireless technology is, without remedy other than termination, one of the most devastating environmental and health threats—and threats to personal liberty—ever created. It is becoming widely known that 4G and 5G technologies cause many harms to human health. Cancer is only one problem, and one that is easily solved. 4G and 5G cause 720! (factorial) different maladies in human beings, and can kill everything that lives but some forms of micro organisms.

According to Peter Tocci, known ICMR effects include endocrine disruption (host of illnesses), breakdown of blood-brain barrier, DNA strand breaks, inhibition of DNA repair, sperm damage, reproductive problems, autism, Alzheimer's – and many more. Though not to be dismissed, cancer, the 'popular' concern, is actually a lesser one in the panoply of effects – as in, ecocide and eventual termination of reproduction.[1]

All this needs to be stopped. There are other ways to communicate that do not require radio waves, nor wires, which cause no damage to any form of life. We need to make those

methods available to the public, while all the RF systems are being phased out.

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- [5] <https://www.defendershield.com/adverse-bioeffects-emf-radiation-shown-government-research-going-back-decades/>
- [6] Wi-Fi, a thalidomide in the making. http://ec.europa.eu/health/scientific_committees/emerging/docs/emf_117.pdf

Appendix:

The US GOVERNMENT REPORTS a sampling of biological effects from low-level microwave radiation. (US Naval Research Institute):¹

Changes in physiological Function (29)

- Alteration of diameter of blood vessels
- Liver enlargement
- Decreased fertility
- Altered sex ratio of births (more females)
- Altered blood flow
- Altered menstrual activity
- Structural changes in cerebral cortex
- Myocardial necrosis
- Dehydration
- Alteration in sensitivity to light, sound and olfactory stimuli
- Altered rate of calcification

Central Nervous System Effects (9)

- Headaches
- Insomnia
- Cranial nerve disorders
- Vagomimetic action of the Heart; sympaticomimetic action

Autonomic Nervous System Effects (4)

- Alteration of the heart rhythm
- Fatigue
- Structural alteration of the synapses of the vagus nerve
- Stimulation of the parasympathetic nervous system (Bradycardia).

Psychological Disorders (17)

- Depression
- Impotence
- Anxiety
- Lack of concentration
- Dizziness

¹ <http://www.justproveit.net/content/biological-impacts?q=content/biological-impacts>

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Sleepiness

Insomnia
Increased irritability
Memory loss
Chest pain

Vascular Disorders (2)

Thrombosis
Hypertension

Blood Disorders (14)

Blood and bone marrow
Blood glucose concentration (increase)
Blood Histamine content (inflammatory marker)
Cholesterol and lipids
Albumin/ globulin ration (decrease)

Enzyme and other biochemical changes (13)

Alteration in cell division
Change in concentration of Glycogen in Liver
Tissue cultures killed

Metabolic Disorders (4)

Gastro-intestinal disorders (4)
Anorexia
Constipation
Epigastric pain
Altered secretion of stomach (digestive juices)

Endocrine Gland Changes (8)

Altered pituitary function
Hyperthyroidism
Thyroid enlargement
Altered adrenal cortex activity
Decreased corticosteroids in blood
Hypogonadism (decreased testosterone production)

Histological Changes (2)

Genetic and Chromosomal Changes (5)

Chromosome aberrations

Mutations

Mongolism

Tumors

Cellular changes (somatic alterations)

Miscellaneous Effects (10)

Metallic taste in mouth

Loss of hair

Sensations of buzzing, vibrations, pulsations, tickling about head and ears

Copious perspiration, salivation

Changes in circadian rhythms

The proof is in the pudding: An outline of new proof of the existence of God

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Abstract

Starting with a review of few known arguments to prove the existence of God, we discuss our argument i.e. Nature's order, Pascal's void and Arrow of Time as Neutrosophic triadic to prove the existence of God. The most convincing one is what we call : the proof is in the pudding, i.e. how direct experience with God is the only way to fill everyone's inner void (cf. Pascal).

To write shortly, our spiritual inner void can be filled by direct experience with God. This is what we suggest: the proof is in the pudding.

Introduction: From St. Anselm to Godel and Florensky

Contrary to Orthodox philosophers which were not particularly interested in proving the existence of God, Western philosophers and theologians alike have embraced and invented numerous efforts to prove His existence, notably St. Anselm from Canterbury (1063-1110) and Descartes with their ontological proof of the existence of God. However, Immanuel Kant and Leibniz have shown that such an ontological proof of Descartes inherently believes in God as its premise, therefore it seems to subject to some kind of "circular logic."

Later on in 20th century, Godel - a renown mathematician at his time- secretly wrote down his attempt to refine the ontological proof of St. Anselm using symbolic logic notations. He showed his version of ontological proof to a few younger mathematicians who then put it down in paper and circulated it. That is now known as "Godel's ontological proof of the existence of God."

Nonetheless, the use of advanced symbolic logic in Godel's proof makes it only accessible to logicians. Moreover, recent study shows inconsistency of Godel's proof. (5)

Apart from such ontological proofs, another proof has been proposed by Pavel Florensky, a Russian physicist who then turned to Orthodox philosopher. His argument can be called "Iconostatic-beauty argument of existence of God." In essence, his argument goes as follows: an icon in Orthodox tradition was drawn with specific guidelines by Catholic

Church. Therefore, the beauty of painting or art works such as in Andrei Rublev's The Holy Trinity can lead us to sense the supernatural, i.e. God Himself.

However, there are others who criticize on Florensky's beauty argument, because it has inherent premise that such an iconic painting, like Rublev's, was really designed to capture the supernatural. (3)(4)

Therefore, again it seems we come to a kind of circular logic here: to arrive at a proof of existence of God, one should assume He is there.

In the next section, we will argue in favor of Neutrosophic triadic's view to prove the existence of God.

Nature's order, Pascal's void and Arrow of Time as Neutrosophic triadic to prove the existence of God

Neutrosophic Logic is a branch of mathematics which studies the dynamics of opposites and neutralities, and it is discovered and developed by Florentin Smarandache, see for instance (1). In contrast to Aristotelian logic, where there is no middle way between A and B entities (The principle of excluded middle), in Neutrosophic Logic there is room for numerous possible middle values (or "neutralities").

In this paper, what we mean with Neutrosophic Triadic is dynamics of opposites and neutralities among three entities, A, B, C. And we apply this Neutrosophic Triadic to refer to 3

possible ways to prove the existence of God: Nature's order, Pascal's void and Arrow of Time.

Now let us discuss one by one these Triadic arguments:

a. Nature's order:

New findings in modern astronomy as well as other branches of science like biology, have shown that the Universe has great order. Isn't it directly pointing to the Supreme God? As Bohm called it: the Implicate Order and Wholeness. For instance, biological clock, seasons, structure of DNA, up to hierarchies of Cosmos such as planets, stars, galaxies, cluster and supercluster show great harmony, order and beauty. These orders in Universe baffle even the most atheistic philosophers, therefore if we can be humble enough, we should admit that all order and harmony prove God, the Supreme Creator.

As a side note, we can mention the late Antony Flew, a former atheist professor who changed his mind after studying how complex and beautiful our DNA structure is.(6)

Some physicists have argued in terms of Anthropic Principle and Copernican Principle, but actually, instead of saying that all order our earth were tuned in order to humanity to exist, we should call it : "reverse-anthropoc principle," i.e. the exact orbit of Earth itself shows great order and precision which points to God Himself.

b. Pascal's inner void:

Blaise Pascal once wrote something like this: there is deep void inside everyone, which he/she always try to fill with crafted materials to surround him/her. But that void is actually an infinite abyss, which can only be filled by the Infinite, God Himself.

If we accept such Pascal's void, then the deep void itself clearly suggests that everyone of us was created and designed to keep longing to be filled with the Infinite.

That is our second argument.

c. Arrow of Time:

Another fact which is very problematic both from physical and philosophical views is the arrow of time. What is time made of, and why time flows in one direction only? All phenomena and our experiences are governed by the Time itself, which is beyond human comprehension.

It seems we will not go too far if we say that the Time (chronos and kairos, in Greek) indeed points to the Supreme Controller of Time, i.e. God. See also Laura Mersini-Houghton & Rudy Vaas, *The arrows of time*. (7)

Now, having discussed the Neutrosophic Triadic as proofs of the existence of God, then we will touch a deeper issue, how we can experience God, which most religions call it : mystical experience.

Logic and mystical experience

Logic and mystical experiences are exclusive domains that cross over into one another, on occasion, just as everything else does as participants in Experiences of the Wholeness, Harmony, Balance, Caring, and Oneness of the Alive Aware Intelligent Conscious Universe. All of this partly constitutes the Mind of God, which is vaster and more complex than most human beings are able to even vaguely comprehend. (RNB: "I have been in the Mind of God, so I speak from personal experience.")

The reader may gather, from the basis of Bhutatmas, the tiny Consciousness-experiencing creatures that have vast experiential memories, that Everything, all fields, all forces, all matter, all life, and the entire of the Infinite Cosmos, results from the activities and agglomerations of Bhutatmas, in an Infinite Universe constructed and operated by Intelligent Design.

According to the Vedic literature on this topic, Divinity resides in the Actually Infinitely Small, which is everywhere and nowhere, at the same time. Thus it can and does act on everything that is and everything that happens. But Divinity has set things up so that Everything has Free Will and individual volition. A factor that has been left out of the Vedic literature on the topic of Bhutatmas, is that every Bhutatma is Unique, with a unique set of memories of experiences, regarding multiple Realities (not just this one). So Uniqueness is an absolute in all the realms, and all the Realities.

To conclude: Nature's order, Time and inner void can be filled by direct experience with God, which sometimes called as mystical experience (in Christian tradition, it is also known as "unio mystica.") This is what we suggest: the proof is in the pudding.

Concluding remarks

Neutrosophic Logic is a branch of mathematics which studies the dynamics of opposites and neutralities, and it is discovered and developed by one of us (FS). See for instance (1). In contrast to Aristotelian logic, where there is no middle way between A and B entities (The principle of excluded middle), in Neutrosophic Logic there is room for numerous possible middle values (or "neutralities").

In this paper, what we mean with Neutrosophic Triadic is dynamics of opposites and neutralities among three entities, A, B, C. And we apply this Neutrosophic Triadic to refer to 3 possible ways to prove the existence of God: Nature's order, Pascal's void and Arrow of Time.

To summarize, Nature's order, Time and inner void can be filled by direct experience with God. This is what we suggest: the proof is in the pudding.

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An outline of extension from Neutrosophic Psychology to Pneumatic Transpersonal Psychology: Towards Relational Psychotherapy and Relational Pedagogy

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Abstract

Continuing our previous paper, we gave an outline of a new integral model of human consciousness scheme beyond Freudian mental model. We start from a recent book by one of us: Neutropsychie personality. Then we discuss possibility to reintroduce spirit into human consciousness. To emphasize what we have outlined in a preceding paper, we consider the following: that human consciousness model should take into consideration “spirit” role, i.e. the mind-body-spirit as integral aspect, which view is neglected in the Freudian mental model. In this paper, we consider a further step: introducing “soul” as a different element of human consciousness. We also discuss a few possible applications of such an integral model of human consciousness, including relational psychotherapy and relational pedagogy. While we are fully aware that much remain to be done and we admit that this is only a sketch, we hope that this paper will start a fresh approach of research towards more realistic nonlinear human consciousness model.

*"The easiest kind of relationship is with ten thousand people, the hardest is with one." -
Joan Baez*

Introduction

The present paper grew out of a new book that one of us, FS, recently wrote, with title: *Neutropsychie personality*. [17] In that book, FS

described possible extension of Freudian mental model: *id-ego-superego*, using his *Neutrosophic Logic* theory. See also [2][3].

Later on, we thought that it would be necessary to push the boundary one step further, by considering a more realistic way to go beyond that classic Freudian mental model, i.e. by reintroducing the spirit into human consciousness model. We are aware that many researchers have proposed such an extension, especially Italian tradition which was continually developed by students of Carl Jung, such as Assagioli and Piere Ferrucci, namely the *Psychosynthesis* movement.

In our previous paper, see ref. [1], we discussed a new integral view of human consciousness beyond Freudian mental model. Among other things, we consider the following: that human consciousness model should take into consideration “spirit” role, i.e. the mind-body-spirit as integral aspect, which view is neglected in the so-called Freudian mental model. [1]

And in this paper, we consider a further extension to previous triune model, by taking into account the role of “soul”. And we also consider a few implications of such an integral view of human consciousness, including *relational therapy*.

First of all, we will review early years of psychoanalysis.

Part A: Basic Principles

A review of early years of psychoanalysis theory

Four figures in early years of psychoanalysis are discussed here, with a theme we kept in mind, i.e. in order to show that despite early develop-

ment not focusing on human spirit, further development of psychoanalysis theories were going to include spirit as central tenets in psychology studies:

a. Pierre Janet

Pierre Janet, in full **Pierre-Marie-Félix Janet**, (born May 30, 1859, Paris, France—died February 24, 1947, Paris), French psychologist and neurologist influential in bringing about in France and the United States a connection between academic psychology and the clinical treatment of mental illnesses.

He stressed psychological factors in hypnosis and contributed to the modern concept of mental and emotional disorders involving anxiety, phobias, and other abnormal behavior. Janet's report (1882) of an unusual case of hypnosis and clairvoyance gained him the attention of neurologist Jean-Martin Charcot. As a Ph.D. candidate at the University of Paris, Janet studied automatic acts, and in his thesis (1889), which went into many editions, he introduced but did not amplify the concept of the unconscious. This work engendered a *later dispute* with Sigmund Freud over priority. At Charcot's invitation, Janet became director of the psychological laboratory at the largest Paris mental institution, the Salpêtrière Hospital (1889).¹

Pierre Janet's therapeutic approach to traumatized patients was the first attempt to create a systematic, phase-oriented treatment of post-traumatic stress. Janet viewed the trauma response basically

¹ <https://www.britannica.com/biography/Pierre-Janet>

as a disorder of memory which interfered with effective action, see [36].

Carl Jung, on the other hand, took much of Janet's work, while developing analytical psychology, and added some of the *spiritual aspects* that Janet had denied. Ultimately, Janet was not successful in explaining the true nature of the psychological phenomena he studied, never resolving his personal struggle between the scientific (focusing on external, observable phenomena) and religious (focusing on internal, spiritual experiences) approaches to understanding life.¹

b. Sigmund Freud

Fundamental to the debate between Janet and Freud were their views on non-conscious processes. Initially there were a number of similarities, but they diverged early, Janet developing a more structural model based on lateral splitting of the psyche, and Freud the more familiar depth model with vertical division.[35]

Furthermore, the term 'ego' originated in the mid- 19th century and by way of Freud became a cornerstone of western psychiatry. He proposed further subdivision into a *tripartite structure to include the super-ego and the id*. Subdivision of the self also had a long ancestry, particularly in regard to sub-selves and multiple personality. The origins of modern self-psychology are to be found in the contributions of a group of psychiatric researchers prior to World War I. [35]

¹ http://www.newworldencyclopedia.org/p/index.php?title=Pierre_Janet

c. Carl Jung

Carl Gustav Jung (1875-1961) had a significant contribution to the psychoanalytical movement and is generally considered as the prototype of the dissident through the impact of his scission and the amplification of the movement he created in his turn (analytical psychology). In 1902-1903 he attended a traineeship in Paris with Pierre Janet, and then returned to Zurich and he was called senior physician at Burgholzli. It was in this context that Jung was introduced to Freud in 1907. Freud would be seduced by the prestige and personality of Jung and would soon see in him the spiritual son that could ensure the survival of psychoanalysis, so much so as Jung was not Jewish.¹

Intense, professional and friendship bonds form between the two, with an ambivalence dominated by the inclination of Jung to underestimate himself in comparison with Freud, the fervor of his devotion to the "father" of psychoanalysis and oneiric hostility (emphasized by Freud in the common interpretation of dreams). Jung had a swift ascension in the hierarchy of psychoanalysis. He became the editor of *Jahrbuch*.

In 1908, he traveled to the United States and in 1910 he became the first president of the *International Association of Psychoanalysis*.² Since 1912 he became more and more distant in his writings, which would cause a scission materialized in 1914 by his resigna-

¹ <https://www.carl-jung.net/biography.html>

² <https://www.carl-jung.net/biography.html>

tion from all the positions he already held. By abandoning the meanders of psychosexuality, Jung would establish himself in the fields of spirituality and esoteric science.¹

Jung, originally a follower of Freud, split from Freud in 1913, primarily because he believed that Freud presented a *reductive view* of human nature that left out transpersonal potentialities. Following the split, Jung began to formulate ideas that helped to explain transpersonal experiences and the possibility of transpersonal development; see [38].



Figure 1. Jung Institut in Kusnacht, Zurich.²

d. Roberto Assagioli

Roberto Assagioli (1888–1974) was the first in Italy to adhere to the Freudian movement, although he soon began to pursue his own course. A near contemporary of Carl Gustav Jung (1875–1961), Assagioli embraced the emerging dynamic psychology of that period and developed it into a multilevel integrative vision of

¹ <https://www.carl-jung.net/biography.html>

² <https://www.carl-jung.net/biography.html>

the human being, which he called “*psychosynthesis*.” In developing both the theory and practice of psychosynthesis, Assagioli contributed to the history of psychology by showing how dynamic and analytical psychology on the one hand and humanistic and transpersonal psychology on the other might be brought into synthesis. He was, with Jung, a major pioneer and exponent of transpersonal psychology.[38]

Initially a follower of Freud and psychoanalysis, Assagioli, along with Jung, was a pioneer of what later became known as transpersonal psychology. He had already begun exploring transpersonal themes before the official creation of psychosynthesis (Assagioli, 1927). In the 1960s he was one of the founders of the new field of transpersonal psychology and with Abraham Maslow played an important role both in giving the name “transpersonal” to the field and in bringing attention to important transpersonal concepts such as those of a higher or transpersonal unconscious, “peak experiences” (Maslow, 1962), and a transpersonal Self (Assagioli, 1973b). See [38].

Both Assagioli and Jung drew on Western philosophy, spirituality, and psychology. Assagioli particularly looked at Platonic and Judeo-Christian traditions and existentialism. Both were interested in occult (Jung, 1902) and parapsychological phenomena (Assagioli, 1976, 11.1–15, 75; 76; 77). However, Assagioli’s general approach was pragmatic, practical, and synthetic and was directed towards benefits for society through transpersonal development in education and psychotherapy and through the practice of interpersonal and social psychosynthesis. As Jung drew inspiration from

physicists, Assagioli drew inspiration from Eastern teachings, especially teachings on energy systems and energetic fields. He named *psycho-energetics* a fifth force of psychology after the fourth (*transpersonal*), and he explored its potential for future development (Assagioli, 1973c). See [38].

In conclusion, Assagioli's view on spirituality differed from Jung's by focusing on a more direct and experiential approach. Assagioli specifically proposed meditations of various types as effective ways to achieve greater awareness, integration, and grounding in the transpersonal (Assagioli, 1963a; 1963b). Similarities, however, exist with the Jungian approach to analysis, symbolic imagery work, and creative-expressive methods. Both men emphasized the importance of the psychotherapeutic relationship as a vehicle for healing, in particular through transference-countertransference dynamics and through the living experience of the transpersonal dimension in human relationships. See [38].

Our contribution: From Neutrosophic Psychology toward integral model of human consciousness

One of us, FS, recently published a new book, with title: *Neutropsychic personality*. [17] In that book, FS described possible extension of Freudian mental model: *id-ego-superego*, using his *Neutrosophic Logic* theory. See also [2][3].

He wrote among other things:

“Neutropsyche is the psychological theory that studies the soul or spirit using the neutrosophy and neutrosophic theories. In other words: Neutrosophic Psychological Theory. It is based on triadic neutrosophic psychological concepts of

the form (<A>, <neutA>, <antiA>). Neutropsychic Personality is a neutrosophic dynamic open psychological system of tendencies to feel, think, and act specific to each individual...”[17]

He goes on to develop a number of implications of this approach, including a model of human memory as follows:

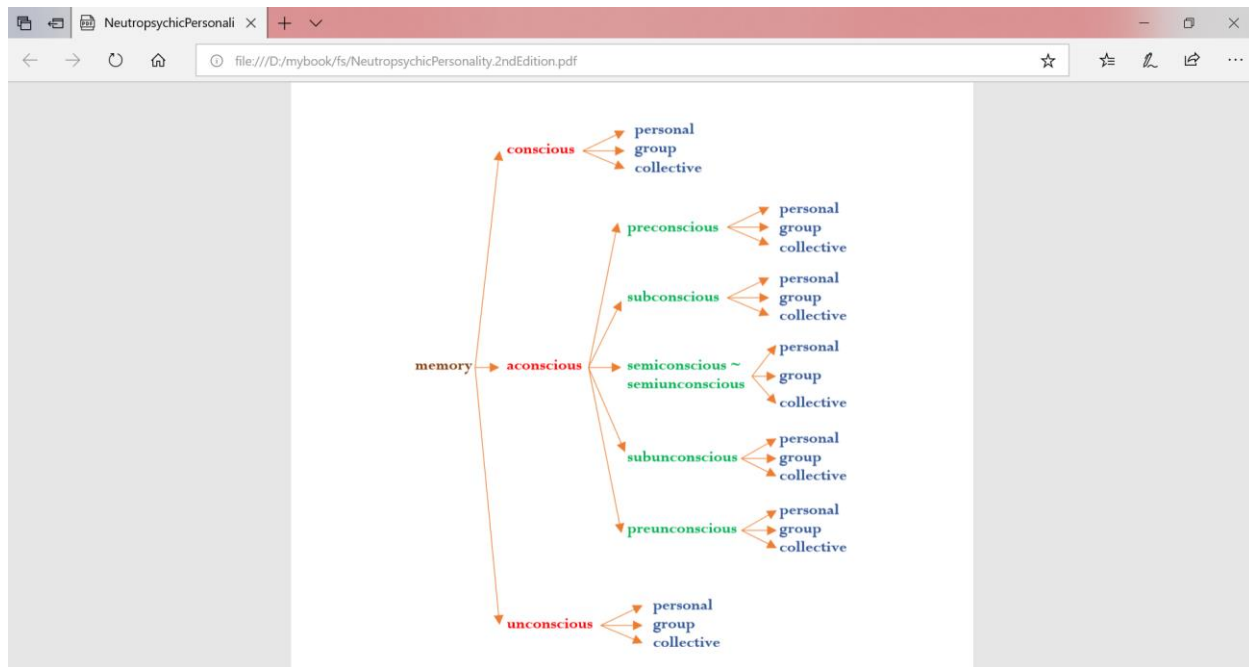


Figure 2. A model of human consciousness based on Neutrosophic Psychology (refined Neutrosophic memory). After F. Smarandache [17, p.41]

But it is not our intention to discuss human memory model in this paper, this topic is reserved for future investigation.

From more discussion on FS's book, we thought that it would be necessary to push the boundary one step further, by considering a more realistic way to go beyond that classic Freudian mental model, i.e. by reintroducing the *spirit* into human consciousness model.

We all know that Hebrew's thought on human being is integral, i.e. the wholeness of *body-mind-spirit*. But now we shall face the question: how

can we come up with a model of human consciousness based on the Bible?

As a starting point, let us begin by the Greatest Commandments:

Matthew 22:37-40 **King James Version (KJV)**

³⁷ Jesus said unto him, Thou shalt love the Lord thy God with all thy heart, and with all thy soul, and with all thy mind.

³⁸ This is the first and great commandment.

³⁹ And the second is like unto it, Thou shalt love thy neighbour as thyself.

⁴⁰ On these two commandments hang all the law and the prophets.

Our re-reading of the above commandments lead us to model a Trinitarian dialogue within human self: *God, self, and others.*¹

¹ For an alternative reading of Mat. 22, see Vern Poythress's article: <https://frame-poythress.org/the-greatest-commandment-the-very-heart-of-the-matter/>

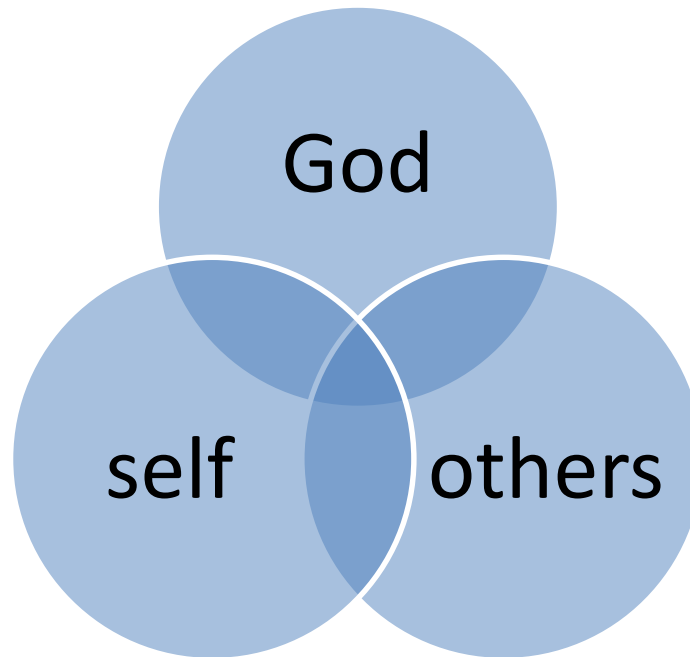


Figure 3. Three directions of human love based on The Greatest Commandments in Matthew 22:37-40.

Comparing with Adam Grant’s give and take model of human basic tensions inside our mind. Let us consider parallels, i.e. “*taking*” reflects selfishness/greediness motive of ego, and “*giving*” reflects altruism motive of conscience.

In other words, now we have two entities in human consciousness: ego and conscience. There is always deep tension between ego and conscience, between selfishness and altruism. Along these two poles, we need a third entity which has purpose to ease and being intermediary between these two motives. In this problem, along with *Neutrosophic Logic* [2],¹

¹ As a simple introduction to Neutrosophic Logic, allow us to quote from ref. [3]: “Neutrosophic Logic (NL) is a Theory of Everything in logics, since it is the most general so far. In the Neutrosophic Propositional Calculus a neutrosophic proposition has the truth

allow us to submit wholeheartedly that the third entity, is actually no other than “the spirit.” (*pneuma* in Greek, *ruach* in Hebrew)

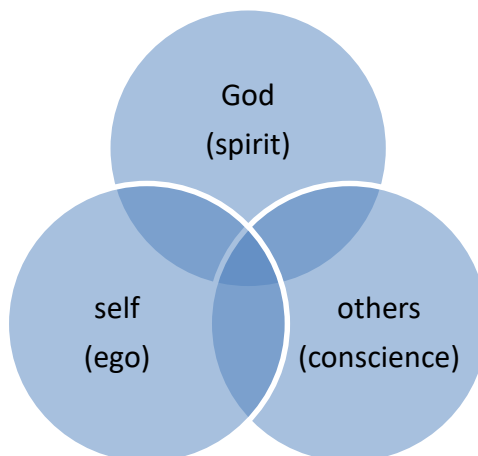


Figure 4. A model of human consciousness based on Greatest Commandments in Matthew 22:37-40.¹

The exact role of human spirit is to enlighten both ego and conscience. Some readers may raise question at this point: *what is new here?* It seems similar with Freud’s id-ego-superego model.

value (T, I, F), where T is the degree of truth, I is the degree of indeterminacy (or neutral, i.e. neither truth nor falsehood), and F is the degree of falsehood, where T, I, F standard or non-standard subsets of the non-standard unit interval]-0, 1+[. In addition, these values may vary over time, space, hidden parameters, etc. Therefore, NL is a triple-infinite logic but, by splitting the Indeterminacy, we prove in this article that NL is a n-infinite logic, with $n = 1, 2, 3, 4, 5, 6, \dots$. The neutrosophic component of Indeterminacy can be split into more subcategories, for example Belnap split Indeterminacy into: the paradox (<A> and <anti-A>) and uncertainty (<A> or <anti-A>), while truth would be <A>, and falsehood <anti-A>. This way Belnap got his four-valued logic. In neutrosophy we can combine <A> and <non-A>, getting a degree of <A> a degree of <neut-A> and a degree of <anti-A>. <A> actually gives birth to <antiA> and <neut-A>.

¹ This model may be compared to Jung’s personality model, which includes individual unconscious and collective unconscious.

Let us answer such a question: No, it is really in contrast with Freud's model which is purely *materialistic* in origin. The notion of spirit is rejected in Freud's model.

More note on the terms used here may be useful for readers. We don't attempt to just alter the term from superego with spirit, in fact we don't think that superego does exist. It is human spirit which governs the whole human consciousness. And human spirit is influenced by the Holy Spirit, if he/she is a believer. That is how our consciousness model is really different from Freudian mental model.

What we propose here may be called *pneumatic-transpersonal* psychology:

"Transpersonal psychology is a sub-field or "school" of psychology that integrates the spiritual and transcendent aspects of the human experience with the framework of modern psychology. It is also possible to define it as a "spiritual psychology."¹

An interesting argument spiritual psychology has been discussed in Santa Monica site:

"If you look up the word "psyche" in the dictionary, you will find "breath, principle of life, Soul." But if you look up "psychology," you will find "the science of mind and behavior." Somehow, in the translation from essence to practice, the most important aspect of "psyche" has been lost. At the University of Santa Monica, we recognize our task as reintegrating the spiritual dimension back into the essence of an authentic psychological inquiry. It is this reintegration that evokes the emergence of a Spiritual Psychology.

Spiritual Psychology is the study and practice of the art and science of Conscious Awakening. To engage in this genre, we must begin by distinguishing the essence of human evolution—what does it mean to evolve? In short, it means learning how to identify, recognize, and navigate successfully within the Context of Spiritual Reality. Practically, it means learning how to surrender—or let go of—anything that disturbs one's

¹ <https://psychcentral.com/blog/6-facts-about-transpersonal-psychology/>

peace. It also means sacrificing our illusions of separation. Essentially, this “surrendering” and “sacrificing” is work that can and has been called “healing,” which includes healing on the physical, mental, and emotional levels in service to the deeper revelation of who we truly are as Loving, Peaceful, Compassionate, and Joyful beings. We refer to this level of awareness as the Authentic Self.”¹

Columbia University also offers SMBI degree (spirituality, mind, body institute), which is “an interdisciplinary approach to learning, in which students explore multiple paradigms — neuroscience, spiritual psychology, innovative and ancient healing practices, inspired creativity and the arts, visionary education and social entrepreneurship — in service of the creation of a *society rooted in spiritual values*.”²

In the last few days, we begin considering a further improvement of our model: from triune model to become quadruple model, by introducing the notion of “soul.”

Actually, the role of soul is immediate from the psychology term itself, although literally speaking “psyche” in Greek can mean mind, soul or spirit. (We know, that there is specific Greek word for spirit: *pneuma*).

According to Neal Goldsmith:

“The word psychology comes from the Greek psukhe, meaning "soul," "spirit," "mind," "life," and "breath," combined with the Greek logos, here used as "statement," "expression," and "discourse," more often thought of today in the form of "-ology," as "the study of." Although the academic and clinical discipline of psychology has become a medical-and therefore a pathology-oriented-field, prior to the late 1800s, the *study of our inner mental life was the study of our soul*, our deepest self or essence.”[39]

However, Jung himself carefully distinguishes between psyche and soul, as it is clear that in German, the word “seele” can mean both: psyche and soul.

¹ <https://www.universityofsantamonica.edu/why-usm/spiritual-psychology/>

² <https://www.tc.columbia.edu/counseling-and-clinical-psychology/smbi/>

“I have been compelled, in my investigations into the structure of the unconscious, to make a conceptual distinction between *soul* and *psyche*. By *psyche*, I understand the totality of all psychic processes, conscious as well as unconscious. By *soul*, on the other hand, I understand a clearly demarcated functional complex that can best be described as a "personality". (Jung, 1971: Def. 48 par. 797)

[The translation of the German word *Seele* presents almost insuperable difficulties on account of the lack of an English equivalent and because it combines the two words "psyche" and "soul" in a way not altogether familiar to the English reader. For this reason some comment by the Editors will not be out of place.]

[In previous translations, and in this one as well, *psyche*—for which Jung in the German original uses either *Psyche* or *Seele*—has been used with reference to the totality of *all* psychic processes (cf. Jung, *Psychological Types*, Def. 48); i.e., it is a comprehensive term. *Soul*, on the other hand, as used in the technical terminology of analytical psychology, is more restricted in meaning and refers to a "function complex" or partial personality and never to the whole psyche. It is often applied specifically to "anima" and "animus"; e.g., in this connection it is used in the composite word "soul-image" (*Seelenbild*). This conception of the soul is more primitive than the Christian one with which the reader is likely to be more familiar. In its Christian context it refers to "the transcendental energy in man" and "the spiritual part of man considered in its moral aspect or in relation to God." ... — Editors.] (Jung, 1968: note 2 par. 9)" [40]

Therefore, although we don't wish to complicate the matters, we come to this understanding: to study human consciousness in depth, we need to consider the four elements: mind, body, soul, spirit. We call it an integral model of human consciousness.

A simplified diagram can be used to represent our integral model:

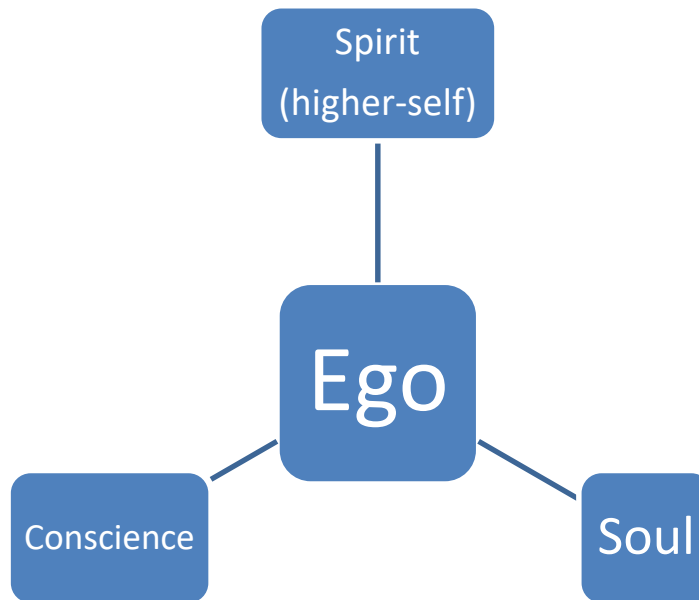


Figure 5. An integral model of human consciousness inspired by the Greatest Commandments in Matthew 22:37-40.

We are aware that our model is far from complete, and we intend to develop this model further later.

Nonetheless, one characteristic of our model is that the four elements are always in constant communications (dialog) among themselves, that is why we prefer to call this model: A relational quadruple model of human consciousness. If we are allowed to borrow a term from Trinitarian theology discourse: “*perichoresis*.” In other words, we believe that human being was created to be in close relationship with the Great Dance of The Trinity. See for instance [41].

Now, readers may ask: what about the name of our model: following Jung's lecture to emphasize the four-fold as a basic requirement of completeness:

“Ancient Greek philosophy used quaternarian thinking. For Pythagoras, not three but four played the major role as, for example, in the so-called Pythagorean Oath. There it is said of the number four, the *tetraktys*, that "it has the roots of eternal Nature." Also in the Pythagorean school the opinion reigned that the soul was not a triangle, but a quadrangle. The origin of these views lies somewhere in the dark prehistory of the Hellenistic spirit. The quaternity is an archetype that occurs universally. Four is the logical prerequisite for every determination of totality. If one wants to make such a determination, it must have a fourfold aspect. If, for example, one wants to designate the totality of the horizon, one names the four cardinal points...”[42]

Therefore we would propose to call this model: *quadruple Neutrosophic Psychology* model of human consciousness.

Introduction to Relational Therapy or the healing effect of compassion-love

Nelson Mandela once remarked: “*Our human compassion binds us the one to the other – not in pity or patronizingly, but as human beings who have learnt how to turn our common suffering into hope for the future.*”

Yes, we can accept his remark, but how to speak of compassion in terms of cancer treatment. Is there healing effect of compassion and love? We will take a deeper look into these questions in this section, which discussion allow us to submit a new method called: Relational Therapy.

First of all, let us admit that although a growing body of evidence suggests that giving to (helping) others is linked reliably to better health and longevity to the helper, the mechanism remains a mystery. However,

there are recent papers which seem to support such a wide-held belief, see for instance [7].

Other research also suggests the neuroscience effect of *pro-social* behavior.[8]. A recent book by Adam Grant from Wharton also reveals on how giving to others may lead to better and happier life. [10]

Key ideas of Adam Grant can be summarized as follows:

“Depending on the situation, people can adopt different behaviors – they can take, give, or exchange. But usually, everyone has a dominant model that determines their behavior. All three models have their advantages and disadvantages. However, the author believes, and his view is supported by real-life experiences that givers receive fewer benefits, as they are guided by the interests of others and forget about their own interests. The link between giving and positive emotion is a cornerstone of Positive Psychology. Giving makes us happy. Studies have shown when subjects are given \$5 with instructions to give the money to a stranger, their **happiness** increases more than subjects who are given \$20 to spend on themselves (Dunn et.al. 2008).”[10]

And a significant work in this direction of research has been written: “The compassion connection.”[9]. Preface of their book begins with these words:

“As human beings, we are born with an innate and nearly limitless capacity for caring and compassion. We recognize when others around us are hurting; as the latest neuroscience has shown, we quite literally feel their pain—imaging studies have demonstrated that the same networks in the brain are activated whether people receive a painful stimulus themselves or are merely witnessing someone else receiving it. And we want to help. In fact, the human brain is actually wired for cooperation and giving. But we’re not always good at it. We say the wrong things, or we zero in on the wrong problems. Often we manage to do more harm than good, causing hurt feelings and even damaging relationships. But there is another way. In *The Compassionate Connection: The Healing Power of Empathy and Mindful Listening*, I explain that we all have the astounding ability to help others in a way that prompts their healing from within and strengthens our bonds with them—while doing emotional and physical good for ourselves in the process. Indeed, some social psychologists have theorized that

giving may enhance the giver's self-interest more than receiving. This is a two-way street.”[9]

The author also tells:

“*I learned the importance of the therapeutic ceremony and how the actual process of delivering care can dramatically enhance the effectiveness of what is prescribed.* Research now shows how this is possible—that is, how personal interactions can actually have physiological effects on patients.”[9]

In fact, that corresponds to the definition of integrative medicine:

“According to the Academic Consortium for Integrative Medicine and Health, it “reaffirms importance of *the relationship* between practitioner and patient, focuses on the whole person, is informed by evidence, and makes use of all appropriate therapeutic and lifestyle approaches, healthcare and disciplines to achieve optimal health and healing.”⁶ Much of the information I had absorbed during my fellowship constellated around how to *stimulate self-healing mechanisms* within my patients' bodies. This is part of what I like to think of as the “mystery and awe” of medicine.” [9]

That is what we argue in this section, that caring and compassion through authentic relationship can lead to self-healing process. That is why we call it: “*Relational therapy*,” to emphasize the role of loving in healing, just as we heard numerous times in Greatest Commandments as quoted above.

While we are aware that the ideas presented here may be not complete yet, but we are convinced that these ideas of authentic relationship, caring and compassion are supported by solid body of evidence. And they may hold the key to autoimmunity system of human body. Again, love and self are inseparable. In other words, a man or woman who do not want to care and practice compassion towards other people, we cannot call them just “*selfish*”, instead they are “*selfless*” – i.e. they are losing the meaning of being a human.

This paper is an outline, or result of early investigation on how we can integrate human spirit into consciousness model. This is our response as

theologian to psychology field [43]. While we are aware that the ideas presented here may be not complete yet, but we are convinced that these ideas of *authentic relationship*, caring and compassion are supported by solid body of evidence. Our proposition on the significant role of relational love is inspired by Sutton and Mittelstadt [44] and also Martin Buber's dialogue philosophy.

Enough with some basic principles, in the next sections we will discuss few applications of these concepts: Relational Psychotherapy and Relational Pedagogy.

Part B: A few applications

Introducing Relational Psychotherapy

First of all, let's ask a basic question: what constitutes a good therapy session? A long series of discussion, where the patient should recover his/her early childhood traumas? Or a more direct approach called Cognitive Behavioral Therapy?

OK, let us start with a joke:

Joe has been seeing a psychoanalyst for four years for treatment of the fear that he had monsters under his bed. It had been years since he had gotten a good night's sleep. Furthermore, his progress was very poor, and he knew it. So, one day he stops seeing the psychoanalyst and decides to try something different.

A few weeks later, Joe's former psychoanalyst meets his old client in the supermarket, and is surprised to find him looking well-rested, energetic, and cheerful. "Doc!" Joe says, "It's amazing! I'm cured!"

"That's great news!" the psychoanalyst says. "you seem to be doing much better. How?"

"I went to see another doctor," Joe says enthusiastically, "and he cured me in just ONE session!"

"One?!" the psychoanalyst asks incredulously.

"Yeah," continues Joe, "my new doctor is a behaviorist."

"A behaviorist?" the psychoanalyst asks. "How did he cure you in one session?"

"Oh, easy," says Joe. "He told me to cut the legs off of my bed."¹

Some other known approaches are called Gestalt Therapy which corresponds to Logotherapy. According to common practice, gestalt therapy emphasizes the therapeutic relationship between client-therapist:

“Gestalt therapy is practiced in the form of exercise and experiments. It can be administered in individual or group settings. In general, exercises are somewhat established practices in gestalt therapy designed to arouse action, emotion, or goals from the person in therapy. The therapist and person in therapy can then examine the result of the exercise in order to increase awareness and help the person understand the “here and now” of the experience.

In contrast to exercises, experiments arise throughout the development of the therapeutic process and **therapeutic relationship**. They are a core component of gestalt therapy and allow the person in therapy to understand different aspects of a conflict, experience, or mental health issue.

The empty chair technique is a quintessential gestalt therapy exercise that places the person in therapy across from an empty chair. He or she is asked to imagine that someone (such as a boss, spouse, or relative), they, or a part of themselves is sitting in the chair. The therapist encourages dialogue between the empty chair and person in therapy in order to engage the person’s thoughts, emotions, and behaviors. Sometimes the roles are reversed and the person in therapy assumes the metaphorical person or part of a person in the chair. The empty chair technique can be especially useful for helping people

¹ <http://www.workjoke.com/psychologists-and-psychiatrists-jokes.html>

become mindful of the whole situation and forgotten or disengaged pieces of their own self.”¹

What we would emphasize here is the “therapeutic relationship” phrase. We just realize that what’s important is not just relationship between client-therapist per se, but also between client and his/her family, his/her friends, etc. In other words, we believe that human being is created to be woven into his/her social fabric, and most of the time this can have a healing effect.

According to Kathryn Stauffer et al:

“Traditionally, the field of psychotherapy, including psychoanalysis, has been fragmented and riddled with factions and specialities and different modalities. This has always left both users and referrers with a bewildering variety of therapies and with the question: which is the most effective for making clients better? There have been many attempts to answer this question, and many serious researchers have studied a variety of outcomes. Every first-year student knows that pretty much all of these studies have yielded the one answer: **It’s All In The Relationship**. Psychotherapy modalities appear to be more or less equally effective, and clients working with therapists from different modalities emphasize that the therapeutic relationship has been the main factor that made a difference to their wellbeing. ... The term Relational Psychotherapy, in the way it is understood nowadays, was first used in the US by Greenberg and Mitchell in 1983, and they saw it as a bridge between the traditions of interpersonal relations and object relations. For relational theorists, mind always emerges and develops in the context of interpersonal relationships. In their view, our internal world acts as a kind of filter through which we experience ourselves and the world around us. It arises out of external experience by a process of internalisation. This filter helps us to function in the world, but it is also a limitation, especially if the experience it was built from originally was limited or damaging. Such ‘bad’ early experience will then lead to a compulsion to re-enact it in an effort to try and make it better. Forming relationships with others offers us an opportunity to widen our perspective by giving us a deeper sense of our own and the other’s humanity, and this experience can enable us to transcend our early introjects.”[18]

¹ <https://www.goodtherapy.org/learn-about-therapy/types/gestalt-therapy>

There is deep truth behind a famous saying by Malcolm X:

“*When I is Replaced by We, Illness Becomes Wellness!*”¹

While we don't see this is an entirely new to psychotherapy, our proposed method is to begin with Martin Buber's famous philosophy: “*I and Thou,*” where he emphasizes the significant role of dialogic-communications. And that is why we consider relational psychotherapy is more related to Buberian philosophy. See also [19]

Introducing Relational Pedagogy

A definition of pedagogy tells us:

“The method and practice of teaching, especially as an academic subject or theoretical concept.”²

And its origin goes back to 16th century:

“Late 16th century: from French *pédagogie*, from Greek *paidagōgia* ‘office of a pedagogue’, from *paidagōgos* (see *pedagogue*).”³

But we can also ask: what constitutes a good pedagogy? That would require a whole bunch of academic papers.

We shall admit that we are not specialist in education/pedagogy theories.

But long time ago, one of us (VC) read a famous book at the time by

Paolo Freire, “*Pedagogy of the oppressed.*” He has a reputation as education philosopher which brought him to do join work with many organiza-

tions, including the World Council of Churches. One word that we

learned from Freire is the significance of “conscientization.” According to

Arthur Lloyd:

“*Paulo Freire*, Brazilian educator, has elaborated an educational theory within the framework of a theory of radical social change and expressed in a literacy

¹ <https://www.epicexperience.org/when-i-is-replaced-by-we-illness-becomes-wellness/>

² <https://en.oxforddictionaries.com/definition/pedagogy>

³ <https://en.oxforddictionaries.com/definition/pedagogy>

training program. A central concept is "*conscientization*," and development of critical consciousness through a process of reflection and action." [20]

While we are not so much in agreement with his post-marxian approach, we accept that conscientization is very important aspect in education. But not only that, a good educator should also give special attention to teach his/her students on how to respect and accept the others (that need a dialogic view), to communicate, to cooperate, and to have compassion. In our opinion, such a set of new *soft skills* are very important especially in the light of the rise of digital networks, which imply that anyone connected to digital networks will be exposed to numerous expressions of cultural and philosophical differences. Therefore, all these skills *become conditio qua non* in this digital and social media age.

We consider that Martin Buber's dialogic philosophy can be useful for this goal too, which leads us to consider "*Relational Pedagogy*." The good news here is that such an idea "Relational Pedagogy" has been discussed for some years by a number of academicians. See [22][23][24][25].

Concluding remarks

As an extension of one of us's book: *Neutrosophic Psychology*, in this paper we consider the following: that human consciousness model should take into consideration "spirit" role, i.e. the mind-body-spirit as integral aspect, which view is neglected in the so-called Freudian mental model. In this paper, we also consider a few applications derived from such an integral quadruple view of human consciousness, including Relational Psychotherapy and Relational Pedagogy.

This paper is an outline, or result of early investigation on how we can integrate human spirit into consciousness model. This is our response as

theologian to psychology field [43]. While we are aware that the ideas presented here may be not complete yet, but we are convinced that these ideas of *authentic relationship*, caring and compassion are supported by solid body of evidence. Our proposition on the significant role of relational love is inspired by Sutton and Mittelstadt [44] and also Martin Buber's dialogue philosophy.

To summarize key ideas in this paper, instead of repeating the Cartesian old adage: cogito ergo sum (I think therefore I am), probably it is much better to consider a new phrase: *I love therefore I am* (we are not sure about Latin version, may be something like this: "*Amo cogito ergo sum.*")

Acknowledgement

One of us (VC) would like to express his gratitude to Jesus Christ who always encouraged and empowered him in many occasions. He is the *Good Shepherd. Soli Deo Gloria!*

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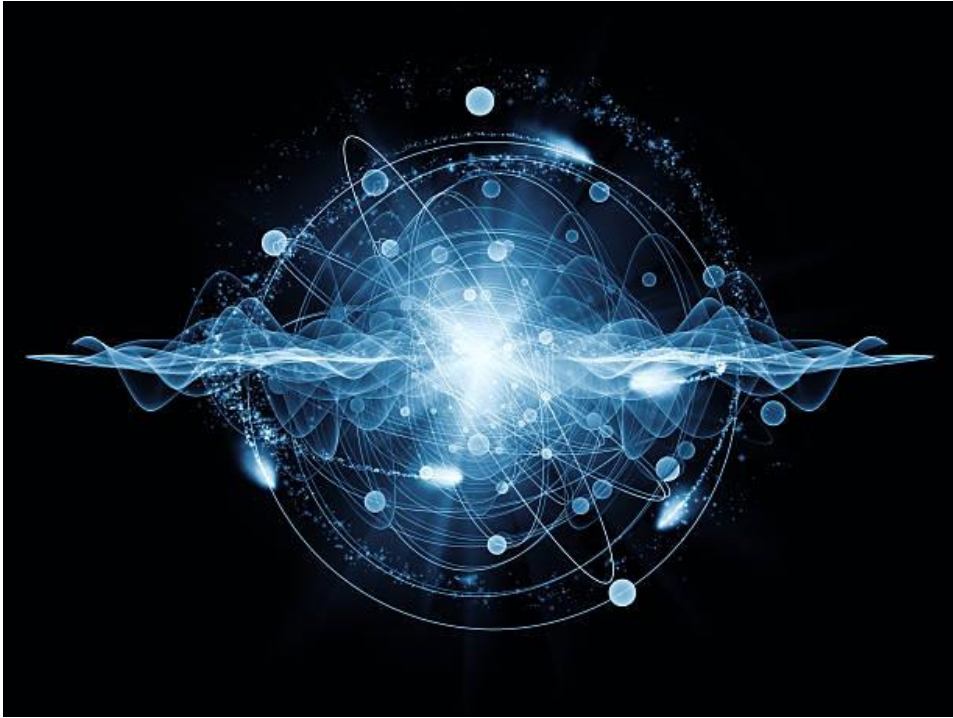
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Part IV – Miscellaneous writings

Chapter 24

**Superluminal Physics & Instantaneous Physics
as new trends in research**

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Abstract.

In a similar way as passing from Euclidean Geometry to Non-Euclidean Geometry, we can pass from Subluminal Physics to Supraluminal Physics, and further to Instantaneous Physics. In the lights of two consecutive successful CERN experiments with superluminal particles in the Fall of 2011, we believe that these two new fields of research should begin developing.

Introduction.

Let's start by recalling the history of geometry in order to connect it with the history of physics.

Then we present the way of S-denying a law (or theory) and building a spectrum of spaces where the same physical law (or theory) has different forms, then we mention the S-multispace with its multistructure that may be used to the Unified Field Theory by employing a *multifield*.

It is believed that the S-multispace with its multistructure is the best candidate for 21st century *Theory of Everything* in any domain.

1. Geometry's History.

As in Non-Euclidean Geometry, there are models that validate the hyperbolic geometric and of course invalidate the Euclidean geometry, or models that validate the elliptic geometry and in consequence they invalidate the Euclidean geometry and the hyperbolic geometry.

Now, we can mix these geometries and construct a model in which an axiom is partially validated and partially invalidated, or the axiom is only invalidated but in multiple different ways [1]. This operation produces a degree of negation of an axiom, and such geometries are hybrid. We can in general talk about the *degree of negation of a scientific entity P*, where P can be a theorem, lemma, property, theory, law, etc.

2. S-Denying of a Theory.

Let's consider a physical space S endowed with a set of physical laws L , noted by (S, L) , such that all physical laws L are valid in this space S . Then, we construct another physical space (or model) S_1 where a given law has a different form, afterwards another space S_2 where the same law has another form, and so on until getting a spectrum of spaces where this law is different.

We thus investigate spaces where anomalies occur [2].

3. Multispace Theory.

In any domain of knowledge, multispace (or S-multispace) with its multi-structure is a finite or infinite (countable or uncountable) union of many spaces that have various structures. The spaces may overlap [3].

The notions of multispace (also spelt multi-space) and multistructure (also spelt multi-structure) were introduced by the author in 1969 under his idea of hybrid science: combining different fields into a unifying field (in particular combinations of different geometric spaces such that at least one geometric axiom behaves differently in each such space), which is closer to our real life world since we live in a heterogeneous multispace. Today, this idea is accepted by the world of sciences. S-multispace is a qualitative notion, since it is too large and includes both metric and non-metric spaces.

A such multispace can be used for example in physics for the Unified Field Theory that tries to unite the gravitational, electromagnetic, weak and strong interactions by constructing a *multifield* formed by a gravitational field united with an electromagnetic field united with a weak-interactions field and united with a strong-interactions field.

Or in the parallel quantum computing and in the mu-bit theory, in multi-entangled states or particles and up to multi-entangles objects.

We also mention: the algebraic multispaces (multi-groups, multi-rings, multi-vector spaces, multi-operation systems and multi-manifolds, also multi-voltage graphs, multi-embedding of a graph in an n -manifold, etc.) or structures included in other structures, geometric multispaces (combinations of Euclidean and Non-Euclidean geometries into one space as in S-geometries), theoretical physics, including the Relativity Theory [4], the M-theory and the cosmology, then multi-space models for p-branes and cosmology, etc.

The multispace is an extension of the neutrosophic logic and set, which derived from neutrosophy. Neutrosophy (1995) is a generalization of dialectics in philosophy, and takes into consideration not only an entity $\langle A \rangle$ and its opposite $\langle \text{anti}A \rangle$ as dialectics does, but also the neutralities $\langle \text{neut}A \rangle$ in between. Neutrosophy combines all these three $\langle A \rangle$, $\langle \text{anti}A \rangle$, and $\langle \text{neut}A \rangle$ together. Neutrosophy is a metaphilosophy.

Neutrosophic logic (1995), neutrosophic set (1995), and neutrosophic probability (1995) have, behind the classical values of truth and falsehood, a third component called indeterminacy (or neutrality, which is neither true nor false, or is both true and false simultaneously - again a combination of opposites: true and false in indeterminacy).

Neutrosophy and its derivatives are generalizations of the paradoxism (1980), which is a vanguard in literature, arts, and science, based on finding common things to opposite ideas [i.e. combination of contradictory fields].

4. Physics History and Future.

- a) With respect to the size of space there are: *Quantum Physics* which is referring to the subatomic space, the *Classical Physics* to our intuitive living space, while *Cosmology* to the giant universe.
- b) With respect to the direct influence: the *Locality*, when an object is directly influenced by its immediate surroundings only, and the *Nonlocality*, when an object is directly influenced by another distant object without any interaction mediator
- c) With respect to the speed: the *Newtonian Physics* is referred to low speeds, the *Theory of Relativity* to subluminal speeds near to the speed of light, while *Supraluminal Physics* will be referred to speeds greater than c , and *Instantaneous Physics* to instantaneous motions (infinite speeds).

A physical law has a form in Newtonian physics, another form in Relativity Theory, and different form at Superluminal theory, or at Infinite (Instantaneous) speeds – as above in the S-Denying Theory spectrum.

We get new physics at superluminal speeds and other physics at very very big speed ($v \gg c$) speeds or at instantaneous (infinite) traveling.

At the beginning we have to extend physical laws and formulas to superluminal traveling and afterwards to instantaneous traveling.

For example, what/how would be Doppler effect if the motion of an emitting source relative to an observer is greater than c , or $v \gg c$ (much greater than c), or even at instantaneous speed?

Also, what addition rule should be used for superluminal speeds?

Then little by little we should extend existing classical physical theories from subluminal to superluminal and instantaneous traveling.

For example: if possible how would the Theory of Relativity be adjusted to superluminal speeds?

Lately we need to found a general theory that unites all theories at: low speeds, relativistic speeds, superluminal speeds, and instantaneous speeds – as in the S-Multispace Theory.

Conclusion:

Today, with many contradictory theories, we can reconcile them by using the S-Multispace Theory.

We also propose investigating new research trends such as Superluminal Physics and Instantaneous Physics.

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Einstein-Podolsky-Rosen paradox and the concept of fictitious space and time

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Abstract

The concept of hidden parameters was suggested by Einstein, Podolsky and Rosen (EPR) in order to replace the probabilistic predictions of quantum mechanics by deterministic laws. The hidden parameters were postulated as local quantities controlled by counterfactual definiteness, but this strict definition was found to be in contradiction with the Bell's inequality derived from quantum mechanical principles. To resolve the contradiction we suggest a less stringent definition for the hidden parameters by releasing the concept of counterfactual definiteness. The argument is based on the quantum

electrodynamic interpretation of Feynman, who represented the temporary phase of photons by rotating arrows. In the non-interacting states of elementary objects (photons and electrons), the space and time can be considered as fictitious coordinates, which gives indefinite representation for the hidden parameters and allows a deterministic interpretation for the elementary processes even though the phenomena are described by the inherently probabilistic formalism of quantum mechanics. The uncertainty relations of quantum mechanics are connected to the indefinite and non-observable orientation of the imaginary arrows of photons and particles. The anomalous terms appearing in the perturbation procedure of quantum electrodynamics (the flow of time can be reversed, the local speed can exceed that of the light) can be rationalized since the time and space are not real, but fictitious. A few cases of thought experiments are discussed and resolution is provided for the different appearances of EPR paradox.

Keywords: EPR paradox; hidden parameter; counterfactual definiteness; fictitious space and time

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I. INTRODUCTION

In our former paper a screw-model was suggested for elementary particles¹ in order to rationalize the role of Feynman's arrows² in quantum electrodynamics (QED). The most important conclusion was the assumption of the strong gravitation, which could explain the origin of mass, charge and spin of the elementary particles produced by the self-rotation of space points with the speed of light. In the present paper we focus on the question whether the arrow-model can give a rationalization for the quantum mechanical paradox put forward by Einstein, Podolsky and Rosen (EPR).³ Quantum mechanics can tell the probability of microscopic events when great number of photons has interaction with matter, but this theory cannot predict the exact outcome of an experiment when only individual photons or particles are involved in the process. EPR investigated the consequence of this characteristic feature of quantum mechanics by a few thought experiments and concluded that quantum mechanics was a non-complete theory and suggested the existence of hidden variables (parameters), which can causally control the outcome of experiments including individual photons or particles.

In subsequent years this question became a controversial issue and great efforts were invested to see if hidden parameters could exist at all. The best studied example is the case of two particles created in a single event and the question was raised whether these particles could have correlated polarization at distant places.⁴ The experiments gave positive answer: such a correlation indeed exists between simultaneously created "twin" particles. E.g. Aspect⁵ found opposite polarization for two photons emitted in the same process if the photons were detected in opposite direction at equal distance from the source. The central issue of debate was whether the correlation can be ex-

plained by hidden variables as suggested by EPR³ or by non-local nature of the interaction between spatially separated twin particles.⁴ The latter explanation defines a particular quantum state for the two particles, what are called as entangled particles or photons. The problem is that both explanations violate basic physical laws.

The assumption of hidden variables was ruled out most convincingly by Bell⁶, who devised a set of experiments where the overall probability in the spin polarization experiments yielded an inequality rule, which was found incompatible with experimental findings. In this analysis Bell defined the hidden variable as a parameter controlling the polarization of photons at any time and took into account the rules of the uncertainty relations in quantum mechanics. The argumentation of Bell was extended by Greenberger⁷ for three- and four-particle systems and pointed out the inconsistency of EPR's assumption with quantum mechanics even if perfect correlation exists.⁸ Since the Bell's inequality seemed to exclude the concept of hidden variables to interpret the EPR paradox, quantum mechanics required a new approach, which lead to the assumption of entangled state of the particles created in a single event. In this state the twin particles should always remain in a correlated state by a non-local interaction. In the Copenhagen interpretation of quantum mechanics⁹ the reduction or collapse of wavefunction is assumed when an experiment is carried out. According to this concept, when the wavefunction of the first particle is collapsed so has to do the second, it means that polarization of the first particle immediately changes polarization of the second particle at a separated spatial location. For resolving the evident contradiction, customary explanation states that this information cannot be transferred between the two distant measuring teams faster than the speed of light. It is, however, easy to see that the concept of non-local interactions is still in contradiction to the principle of relativity, since the entangled photons can produce interactions between the internal and external zones of the space-time cones.

Suppose a supernova explosion billion years ago if entangled particles really exist, these pairs of particles should be also emitted. One particle of this pair can reach one galaxy, while the other can encounter another galaxy. If as a consequence of encountering, the polarization of the first particle is changed, then, according to the definition of entangled particles, at the same time the polarization should be changed for the other photon in the other galaxy. It means that an event in one galaxy has an immediate impact in the other galaxy.

In this paper we make an effort to show that the assumption of underlying deterministic and causal laws for the elementary processes can be reconciled with the probabilistic predictions of quantum mechanics. Our arguments are partially based on the concept of intrinsic rotation (see either the rotating arrows of Feynman,² or our previously introduced screw-model¹) and partially on the concept of fictitious space and time defined for the state when the studied particles or photons do not interact with the surroundings. We interpret the “strange” behavior of the virtual photons in the theory of QED³ by the fictitious characteristics of space and time. We demonstrate that the above concepts can alleviate interpretational problems of the EPR paradox by giving a less stringent definition for the hidden parameter compared to the assumptions of Bell.⁶ In order to emphasize this concept, we introduce the term “indefinite parameter”, which can prescribe the outcome of individual elementary processes even though the value of this parameter remains indefinite. The indefiniteness involves an inherent statistics yielding to the probabilistic laws of quantum mechanics. This indefinite character also obliterates the counterfactual definiteness, which principle was considered by Blaylock⁴ as a decisive assumption for interpreting the EPR paradox.

II: THEORY

A. Quantum mechanical probabilities and the phase of intrinsic rotation

In the arrow- or screw-model, we can assign intrinsic phase for the temporary state of self-rotation:

$$\phi = 2\pi\nu(t - t_0) + \phi_0 \quad (1)$$

Here ϕ_0 depends on the prehistory of photons or electrons applied in the experiment. The phase of intrinsic rotation plays an analogous role as the direction of arrows in the QED concept of Feynman² and furthermore, it can be related to the phase of the imaginary argument of wavefunction for the quantum mechanical objects. We can extend Feynman's concept devised primarily for photons by assuming arrows also for the self-motion of fermions. When the outcome of any individual physical events is considered, e.g. the probability of reflection or transmission when the light reaches the surface of glass, the probability of events can be characterized by a scalar product of the arrows representing the relative phase of electron and incident photon in the glass. There is a further factor, which affects any elementary process, since transitions take place as a resonance when the frequency of the incoming photon is equal to the frequency difference between two electron states. In the present quantum mechanics only this resonance condition is considered for calculating transition probabilities without taking into account the role of phase agreement. The probabilistic description of elementary processes is a consequence of the missing information for the intrinsic phases, since we cannot control the prehistory of particles, neither for photons nor for electrons involved in the interaction.

We can postulate also indefinite phase for the orbital motion of electrons. The unknown phase makes impossible guarantying identical experimental conditions and, for this reason, only a statistical prediction can be given for the outcome of measurements

by averaging the impact of all possible phases. This situation does not influence the result of experiments if great amount of photons and particles are involved in the processes, but makes impossible predicting the outcome of the individual elementary events. The theory of quantum mechanics is in accordance with this situation, since the computation of expectation values and transition probabilities include always averaging procedures eliminating the unknown phase of the wavefunction.

B. Uncertainty principles and indefinite phase of the intrinsic rotation

The uncertainty of any physical observables can be connected to the indefinite phase of the intrinsic rotation of elementary objects when transition takes place between two states of the system. If, e.g., the photon bears large energy $h\nu$, we can obtain precise information for the position, but poor for the momentum. If subsequently a second photon is applied with small energy, we can improve the precision for momentum measurement, but this system is no more in the same state as before, since the investigated object has been already disturbed by the first photon. Thus the uncertainty rules are related to the fact that we cannot carry out two experiments under identical conditions in any elementary process. In the case of measuring position, the phase uncertainty limits resolution, since the experiment does not allow measuring the position of any objects by a better precision than the spatial separation $\Delta s = c/\nu$ between two turns in the intrinsic rotation of photons. Furthermore in the course of self-rotation, the direction of momentum also depends on the unknown phase causing an uncontrolled change of the object's momentum, which limits the precision of measurement in the amount of $\Delta p = h\nu/c$

.¹⁰ Consequently, the product of these uncertainties cannot be less than the Planck constant h . The same holds for the product of time and energy uncertainties, since the phase uncertainty limits the precision of time determination by the period of one turn in the self-rotation $\Delta t = 1/\nu$ and the energy of object can be altered by the $h\nu$ quantum of photon. The product of the two uncertainties is again the Planck constant.

III. RESULTS AND DISCUSSION

A. Local indefinite parameters and fictitious coordinates of space and time

A.1. Strange behavior of the photons in the theory of QED

For the self-rotation of photon, one can raise the question how a cylindrical motion can represent spherical propagation for the light. For answering this question we can start from the concept of the spatial “direction” in the case of the elementary processes. In the macroscopic world this concept is developed in our mental perception in order to organize information transferred by great amount of photons arriving from different points in the space, accordingly, the direction cannot be considered as an *a priori* category, it depends on how we compare the different information collected in the course of observation. When the propagation of a single photon is mathematically described in a state lacking any interaction with its surrounding, we cannot compare the orientation of propagation with any external information, thus in the non-interacting state of photons the category of direction becomes meaningless, or in other words, the direction represents a fictitious coordinate. The situation is analogous when the polarization of photons or other particles is measured. The measuring device constitutes a macroscopic instrument including great number of atoms and molecules. The flood of photons arriving from the constituents of the apparatus defines the direction, which serves as a base for

the measurement of polarization. For this reason this measurement utilizes the information obtained not only from the individual photon under investigation but also from a large amount of photons emitted by the macroscopic instrument. A further question can be raised about the definiteness of polarization in the state preceding the interaction between the investigated photon and the measuring device. Obviously in the non-interacting stage, the photon state is not affected by any properties of the experimental device, that is, no information is available for the spatial direction defined by the instrument, which fact is expressed in the quantum mechanical formalisms by the principle of superposition and identical probability amplitudes are postulated at all directions. For this reason we can consider the direction as a **fictitious coordinate** and speak about spherically propagating photons when the self-motion is presented by a helical screw-rotation. The appearance of superimposition in the mathematical formalism is the basic turning point that separates quantum mechanics from classical physics and assigns wave character for the particles. This distinction can give a clear explanation to the dilemma of Schrödinger's cat.¹¹ While, for the quantum system, we can speak about a non-interacting state with fictitious space and time, the cat in the sealed box is always in an interacting state with its surrounding where the space and time are real. The interaction with the surroundings of cat is very different if the animal is dead or alive, thus we cannot describe the state of the cat by neglecting the impact of surrounding and we cannot apply the superposition principle, which is valid only for the fictitious space and time.

The distances and time become also fictitious for non-interacting photons, which is in accordance with the theory of special relativity¹² rendering zero length for the traveling path due to the Lorentz contraction and zero self-time due to the time dilu-

tion in the self-system of photon. The time dependence is also missing in the wavefunction of electrons in stationary atomic state. Originally Bohr¹³ introduced the concept of stationary orbits in atoms when he assumed, that in the course of orbital motion, the electrons do not emit electromagnetic radiation. In quantum mechanics these orbits are described by the time-independent eigenfunctions of the Hamiltonian. The time-independence of the stationary states is a special manifestation of the fact, that time is fictitious for the orbital motion in atoms.

The fictitious nature of space and time also rationalizes the reason why unusual perturbation terms appear in the theory of QED³ when the anomalous magnetic moment is calculated. The computations include perturbation terms visualized by the Feynman diagrams when the impact of virtual electron-positron creation is taken into account even before the pair formation. Since in the QED formalism the virtual photons are described by fictitious coordinates, the usual constraints of real space and time are released, which are exemplified when the local motions can be faster than the speed of light and the flow of time can be reversed. The fictitious character of space is also manifested in the propagation of photons in which all points in the itinerary are considered as creating centers for new spherical waves, which are represented by sequences of the local arrows in the interpretation of Feynman. These arrows form a complex network for a single photon, while the actual interaction is determined by the resulting arrow composed as a sum of all possible individual arrows for which the temporary orientation is governed by the “internal clock” of photon. The individual arrows represent potential steps of the elementary process, while the final arrow indicates the realization of the possible outcomes of the experiment. As we pointed out in our previous paper,¹ these arrows can be represented by the temporary phase of the screw-motion, and the final phase of the resulting

screw can determine which one is actually realized among the possible outcomes of an elementary event.

A.2. Bell's inequality and counterfactual definiteness

In the screw-model we postulate intrinsic phase for the emitted photons, and we investigate if this phase can ensure determinism in the elementary processes. The internal “clock” of the photon is connected to the real time only when the photon interacts with the surrounding, namely, when it is created and absorbed. These two events determine the **real time** elapsed in the course of photon propagation, and this time prescribes the overall change of phase. Let us consider the question of spatial orientation in the propagation of photon. Before the instrument detects the photon, we cannot connect its intrinsic phase to any direction prescribed by the measuring device, consequently, we cannot assign a definite polarization to the intrinsic phase in the non-interacting state. The polarization remains indefinite even if it has already been measured right after the emission, since the interaction will change the original phase and we cannot have any definite relation between the final polarization and the original phase of photon. This fact makes a decisive difference between the intrinsic phase of self-rotation and the hidden variables assumed by Bell,⁷ namely, the former parameter cannot be considered as a “classical variable”, while the latter one is defined under the principle of classical physics. To accentuate this difference, we introduce the term local **indefinite variable or parameter** for classifying the intrinsic phase of self-rotation and speak about fictitious direction for the propagation of photon. In the derivation of Bell's inequality, the basic point is the assumption of counterfactual definiteness⁴ stating the outcome of any (even counterfactual) events is completely defined. This definition postulates the hidden pa-

rameters according to the concept of classical physics and for this reason the Bell's inequality leads to the conclusion, that we cannot extend quantum mechanics by any classically defined hidden variables. More concretely, while Bell's concept of hidden variables assigns definite polarization for the photons at any time, in the case of indefinite variables, the polarization is defined only when the measurement has already been completed. It is the reason why the existence of local indefinite variables does not contradict to the laws of quantum mechanics, and the principle of determinism is in line with a probabilistic theory for elementary processes.

A.3. Reduction of the wavefunction

A clear distinction of fictitious and real time is also important for interpreting the "reduction" of wavefunction.¹² It is customary to speak about reduction or collapse of the wavefunction when a measurement is carried out. Before the physical object interacts with the measuring device, the quantum mechanical system can be characterized by superimposition of states rendering probability distribution for the studied physical quantity, but as a consequence of measurement the measured quantity should have a well defined value, which corresponds to one of the eigenstates. According to our concept, the reduction of wavefunction just reflects the idea that before the interaction, which is necessary for gaining information for the physical quantities, we can use only fictitious coordinates and have only limited knowledge about the elementary system, and this limitation is acknowledged in quantum mechanics by introduction of the probability amplitudes. When the measurement is carried out, the obtained information is manifested by a definite wavefunction without any statistical character. In other words, the state of the microscopic system is not collapsed; this reduction is simply a mathematical operation when the fictitious coordinates are replaced by the real coordinates as the result of a real interaction.

B. Indefinite variables in atoms and molecules

In order to develop a consequent deterministic picture for all elementary processes, we have to postulate indefinite variables not only for the self-motion of particles, but also for the orbital trajectories of electrons in atoms and molecules. According to quantum mechanics the wavefunction can tell the spatial distribution of orbits, but no information can be given for the temporary position of electrons in the stationary states. The deterministic model is not equivalent to a completely defined classical motion for the electrons, since it requires at least two indefinite parameters in the course of orbital motion, namely the phase and the orientation. The phases of the orbital- and self-motion can be connected, but this relation is also indefinite.

For elementary objects the local symmetry reflects information deficit when certain orientations cannot be distinguished. For this reason in quantum mechanics the symmetry plays a decisive role and the wavefunction is classified according to the irreducible representations of symmetry group.¹⁴ Symmetry defines non-distinguishable quantum mechanical states where the dimension is given by the irreducible representations. In order to obtain deterministic theory, we assume indefinite variables that could resolve this ambiguity. Elements of the symmetry group are defined by the transformations not modifying the overall Hamiltonian of system, in atoms it is the rotational-inversion group, in crystals the finite point groups, respectively. The dimension of space formed by the indefinite variables depends on the actual symmetry: the higher is the symmetry the larger can be this dimension. In molecules and crystals the electrons have interaction with a set of nuclei, which gives information about the directions, and due to this additional information, the number and degree of indefinite variables become

smaller, which is reflected in the smaller dimension of irreducible representations of point groups compared to that of the spherical group.

As an example let us look the motion of electrons in atoms. Here the wavefunction is classified by the l orbital quantum number assigned to the $2l+1$ dimensional irreducible representations of rotation-inversion group. The integer l value gives also the angular momentum in \hbar units. As concerning the isotropic distribution of s electrons, the critical point is the fictitious character of direction coordinate. Since in this orbit the angular momentum is zero, the orbits should be represented by linear trajectories,¹⁵ but the orientation of trajectories is completely indefinite, which means that all orientations have identical probability amplitudes. For this reason isotropic spatial distribution is obtained without assuming any kind of secondary motion for the linear trajectories. This explanation is parallel for the propagation of photons described by spherical wave even if the motion is represented by cylindrical screw-motions.¹

For the atomic orbits with non-zero angular momentum, there are degenerate energy levels and the electronic states can be represented by any linear combination in the respective basis. This feature is again related to the fictitious orientation. The inversion symmetry plays also important role in the properties of wavefunction, which is symmetric for even and anti-symmetric for odd l quantum numbers. In molecules and crystals the dimension of indefinite variables is reduced, since we have additional spatial information and in this case the number of elements is finite in the point group. Look now the three anti-symmetric p orbits when $l = 1$. For spherical symmetry any linear combinations of these orbits are equivalent due to the lacking information for directions. In the case of rhombic symmetry where only the inversion symmetry exists, all representations are one-dimensional defining separately the p_x , p_y and p_z orbits. The exact determination of these orbits is related to the knowledge of principal directions defined by the

geometry of crystals. Since the angular momentum is non-zero, the orbits have zero probability at the center and due to the anti-symmetry, the probability amplitude changes sign while crossing the center, e.g. above the xy plane p_z is positive, below negative. For this orbit the probability amplitude is zero not only at the center but also in the whole xy plane. The question can be raised how an electron can communicate between the two lobes if we have zero probability for finding an electron in the plane of interception? No classical corpuscular model can answer this question, but it is in accordance to the wave characteristics of particles by assuming interference caused by the alternating sign of wavefunction.¹⁶ We assign this wave-like behavior to the inversion symmetry, since we cannot distinguish if the electron is above or below the xy plane. The indefinite character of inversion is expressed in the quantum mechanical formalism by the same absolute value of probability amplitudes for the two lobes of the p orbits. We can postulate as a general rule in quantum mechanics: *anything that is not distinguishable experimentally is not distinguished, and everything that is indefinite is not defined.*

In the framework of screw-model, the wave nature of particles is compatible with the assumption of deterministic elementary processes if we take into account indefinite variables. Quantum mechanics can tell the probability of transitions between two states of electron, e.g. when an s state is excited into a p state, but for a selected atom we cannot tell when the excitation will take place. In this case the causality requires well-defined relation between the indefinite parameters, and this relation has to be satisfied when the electron is excited to a higher level. This concept can be extended for multi-electron configurations. According to quantum mechanics the electrons are non-distinguishable and the wavefunction of the whole configuration changes the sign when two electrons are interchanged. In this case the permutation represents indefinite parameter,

since we do not have any information that could differentiate two electrons in the system.

The concept of indefinite parameters can be extended also to the field of nuclear physics. In this case indefinite variables can be assigned to the internal motion of constituents of the hadrons. The Standard Model¹⁷ can give predictions for the probability of nuclear processes, but not able to tell when a selected neutron will decompose. For a deterministic theory we can assume a resonance between the rotational phases of three quarks, which can promote the beta decay.

C. Interference phenomena and intrinsic phase of particles

While the phase in the wavefunction is eliminated when the expectation values or transition probabilities are calculated, it has crucial role when interference takes place. Interference can be observed not only for photons, but also for electrons and heavier atomic or molecular objects, which is indicated by the wave aspect of elementary particles. We interpret the wave aspect of elementary objects by the screw-motion of photons and fermions combined with the fictitious nature of space and time coordinates in the non-interacting state of particles. In quantum mechanics interference is considered only between identical objects, like photons with the same frequency, or electrons with the same rest mass. In the screw-model we generalize this concept speaking about asymmetric interference between individual photons and electrons: their interaction is determined by the relative phase between the self-rotation of interacting particles. According to this interpretation, when the photon reaches the surface of a glass plate, it will be reflected, if the difference between the respective phases is small, which corresponds to the interference maximum, while the photon can transmit the glass if due to the lack of phase agreement the interference has a minimum. The asymmetry of this interference is manifested by the smaller probability at the maximum than at the minimum.

D. Examples of the EPR paradoxes

D.1. Single photon experiments

There are a few variations of EPR experiments when single-photons or particles are observed. In one of the thought experiment a half transmitting mirror and two detectors are applied for observing either the transmitted or the reflected photon. When single-photons are detected, only one of the two detectors can give a signal. In other arrangement, the photons are emitted from a source inside of a sphere, in which detectors are placed at all directions. If the photons are detected one by one, each time only one detector can give signal, but how this special detector is selected by the photon and why the other detectors remain silent? These questions lead Einstein to the conclusion that quantum mechanics is not a complete theory, and a hidden variable must determine which direction is chosen by the individual photons. The above thought experiment is interpreted by the Copenhagen school⁹ as a reduction of the wavefunction claiming the original function describes all possible outcomes of the experiment built up as a superimposition of states, but as a consequence of the detection, the wavefunction is reduced into one of the states. By the screw-model¹ we can interpret this phenomenon in terms of the relative phase between a photon and the interacting electron. The relative phase constitutes an indefinite variable, and when this parameter has the proper value for the electrons in one of the detectors, the respective device can give the signal. The observer cannot predict the expected outcome of experiments due to the unknown intrinsic phase of the electrons in the experimental device.

D.2. Two-photon experiments

There is another type of EPR experiments when from a source two particles¹⁸ are simultaneously emitted and the particles are detected at equal distance from the

source in opposite direction.⁵ If the polarizations are detected in both detectors, the results are correlated; it means that we can have information from a particle at one point when we carry out the measurement at a distant spot. In terms of the concept of Copenhagen school, there is a strict correlation between the two reduced wavefunctions, which requires that the two particles should be in contact at any distance, that is the interaction has non-local character. The self-rotation can explain the correlation without assuming non-local interaction. For the simultaneously emitted particles the initial phases of self-rotation are correlated due to the conservation laws, but this correlation does not require the prescription of phase, only the difference of phases should be fixed. It means that the assumption of Bell is too stringent when he defines the hidden parameter completely prescribing the starting polarization of simultaneously emitted photons. It is adequate defining only the **relative polarization** of the two photons, which can be emitted with opposite polarization e.g. in the experiment of Aspect.⁵ Since the frequency of the two photons agrees and the polarization is measured at equal traveling distance, their relative phase of self-rotation, and consequently the relative polarization still remains the same.

D.3. Two-slit experiments

A further type of EPR experiment is represented when the light can transfer in two different slits and interference is observed in a screen for coherent monochrome light. If individual photons are separately detected, the frequency of strikes in the screen agrees with the intensity of interference bands, which means that the individual photon must transfer simultaneously through both slits. It is in accordance with the propagation of wave if we represent the photons by a set of cylindrical screw-rotations moving in each direction by the same probability and the same phase. As we pointed out earlier, the uniform probability distribution is a consequence of the fictitious nature of direction. Actually this model represents a spherically propagating wave where inside a sphere with

the radius $r = ct$ each point can be considered as a source of a new spherical wave.¹⁹

The photon is absorbed predominantly by the electrons in the wall, but it can happen that none of the electrons fulfill the necessary resonance condition. In this case both slits are achieved by the photon where two spherical waves are created producing interference pattern in the screen placed outside of the slits. Feynman² discusses in detail the situation where the photons are detected also on the slits to see which slit that actually transmits the photon. In this case, however, no more interference can be observed on the screen. In the screw-model we can explain this behavior by interaction of the incident photon with the activated electron in the detector. From the two detectors only one can detect the photon, in which the phase of electron is adequately close to the phase of photon. We cannot control, however, the prehistory of electrons, thus the interaction will change the original phase of photon at a random way obliterating any interference.

IV. CONCLUSIONS

The clear distinction between real and fictitious space-time is the clue for understanding the origin of the probabilistic character of elementary processes described by quantum mechanics. The fictitious nature of coordinates makes the phase of intrinsic rotations indefinite, which obliterates the counterfactual definiteness and resolves the contradiction between the quantum mechanical principles and existence of the hidden parameters. The missing information for the prehistory of particles gives an inherent statistical character for the quantum mechanical predictions and leads to a pragmatic approach, which describes correctly the observable phenomena, but dismisses metaphysical questions concerning to causality and determinism of the elementary processes.

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- 10 Here we disregard numerical factors in the order of unity.
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- 14 H. Bethe, "Termaufspaltung in Kristallen," *Ann. Physik* **395**, 133 (1929). All symmetry operations, like rotations and reflections, can be represented by matrices in group theory. The matrix is reducible if it can be built up of blocks of smaller matrices, and irreducible in the opposite case. The irreducible representations define the degenerate states of wavefunction.
- 15 If the momentum of motion is not pointed to the direction of center, the particle should have non-zero angular momentum.
- 16 There are interference maxima both above and below the plane and minimum at the plane of interception.
- 17 The Standard Model summarizes the basic theoretical laws of elementary particles accepted by the main stream physics, see in L K Gordon, *Modern Elementary Particle Physics* (Perseus Books, 1987).
- 18 Two photons or an electron-positron pair.
- 19 Here t is the real time elapsed after the emission of photon.

Chapter 26

On the existence of Fibonacci-like triangles, including Pythagorean triplets and quadruplets

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In 1972 Brother Alfred Brousseau asked for “*other types of geometric designs that lead to the discovery of Fibonacci formulas ... welcome by the Editor of the Elementary Section of the Quarterly*” [1], page 323. Present correspondent is one order of magnitude slower than Cohn [2], and sends this sketch for an alternative geometrical interpretation of Fibonacci sequences with a 47-year-delay relative to Brousseau’s call. A quick survey in the freely accessible issues of your Journal, and in the On-line Encyclopedia of Integer Sequences (OEIS) indicates that our results may be new, and in the direction of “*a geometric approach to algebraic numbers*” [3] recently suggested in the context of fractal spirals and paralelogram tiling [4], and of three-dimensional (3D) spirals [5].

In the mid-1990s this writer discovered quantized solutions for the 3D-classical wave equation in spherical coordinates [6,7]; our directional component is formed by 3D-helices evolving over surfaces of cones with quantized vertex angles. Since 2D-spirals appear in Fibonacci tiling [8,9], derived from Brousseau’s paper [1], this writer is analysing the links between 3D-helices and Fibonacci-type sequences. This letter reports an unexpected stand alone inherent connection between generalized Fibonacci numbers H_n and Pythagoras theorem –hence, with the elementary circular trigonometric identities.

The original Fibonacci sequence $\{F_n\}$ was generalized around 1960 [10-14]. Horadam [11,12] generalized sequence $\{H_n\}$ was used by Brousseau [1], and by Hoggatt in the elementary [15] and advanced [16] problem sections of their new journal. Many properties of square F_n were studied [17-19], particularly whether Pythagorean triplets belonged to a Fibonacci sequence [19-21]. In retrospect, such search was (apparently) doomed ab initio. Indeed, by 1979 it was reported [22] that theorem 6 in a (too terse) paper published in 1964 by Carlitz [23] proved that three Fibonacci numbers cannot occur in a Pythagorean triplet. Bicknell [22] also quoted a theorem by Hoggatt [24] proving that three distinct Fibonacci numbers cannot be the lengths of the sides of any triangle.

Our serendipitous finding is that foregoing theorems only hold when F_n and H_n are treated as 1D-lengths of line segments (in reduced units). However, if F_n and

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H_n are 2D-objects, i.e. squares of lengths (in reduced units), right triangles in general – Pythagorean triplets in particular – are in an almost trivial one-to-one correspondence to Horadam generalized sequences $\{H_n\}$ [11,12,20]. Our claim is proven by construction.

Let us consider the conversion from Cartesian coordinates to spherical coordinates. By analogy to sliding statistical averages and to time-series and similar empirical sequences, Horadam $\{H_n\}$ is interpreted here as a sliding succession of triplets $\{_{HT_n}\} = \{(H_n, H_{n-1}, H_{n-2})\}$ for all $n \geq 2$, with arbitrary initial values (H_1, H_0) such that $H_1 \geq H_0 \geq 0$. Let point $P = (a, b, c)$ in 3D-space originally be in Cartesian coordinates (figure 1A). Line segment OP' is both a diagonal of rectangle $R(a, b)$ of sides (a, b) on the XY -plane, and the hypotenuse in a right triangle with catheti (a, b) , whose length ρ is given by Pythagoras theorem. The Horadam sequence of triplets $\{_{HT_n}\}$ is in one-to-one correspondence to a sequence of horizontal triangles given by triplets $\{_{HP_n}\} = \{(\rho_n, a_n, b_n)\}$, such that

$$\rho_n^2 \equiv H_n, a_n^2 \equiv H_{n-1}, b_n^2 \equiv H_{n-2} \Rightarrow {}_HP_n \equiv (\rho_n, a_n, b_n) = (H_n^{1/2}, H_{n-1}^{1/2}, H_{n-2}^{1/2}), n \geq 2$$

$$\text{Thus, } \rho_n^2 = a_n^2 + b_n^2 \text{ (2D - Pythagoras theorem)} \Leftrightarrow H_n \equiv H_{n-1} + H_{n-2} \text{ (2D - Horadam)} \quad (1)$$

The key element in equations (1) is that number H_n is the square of each side of a triangle, rather than their length, as in foregoing references and usual works [25-27].

Line segment OP is a diagonal r in a 3D-rectangular prism with (a, b, c) edges. Equivalently, it is a diagonal in the 2D-face $OP'PC$ of a right prism whose base is the right triangle OAP' . Hypotenuse of the vertical right triangle $OP'P$ is given by Pythagoras theorem. In 3D-cylindrical coordinates, point P is (ρ, φ, c) , where φ is azimuthal location of plane $OP'PC$, orthogonal to the XY -plane (figure 1A). Let a succession of vertical triangles $\{_{VP_n}\} = \{(r_n, \rho_n, c_n)\}$ be associated to Horadam sequence $\{V_n\}$. As before, sequence of triplets $\{_{VT_n}\} = \{(V_n, V_{n-1}, V_{n-2})\}$ for all $n \geq 2$ is in one-to-one correspondence to $\{_{VP_n}\}$:

$$r_n^2 \equiv V_n, \rho_n^2 \equiv V_{n-1}, c_n^2 \equiv V_{n-2} \Rightarrow {}_VP_n \equiv (r_n, \rho_n, c_n) = (V_n^{1/2}, V_{n-1}^{1/2}, V_{n-2}^{1/2}), n \geq 2$$

$$\text{Thus, } r_n^2 = \rho_n^2 + c_n^2 \text{ (2D - Pythagoras theorem)} \Leftrightarrow V_n \equiv V_{n-1} + V_{n-2} \text{ (2D - Horadam)} \quad (2)$$

Equations (1) and (2) are equivalent to a 3D-generalized Fibonacci-like sequence $\{M_n\}$, and the associated sliding succession of quadruplets $\{Q_n\} = \{(M_n, M_{n-1}, M_{n-2}, M_{n-3})\}$ for all $n \geq 3$, with initial conditions (M_2, M_1, M_0) such that $M_2 \geq M_1 \geq M_0 \geq 0$. Sequence $\{Q_n\}$ is in one-to-one correspondence to a sequence of quadruplets $\{_{3P_n}\} = \{(r_n, a_n, b_n, c_n)\}$, representing the diagonal r_n in a 3D-rectangular prism with (a_n, b_n, c_n) edges, respectively parallel to the X, Y, Z axes (figure 1A):

$$r_n^2 \equiv M_n, a_n^2 \equiv M_{n-1}, b_n^2 \equiv M_{n-2}, c_n^2 \equiv M_{n-3}; {}_{3P_n} \equiv (r_n, a_n, b_n, c_n) = (M_n^{1/2}, M_{n-1}^{1/2}, M_{n-2}^{1/2}, M_{n-3}^{1/2})$$

$$r_n^2 = a_n^2 + b_n^2 + c_n^2 \text{ (3D - Pythagoras)} \Leftrightarrow M_n \equiv M_{n-1} + M_{n-2} + M_{n-3} \text{ (3D - tribonacci)}, n \geq 3 \quad (3)$$

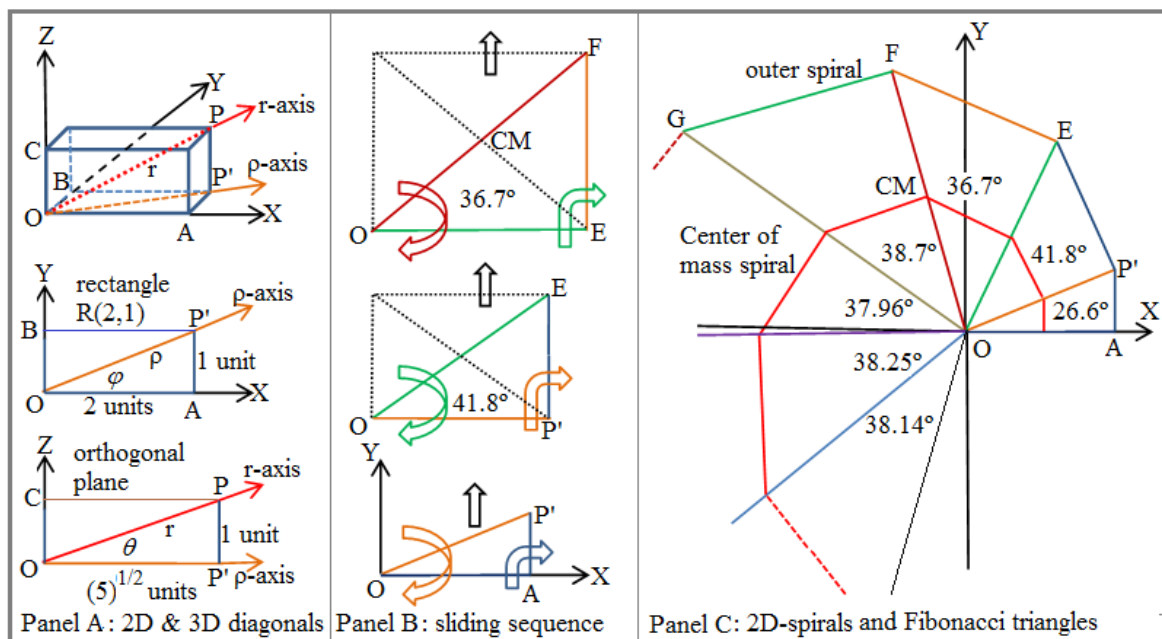


Figure 1. Point P in panel A may be in Cartesian, cylindrical or spherical coordinates. Diagonal OP obtains from horizontal triangle OAP' plus vertical triangle OP'P. Sequence of triangles in panel B is associated to generalized Horadam sequence, see equations (4). Panel C shows 2D-spirals arising from sequence of triangles in panel B. As shown in panel B, the center of mass of nth rectangle $R(a_n, b_n)$ is at the crossing of two diagonals.

The 2D-right triangle tiling in figure 1C is a new companion to Holden's tiling of the plane with squares of side F_n spiraling CW or CCW [20], and to equilateral triangles tiling.

Let us focus now on initial conditions in 3D-Euclidean space, given as 2D-rectangle $R(a, b)$ of sides (a, b) on the XY-plane, or as 3D-rectangular prism $R(a, b, c)$, where (a, b, c) are arbitrary real values, including irrationals. Rectangle $R(a, b)$ and rectangular prism $R(a, b, c)$ are equivalent to the initial pair of rabbits in Fibonacci's original problem. Here, the off-spring are diagonals embedded in 2D- and 3D-space. In Horadam 2D-sequence $\{H_n\}$, the parents are the duplet $(H_1 = a^2, H_0 = b^2)$ or $R(a, b)$. Likewise, in the 3D-sequence $\{M_n\}$ the parents are the arbitrary triplet $(M_1 = a^2, M_2 = b^2, M_0 = c^2)$, or equivalently $R(a, b, c)$.

Original Fibonacci numbers $\{F_n\}$ are a particular case of $\{H_n\}$ when $(H_1=1, H_0=1)$. Lee's k-generalized sequence for $k = 2$ [28] also is a particular case $\{H_n\}$ for $(H_1=1, H_0=0)$. Lee's sequence for $k = 3$ is a particular case of equations (3) above when $(M_2 = M_1 = 1, M_0 = 0)$. Likewise, tribonacci sequence [29-31] is a particular case of $\{M_n\}$ with $(M_2=2, M_1=M_0=1)$. Our own work [32-35] enforces both discreteness and 3D-extension, and imposes the stronger initial conditions $H_1 \geq H_0 > 0$ and $M_2 \geq M_1 \geq M_0 > 0$.

Let us now turn to triangles. It is evident that any 2D-right triangle is fully described by lengths (a,b) of the catheti. Nothing prevents us for choosing those catheti as the input $(H_1=a^2, H_0=b^2)$ for $\{H_n\}$. Thus, every imaginable 2D-right triangle is associated at least with one Horadam sequence. Of course, this is also applicable to the subset of Pythagorean triplets (PT) as in the horizontal and vertical triangles in table 1. Pythagorean quadruplets (PQ) with relative-prime integer values for the three sides of a rectangular prism and its 3D-diagonal are also included in table 1. They were derived from the first 20 Pythagorean triplets in [21] (no claims for completeness).

Table 1. Sequences of Pythagorean triplets (PT) and quadruplets (PQ), and initial conditions

	Horizontal triangles and $\{H_n\}$			Vertical triangles and $\{V_n\}$			Right triangular prism and $\{M_n\}$			
	PT($d;a,b$)	H_1	H_0	PT($d;a,b$)	V_1	V_0	PQ($d;a,b,c$)	M_2	M_1	M_0
1	<u>5;4,3*</u>	16	9	<u>13;12,5ç</u>	144	25	13;12,4,3	144	16	9
2	15;12,9*	144	81	<u>17;15,8#</u>	225	64	17;12,9,8	144	81	64
3	15;12,9*	144	81	25;20,15*	400	225	25;20,12,9	400	144	81
4	20;16,12*	256	144	25;20,15*	400	225	25;16,15,12	256	144	81
5	20;16,12*	256	144	<u>29;21,20</u>	441	400	29;21,16,12	441	256	144
6	35;28,21*	784	441	<u>37;35,12</u>	1225	144	37;28,21,12	784	441	144
7	40;32,24*	1024	576	<u>41;40,9&</u>	1600	81	41;32,24,9	1024	576	81
8	45;36,27	1296	729	<u>53;45,28</u>	2025	784	53;36,28,27	1296	729	729
9	60;48,36*	2304	1296	<u>61;60,11</u>	3600	121	61;48,36,11	2304	1296	121
10	<u>25;24,7\$</u>	576	49	65;60,25ç	3600	625	65;60,24,7	3600	576	49
11	60;48,36*	2304	1296	65;60,25ç	3600	625	65;48,36,25	2304	1296	625
12	39;36,15ç	1296	225	65;52,39*	2700	1521	65;52,36,15	2700	1296	225
13	52;48,20ç	2304	400	65;52,39*	2700	1521	65;48,39,20	2304	1521	400
14	55;44,33*	1936	1089	<u>73;55,48</u>	3025	2304	73;48,44,33	3025	1936	1089
15	<u>13;12,5ç</u>	144	25	<u>85;84,13?</u>	7056	1681	85;84,12,5	7056	144	25
16	40;32,24*	1024	576	85;75,40#	5625	1600	85;75,32,24	5625	1024	576

17	80;64,48*	4096	2304	<u>89;80,39</u>	6400	1521	89;64,48,39	4096	2304	1521
18	39;36,15ç	1296	2255	<u>89;80,39</u>	6400	1521	89;80,36,15	6400	1296	2255
19	65;52,39*	2704	1521	<u>97;72,65</u>	5184	4225	97;72,52,39	5184	2704	1521
20	20;16,12*	2564	1444	<u>101;99,20</u>	9801	4000	101;99,16,12	9801	2564	1444
21	60;48,36*	2304	1296	<u>109;91,60</u>	8281	3600	109;91,48,36	8281	2304	1296
22	15;12,9*	14481	81	<u>113;112,15</u>	12544	2255	113;112,12,9	12544	14481	81
23	117;108,45ç	11664	2025	<u>125;117,44</u>	13689	1936	125;108,45,44	11664	2025	13689
24	35;28,21*	7841	441	<u>125;120,35</u>	14400	1225	125;120,28,21	14400	7841	441
25	100;96,28\$	9216	784	<u>125;100,75*</u>	10000	5625	125;96,75,28	9216	784	10000
26	<u>17;15,8#</u>	2256	64	<u>145;144,17</u>	20736	289	145;144,15,8	20736	2256	289
27	<u>65;56,33</u>	3136	1089	<u>169;156,65ç</u>	24436	4225	169;156,56,33	24436	3136	4225
28	<u>65;63,16</u>	3969	256	<u>169;156,65ç</u>	24436	4225	169;156,63,16	24436	3969	4225
29	45;36,27*	1296	729	<u>205;200,45&</u>	40000	2025	205;200,36,27	40000	1296	729
30	<u>85;84,13</u>	7056	169	<u>221;204,85ç</u>	41616	7225	221;204,84,13	41616	7056	7225
31	<u>85;77,36</u>	5929	1296	<u>221;204,85ç</u>	41616	7225	221;204,77,36	41616	5929	7225
32	<u>25;24,7\$</u>	57649	49	<u>313;312,25</u>	97344	625	313;312,24,7	97344	57649	625
33	25;20,15*	4005	225	<u>313;312,25</u>	97344	625	313;312,20,15	97344	4005	625

Pythagorean triplets are underlined.
 Asterisk * and other signs (ç,#,&,\$,?) after a triplet means that multiples are used in other pairs in the table.

Table 2 shows two 2D-Horadam sequences with initial conditions R(2,1) representing a right triangle with irrational hypotenuse, and R(4,3) leading to a Pythagorean triplet.

Table 2. Generalized 2D-Fibonacci sequences, and associated triangles with different initial conditions

n	$H(4, 1)$	H_n/H_{n-1}	hypothenu se	$\varphi_n, ^\circ$	$H(16, 9)$	H_n/H_{n-1}	hy- pothenus e	$\varphi_n, ^\circ$
0	1				9			

1	4	4.0000 00				16	1.7777 78		
2	5	1.2500 00	2.23606 8	26.5650 51		25	1.5625 00	5.000000	36.8698 98
3	9	1.8000 00	3.00000 0	41.8103 15		41	1.6400 00	6.403124	38.6598 08
4	14	1.5555 56	3.74165 7	36.6992 25		66	1.6097 56	8.124038	37.9851 67
5	23	1.6428 57	4.79583 2	38.7220 71		107	1.6212 12	10.34408 0	38.2441 22
6	37	1.6086 96	6.08276 3	37.9609 81		173	1.6168 22	13.15294 6	38.1453 98
7	60	1.6216 22	7.74596 7	38.2533 01		280	1.6184 97	16.73320 1	38.1831 34
8	97	1.6166 67	9.84885 8	38.1418 83		453	1.6178 57	21.28379 7	38.1687 24
9	157	1.6185 57	12.5299 64	38.1844 76		733	1.6181 02	27.07397 3	38.1742 29
10	254	1.6178 34	15.9373 77	38.1682 12		1186	1.6180 08	34.43835 1	38.1721 26
11	411	1.6181 10	20.2731 35	38.1744 25		1919	1.6180 44	43.80639 2	38.1729 30
12	665	1.6180 05	25.7875 94	38.1720 52		3105	1.6180 30	55.72252 7	38.1726 23
13	1076	1.6180 45	32.8024 39	38.1729 58		5024	1.6180 35	70.88018 1	38.1727 40
14	1741	1.6180 30	41.7252 92	38.1726 12		8129	1.6180 33	90.16096 7	38.1726 95
15	2817	1.6180 36	53.0754 18	38.1727 44		13153	1.6180 34	114.6865 29	38.1727 12

Table 3. 3D-M sequence, sides of prism, 3D-Fibonacci ratio, and three angles φ , θ , and Euler-X

n	Quadruplet (6 ^{1/2} ;2,1,1)						Pythagorean quadruplet (13;12,4,3)					
	M _n	M _n ^{1/2} ₂	M _n /M _{n-1}	φ _n _o	θ _n _o	Ex _n _o	M _n	M _n ^{1/2}	M _n /M _{n-1}	φ _n _o	θ _n _o	Ex _n _o
0	1	1					9	3				
1	1	1					16	4				
2	4	2					144	12				
3	6	2.4 49	1.50 00	26. 6	24. 1	35. 3	169	13	1.17 36	18. 4	13. 3	22. 6
4	11	3.3 17	1.83 33	39. 2	17. 5	42. 4	329	18.1 38	1.94 67	42. 7	12. 7	44. 2
5	21	4.5 83	1.90 91	36. 4	25. 9	43. 6	642	25.3 38	1.95 14	35. 6	28. 3	44. 3
6	38	6.1 64	1.80 95	35. 9	23. 4	42. 0	1140	33.7 64	1.77 57	35. 6	22. 6	41. 4

7	70	8.3 67	1.84 21	36. 6	23. 4	42. 5	2111	45.9 46	1.85 18	36. 9	23. 3	42. 7
8	129	11. 36	1.84 29	36. 4	23. 8	42. 6	3893	62.3 94	1.84 41	36. 3	24. 0	42. 6
9	237	15. 39	1.83 72	36. 4	23. 6	42. 5	7144	84.5 22	1.83 51	36. 4	23. 5	42. 4
10	436	20. 88	1.83 97	36. 4	23. 6	42. 5	13148	114. 66	1.84 04	36. 4	23. 6	42. 5
11	802	28. 32	1.83 94	36. 4	23. 6	42. 5	24185	155. 52	1.83 94	36. 4	23. 7	42. 5
12	1475	38. 41	1.83 92	36. 4	23. 6	42. 5	44477	210. 90	1.83 90	36. 4	23. 6	42. 5
13	2713	52. 09	1.83 93	36. 4	23. 6	42. 5	81810	286. 02	1.83 94	36. 4	23. 6	42. 5
14	4990	70. 64	1.83 93	36. 4	23. 6	42. 5	15047 2	387. 91	1.83 93	36. 4	23. 6	42. 5
15	9178	95. 80	1.83 93	36. 4	23. 6	42. 5	27675 9	526. 08	1.83 93	36. 4	23. 6	42. 5
16	16881	129. 9	1.83 93	36. 4	23. 6	42. 5	50904 1	713. 47	1.83 93	36. 4	23. 6	42. 5
17	31049	176. 2	1.83 93	36. 4	23. 6	42. 5	93627 2	967. 61	1.83 93	36. 4	23. 6	42. 5
18	57108	239. 0	1.83 93	36. 4	23. 6	42. 5	17220 72	1312. 3	1.83 93	36. 4	23. 6	42. 5
19	10509	324. 1	1.83 93	36. 4	23. 6	42. 5	31673 85	1779. 7	1.83 93	36. 4	23. 6	42. 5
20	193195	439. 5	1.83 93	36. 4	23. 6	42. 5	58257 29	2413. 7	1.83 93	36. 4	23. 6	42. 5

The generalized 2D-ratio $H(n)/H(n-1)$ (that converges to Phidias number Φ), and the hypotenuse of the triangle contained in the XY-plane (which is the radius of outer spiral in figure 1C) are also shown in table 2. Sequence of angles φ in same figure 1C converges to φ_∞ and is linked to Φ by:

$$\Phi \equiv \lim_{n \rightarrow \infty} \left(\frac{H_n}{H_{n-1}} \right) = \frac{1 + \sqrt{5}}{2} = 1.618033988749895\dots = \lim_{n \rightarrow \infty} (\sec^2 \varphi_n)$$

$$\Rightarrow \varphi_\infty = \lim_{n \rightarrow \infty} (\varphi_n) = \sec^{-1}(\sqrt{\Phi})$$

(4)

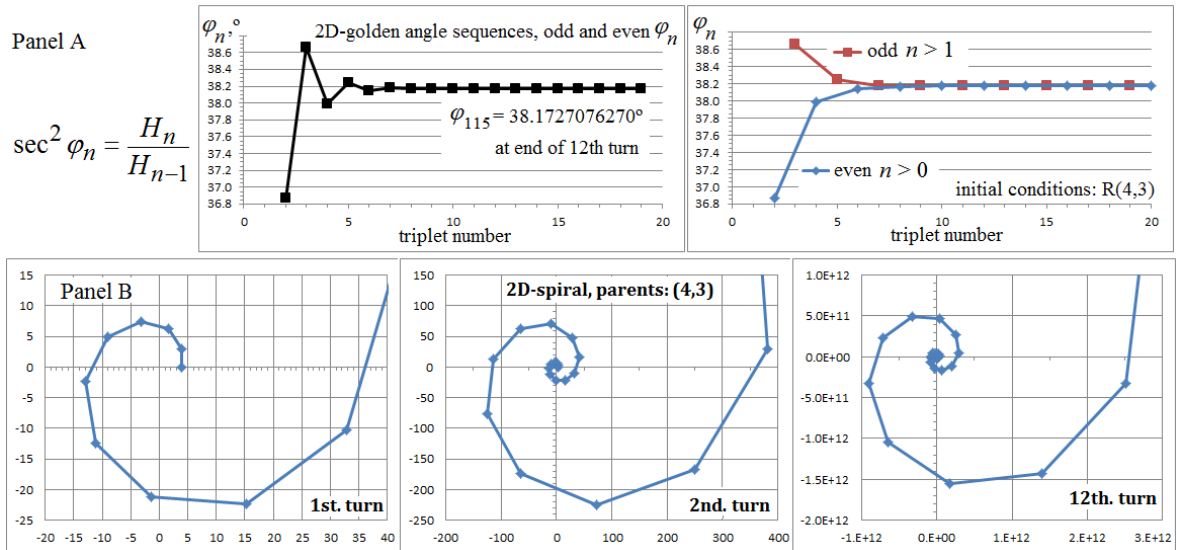


Figure 2. Panel A shows evolution over time n of the 2D-ratio $H(n)/H(n-1)$, linked to angular sequence φ . Both limits attain very quickly for $n < 10$. Panel B shows 2D-spirals evolving over n generations. Shape of spiral in first turn depends on initial conditions $R(4,3)$. Scale invariance is visually manifest in the spirals for second and 12th turns.

Holden [8] noted that in Fibonacci tiling the limiting values of sequences are independent of initial conditions. Same results arise in Tables 2 and 3 where limiting values of ratios $H(n)/H(n-1)$, $M(n)/M(n-1)$ and φ , θ , and Euler angles are independent of initial conditions $R(2,1)$, $R(4,3)$, $R(2,1,1)$, $R(12,4,3)$. As illustrated in figure 2, converging is quite fast: from second turn onwards (i.e. from $n \sim 10$) changes only occur at decimal places.

Likewise, table 3 presents two 3D- $M(n)$ sequences, with initial conditions $R(2,1,1)$ for a right triangle with irrational hypotenuse, and $R(12,4,3)$ for a Pythagorean quadruplet. The generalized 3D-ratio $M(n)/M(n-1)$ tends in the limit to $\Phi_{3D} = 1.8393$ which is larger than the usual 2D-Phidias number $\Phi = 1.6180$. From a physical viewpoint this means that, rather than using simple 2D-approximation as a first solution, volumes must be treated as three-dimensional ab initio. As a result, in the 3D- M sequence the limiting angle $\varphi_\infty = 36.4^\circ$ is smaller than the limit $\varphi_\infty = 38.17^\circ$ in the 2D- H sequence (figure 3). Both sequences $\{M_n\}$ in table 3 lead to spiraling ladders of prisms whose bases on the XY -plane are right triangles similar to those shown in figure 1C, but with smaller angle φ . Note the presence of irrational numbers in triangles and prisms in tables 2 and 3.

Rules to raise from triplet ${}_H T_n = (H_n, H_{n-1}, H_{n-2})$ to ${}_H T_{n+1} = (H_{n+1}, H_n, H_{n-1})$ are illustrated in figure 1B. Similar rules underlie triplet ${}_V T_n = (V_n, V_{n-1}, V_{n-2})$ and quadruplet $Q_n = (M_n, M_{n-1}, M_{n-2}, M_{n-3})$. Sides of the 2D-rectangle and the 3D-rectangular prism at $n+1$ are:

$$\begin{aligned}
 a_{n+1} = \rho_n, b_{n+1} = a_n &\Rightarrow {}_H P_{n+1} = (\rho_{n+1}, \rho_n, a_n) = (H_{n+1}^{1/2}, H_n^{1/2}, H_{n-1}^{1/2}) \\
 a_{n+1} = r_n, b_{n+1} = a_n, c_{n+1} = b_n &\Rightarrow {}_3 P_{n+1} = (r_{n+1}, r_n, a_n, b_n) = (M_{n+1}^{1/2}, M_n^{1/2}, M_{n-1}^{1/2}, M_{n-2}^{1/2})
 \end{aligned}
 \tag{5}$$

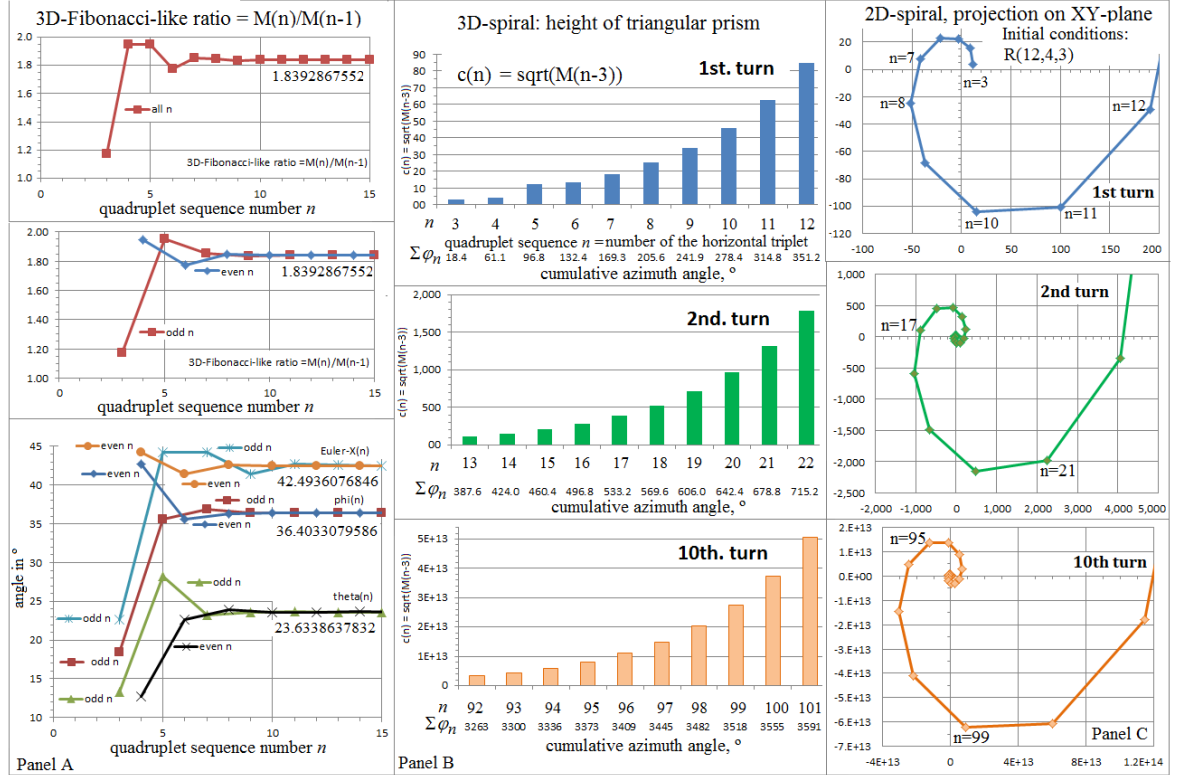


Figure 3. Evolution of 3D-spirals over n (which is time measured in generation units). Convergence is fast attained at n around 10. Panel A shows the 3D-tri-bonacci ratio $M(n)/M(n-1)$ with limit $\Phi_{3D} = 1.8393$ attained from above (below) according to even (odd) n ; lower panel shows convergence of angles φ , θ , and Euler-X. Panel B shows vertical evolution of spiral along Z-axis direction. Panel C shows projections of 3D-spiral upon XY-plane (similar but not identical to figure 1C). Shape of spiral in first turn depends on initial conditions $R(12,4,3)$. Some values of n are marked along spirals.

In the 2D- $\{H_n\}$, triangles OAP' belonging to $\{{}_H P_n\}$ may be also represented by a sequence of acute angles $\{\varphi_n\}$, or, by its complementary sequence $\{\varphi_n^*\}$, where

$$\sec \varphi_n = \csc \varphi_n^* = \frac{\rho_n}{a_n} = \sqrt{\frac{H_n}{H_{n-1}}}, \quad \varphi_n + \varphi_n^* = \frac{\pi}{2}$$

$$\varphi_n = \tan^{-1} \left(\sqrt{\frac{H_{n-2}}{H_{n-1}}} \right) = \sec^{-1} \left(\sqrt{\frac{H_n}{H_{n-1}}} \right) \Rightarrow \sec^2 \varphi_n = 1 + \tan^2 \varphi_n \text{ (Pythagoras theorem)}$$

(6)

Likewise, in 3D- $\{M_n\}$, horizontal triangles $OAP'\varepsilon\{HT_n\}$ lead to a sequence of acute angles $\{\varphi_n\}$, and vertical triangles $OP'P\varepsilon\{VT_n\}$ to a sequence of acute angles $\{\theta_n\}$ where

$$\cos \varphi_n = \frac{a_n}{\rho_n} = \sqrt{\frac{M_{n-1}}{M_{n-1} + M_{n-2}}}, \quad \tan \theta_n = \frac{c_n}{\rho_n} = \sqrt{\frac{M_{n-3}}{M_{n-1} + M_{n-2}}} \tag{7}$$

In figure 1A, Euler angle Ex with X-axis is angle POA, Euler-Y (= Ey) is angle POB, and Euler-Z (= Ez) is angle POC. As an alternative to equations (7), direction of ray OP is determined by any two Euler angles, each one contained in a right triangle with OP as hypotenuse. Thus, OP belongs to three different triangles involving generations $n-3$ to n :

$$\begin{aligned} \cos Ex_n &= \frac{OA}{OP} = \frac{a_n}{r_n} = \sqrt{\frac{M_{n-1}}{M_n}} \Rightarrow M_n = \frac{M_{n-1}}{\cos^2 Ex_n} \\ \cos Ey_n &= \frac{OB}{OP} = \frac{b_n}{r_n} = \sqrt{\frac{M_{n-2}}{M_n}} \Rightarrow M_n = \frac{M_{n-2}}{\cos^2 Ey_n} \\ \cos Ez_n &= \frac{OC}{OP} = \frac{c_n}{r_n} = \sqrt{\frac{M_{n-3}}{M_n}} \Rightarrow M_n = \frac{M_{n-3}}{\cos^2 Ez_n} \end{aligned} \tag{8}$$

In steady state conditions, and/or large n , angles in equations (6) to (8) may be substituted in first approximation by their limiting values collected in table 4. This leads to interesting possibilities, as forecasting the value of a future $M(n)$ in a hurricane based on a previous value, say $M(n-3)$ in equations (8).

Table 4. Limiting values of ratios and angles (estimated at $n=115$, 12 turns approximately)

2D-sequence H		3D-sequence M					
Initial conditions: $R(4,3)$		Initial conditions: $R(12,4,3)$					
H_n/H_{n-1}	$\varphi_n, ^\circ$	M_n/M_{n-1}	$\varphi_n, ^\circ$	$\theta_n, ^\circ$	$Ex, ^\circ$	$Ey, ^\circ$	$Ez, ^\circ$
1.6180339	38.172707	1.8392867	36.403307	23.633863	42.493607	57.064879	66.366136
8874989	6270123	5521416	9585859	7832054	6846353	1992273	2167946

Summarizing, generalized Fibonacci sequences defined in equations (1) through (3) are inherently linked to ρ, z and r appearing in the cylindrical (ρ, φ, z) and spherical (r, θ, φ) or (r, Ex, Ez) systems of coordinates. From equations (1) through (8), readers may derive many identities connecting back and forth the three generalized sequences $\{H_n\}$, $\{V_n\}$, $\{M_n\}$, to triplets $\{HT_n\}$, $\{VT_n\}$ and quadruplets $\{Q_n\}$, and the corresponding geometrical figures defined by the lengths of their sides: triangles $\{HP_n\}$, $\{VP_n\}$, and right triangle prisms $\{3P_n\}$. Tautologically equivalent identities arise by assigning the role of XY-plane to any of the other two coordinate planes YZ or ZX.

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Chapter 27

**Transformation of heat into mechanical energy
by means of rotating systems***Marian Mešina¹*¹ Privat, D-73266 Bissingen, Mörikestraße 25, Germany**Abstract**

All heat engines need two different temperatures for their work, $T_1 < T_2$. The efficiency is limited by the Carnot formula from above. This article presents a new conception for heat engines. Unlike conventional heat engines, the working medium has an additional degree of freedom, the rotation around a given axis. The heat introduced and removed can not only lead to a change in the parameters of temperature, pressure, and volume, which are considered in conventional thermodynamics, but also to a change in the state of rotation. The rotational speed must also be taken into account in all phases of the cycle for all efficiency calculations. In many cases, this leads to a surprisingly different result from the results of conventional thermodynamics, that the efficiency of the cycle can exceed the Carnot limit. The efficiency values depend not only on temperatures and rotational speeds, but also on the material data.

The proposed new type of heat engine makes it possible to better utilise very small temperature differences and under certain conditions, in combination with an ideal heat pump, to extract ambient heat and convert it into mechanical energy.

The calculated results were presented for simple geometry and can easily be verified experimentally. In combination with an ideal heat pump, the proposed heat engine facilitates the surroundings to withdraw heat and convert it into mechanical work.

Keywords: Heat-mechanical energy conversion, efficiency, RS machine, Carnot

1. Introduction

In conventional thermodynamics, the maximum efficiency of heat engines can be fully specified by means of temperatures in the range of which the working cycle takes place. Carnot's theorem is the well-known formulation of this fact.

This article presents a whole new principle for converting heat into mechanical energy. The systems under consideration have an additional degree of freedom - the rotation around their own axis. The heat supplied can also partly be converted into the acceleration of the rotation of the system. This degree of freedom can take the energy from the surroundings and also put it back into the surroundings. Not only temperatures but also rotational states (rotational speeds) must therefore be taken into account in the description of the efficiency. We refer to the new type of heat engines proposed here as RS machines (machine operating on the basis of the rotating system).

With conventional heat engines, the thermal expansion or shrinkage of the working material (e.g. a gas) is directly converted into mechanical work. The new working

principle proposed here works differently. In the proposed concept, in the rotating systems the heat supply leads to the expansion of the working medium and thus to mass displacement in the direction of the rotational axis. This movement of the mass leads to a reduction of the inertia moment. This reduction results in the increase of the rotational frequency at a constant angular momentum and also an increase in the rotational energy. This phenomenon has long been used by ice skaters when performing pirouettes. However, the muscle work of the athletes causes a shift in mass. In an RS machine, the heat supplied is the cause of the mass shift.

The aim of the calculations carried out was to check whether this phenomenon was sufficient to increase efficiency beyond the Carnot limit. The functioning of the RS machine as described here allows the user - due to a partially selectable starting rotational frequency - to determine the amount of heat that can be converted to mechanical energy, at fixed working temperatures T_1 and T_2 .

The RS machines operate cyclically, each cycle has 4 phases. In phase 1, the system is operated at the ambient temperature T_1 and accelerated at the rotational speed ω_1 . In this phase, mechanical energy must be supplied to the system. In phase 2, the temperature of the working liquid is increased from T_1 to T_2 . To simplify our calculations, we have assumed that the necessary heat is supplied at a constant angular momentum. The rotational speed increases to ω_2 . In phase 3, the rotational energy is removed from the system at the constant temperature T_2 and the system is decelerated. In phase 4, the working liquid is cooled down to the T_1 temperature. The work medium could still work in phase 4, but we have not included this to simplify the calculations.

When the rotation in phase 1 is accelerated, only in the case of a compressible liquid, some of the energy supplied is consumed to compress the liquid. In the following calculations, we assume that when the rotation is decelerated in phase 3, the braking of the rotation leads to decompression and the decompression energy is converted into rotational energy.

2. Description of the geometry of the RS machine (simplest version)

The basic principle of an RS machine can be seen in figures 1-3. The main part of the machine is a hollow cylinder that is to rotate around its axis. The working fluid first has the T_1 temperature and is in a cylindrical shell in the rotation with the outer radius R_a and the internal radius R_{i1} (see Figure 1 and 2). The influence of gravitation on the geometry of the working fluid is not included.

In the container are at least two partition walls, which serve to ensure the rotation of the working medium together with the container. The partitions are mechanically fixed to the container. In addition, by pressure on the separating walls, the expanding liquid can change the rotational state of the system. The geometry described here has deliberately not been selected optimally! The article only intends to show that even with this simple and non-optimal design, higher efficiency values can be achieved than according to Carnot. The greatest advantage of this geometry is that the computational check can be performed very easily.

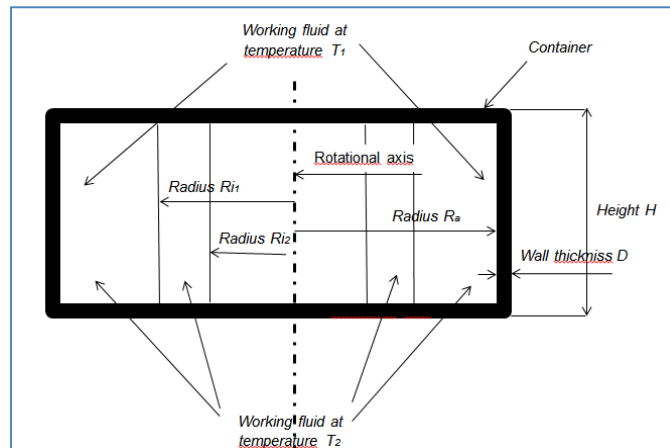


Fig. 1: RS machine, side view, perpendicular to the axis of rotation

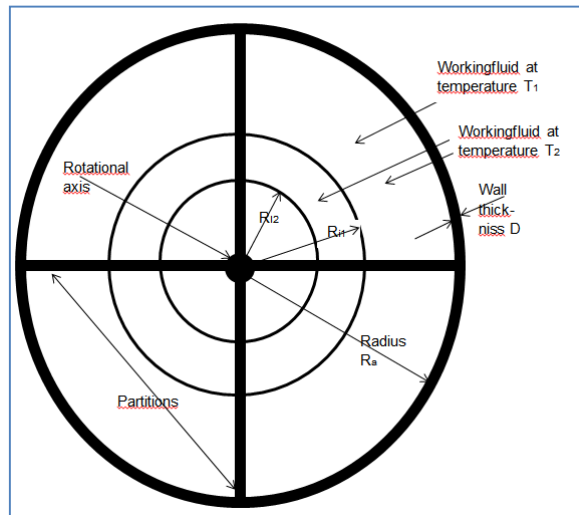


Fig. 2: Geometry of an RS machine, view from above, in the direction of the rotational axis

After heating to the temperature T_2 the liquid is in the cylinder with the outer radius R_a and in the inner radius R_{i2} . Because $T_2 > T_1$ (expansion in the direction of the axis of rotation), R_{i2} is also $< R_{i1}$. This results in the reduction of the moment of inertia. For all further considerations, we assume that with the temperature transition from T_1 to T_2 the container geometry remains virtually unchanged.

3. Basic formulas for the efficiency calculations of the RS machine.

Terms:

M_{flu} - Mass of the working medium

$\rho(P_1, T_1)$ - density of the liquid used at initial pressure P_1 and temperature T_1

C_{VFlu} - specific heat of the liquid
 H – Container height
 M_{Cont} - mass of the container
 ρ_{Cont} - density of the container material
 C_{VCont} - specific heat of the container material
 α - thermal expansion coefficient of the liquid
 P_1 - initial pressure, 100000N/m²
 Working fluid – diethyl ether
 The geometry terms are described in the figures 1-3.

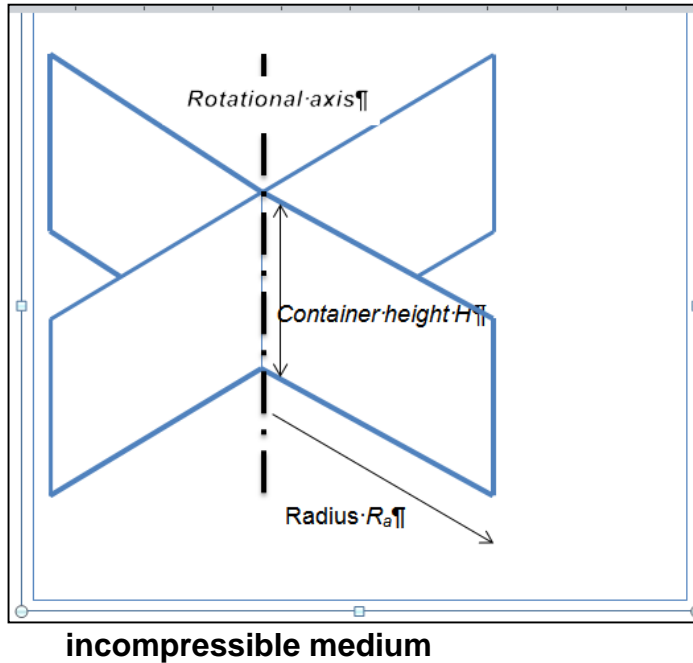


Fig. 3: Four partitions in the container of an RS machine

4. Efficiency calculation for the

At temperature T_1 and at pressure P_1 the following applies:

$$M_{Flu} = \pi * (Ra^2 - Ri_1^2) * H * \rho(P_1, T_1) \quad (1)$$

For incompressible media, we consider ρ as dependent on temperature only.

The M_{Flu} mass is located in the cylinder shell with the outer radius Ra and inner radius Ri_1 .

Mass M_{Flu} is equal to product volume (P_1, T_1) times the density (P_1, T_1)

At temperature T_2 the following applies:

$$M_{Flu} = \pi * (Ra^2 - Ri_2^2) * H * \rho(P_2, T_2) \quad (2)$$

The M_{Flu} mass is located in the cylinder shell with the outer radius Ra and inner radius Ri_2 .

From the equalisation of (1) and (2) the following applies:

$$Ri_2 = \sqrt{Ra^2 - (Ra^2 - Ri_1^2) * \frac{\rho(P_1, T_1)}{\rho(P_2, T_2)}}$$

(3)

Since $Ri^2 \geq 0$ must be, the temperature T_2 cannot be arbitrarily large for a given geometry. However, this limitation can be corrected by a small change in the geometry. For the moment of inertia of a cylinder shell with the outer radius R_a inner radius R_i , density ρ , and the height H , the following applies:

$$J(P, T) = \pi * (Ra^2 - Ri^2) * H * \rho(P, T) * \frac{(Ra^2 + Ri^2)}{2} \quad (4)$$

In which ρ is the material density of the liquid in the shell. The formula (4) is used with various parameters for the calculations of the moments of inertia of the working fluid and the container.

We refer to J_1 as the complete moment of inertia of the whole system at the beginning of phase 2 and J_2 at the end of phase 2.

$$J_1 = J_{1Flu} + J_{Cont} \quad (5)$$

$$J_2 = J_{2Flu} + J_{Cont} \quad (6)$$

Assumption: The moment of inertia of the container J_{Cont} remains virtually unchanged in the temperature range used.

The kinetic energy of rotation at the beginning of phase 2 is:

$$Ek_1 = J_1 * \frac{\omega_1^2}{2} \quad (7)$$

At the end of phase 2

$$Ek_2 = J_2 * \frac{\omega_2^2}{2} \quad (8)$$

Where $\omega = 2 * \pi * f$, f is the frequency of rotation.

For the angular momentum L the following applies:

At the beginning of phase 2

$$L_1 = J_1 * \omega_1 \quad (9)$$

At the end of phase 2

$$L_2 = J_2 * \omega_2 \quad (10)$$

Ideally, the loss of rotational moment during phase 2 is 0. In reality, there are losses in rotational momentum (eg due to friction). These losses can be represented by factor K_{red} . Then:

$$J_2 * \omega_2 = J_1 * \omega_1 * K_{red} \quad (11)$$

Where $K_{red} \leq 1$ (the loss of the angular momentum).

From the equation (11), the angular velocity ω_2 at the end of phase 2 can be calculated:

$$\omega_2 = \left(\frac{J_1}{J_2} \right) * \omega_1 * K_{red} \quad (12)$$

For the kinetic energies E_{kin1} and E_{kin2} the following applies:

$$E_{k_2} = E_{k_1} * \frac{J_1}{J_2} * K_{red}^2$$

$$(13)$$

When $J_1 * \omega_1^2 > J_2 * \omega_2^2$, then E_{k2} is also $> E_{k1}$. This means an increase of the rotational energy due to the heat supply.

In the course of phase 3, the system can provide the kinetic energy E_{k2} . In phase 4, the working liquid and the container are cooled from temperature T_2 to temperature T_1 . In order to simplify the calculations, at the end of phase 3 the remaining temperature difference between T_2 and T_1 are deliberately not used for the production of the work! Nevertheless, the achieved efficiency values can exceed Carnot's limit.

For the obtained mechanical energy ΔE_k the following applies:

$$\Delta E_k = E_{k2} - E_{k1} \tag{14}$$

From equations (7-14) the following applies:

$$\Delta E_k = \left(\frac{J_1}{J_2} \right) * E_{k1} \tag{15}$$

For incompressible working media, we assume $K = \text{const}$. The moment of inertia J_1 and J_2 are only dependent on temperatures T_1 and T_2 .

Equation (15) shows that the gained energy ΔE_k is proportional with the kinetic energy E_{k1} . As ω_1 and thereby also E_{k1} can be selected freely, the efficiency can be influenced at least in part (see figures 5-8 and tables 2-5). This is a new and the most important property of RS machine, which leads to the possibility to exceed the Carnot limit of efficiency.

5. Calculation of the efficiency η

The efficiency of the above-described working cycle η is defined as the work obtained in the cycle divided by the total amount of the heat supplied to the system.

The heat supplied must provide the following three tasks for incompressible working fluid) and four tasks for compressible liquid energy:

A1: Increase of the rotational energy by ΔE_k , see equation (15). The increase of the kinetical energy ΔE_k is the gained work in one working cycle (s later the phase 2).

A2: Heating the working fluid (see Eq. 16) and the container see eq. (17) from temperature T_1 to temperature T_2 .

For the required heat quantity, the following applies:

$$DQ_{Cont} = M_{Cont} * C_{VCont} * (T_2 - T_1) \tag{16}$$

$$DQ_{Flu} = M_{Flu} * C_{VFlu} * (T_2 - T_1) \tag{17}$$

A3: As a result of the thermal expansion, some of the working liquid is displaced in the direction of the axis of rotation.

The necessary work A_{transl} serves to overcome the centrifugal force. This work can be estimated from the following formula:

$$A_{transl} = M_{Flu} * \alpha * (T_2 - T_1) * (R_1 + R_2) \tag{18}$$

Where R_1 internal limit of the zone at temperature T_1 , R_2 internal limit at temperature T_2 and M_{Flu} is the mass of the working fluid in the zone (see Fig.12 and 2). For the calculation of the efficiency η we make the pessimistic assumption that A_{transl} can only be taken into account when calculating the heat supplied to the system. In our calculation, this work does not contribute to the energy that can be supplied by the system.

A4: For compressible fluids there is a 4th task. In phase 3 for isothermal deceleration of rotation, the heat must also supply the expansion energy of the compressible medium. This task is not applicable for incompressible working media.

For the efficiency η of the RS machine with incompressible working fluid the following applies:

$$(19)$$

Formulas (14) - (19) show that the efficiency η is dependent not only on the temperatures T_1 and T_2 , but also on the angular velocity ω or frequency F_1 as well as the material data. By the practical application of formulas (4) - (19), it can be easily shown (s. figure 4) for many combinations of ω , T_1 , and T_2 , that the efficiency η is greater than the Carnot limit. Because the gained energy ΔE_k and the work A_{transl} are quadratically dependent on frequency F_1 , converges with increasing frequency F_1 to a value that is less than 1, but can still be greater than Carnot's.

The real liquids are compressible. Formula (19) can therefore only be used for rough estimates of the efficiency values.

Formula (19) has to be modified for calculating the efficiency.

Our calculations for compressible fluids are based on the following formula:

$$\rho(P_2, T_2) = \rho(P_1, T_1) \frac{(1 + \kappa(P_2 - P_1))}{(1 + \alpha(T_2 - T_1))} \quad (20)$$

P_1, P_2 - different pressure values

T_1, T_2 - different temperatures

ρ - pressure and temperature dependent density

α - thermal expansion coefficient

κ - Compressibility coefficient

Assumption: The parameters α and κ are considered constant. Formula (20) can be seen as a substitute for the state equation of the liquid.

In order to calculate the location dependency of the density, we divided the total volume of the liquids into N sub-regions (cylinder shells) of the same mass. In our test examples it was found sufficient to take $N = 30$ and 40 radial zones, respectively. When the temperature or ω changes, only the boundaries between the subareas shift. Pressure in the radial zones is location-dependent and increases in the direction of the outer edge by the own weight of the liquid in the radial zone.

For the efficiency calculation the following applies:

$$\eta = \frac{E_{dekompr} - E_{kompr} + \Delta E_k}{\Delta E_k + DQ_{Kom} + DQ_{Els} + A_{rot} + E_{dekompr}} \quad (21)$$

Let us call E_{kompr} the necessary energy for the compression of the liquid in the phase 1 and as $E_{dekompr}$ the releasing energy in the expansion of the liquid in phase 3. In the counter of the fraction in equation (21) is the total energy that can be taken from the system in one cycle. In the denominator is the total heat required to be supplied to the system in one cycle.

Advantages of the RS machine:

- Efficiency is much better in many situations than according to Carnot
- Numerous designs and optimisation options are possible (e.g. geometry, material selection, rotational speed)
- Use of small temperature differences

- Regeneration possibility of the used heat reservoir by the heat supply from the environment
- In principle, a new energy source (as perpetuum mobile of 2nd type)
- A technically possible use of the water-ice anomaly. When freezing water, the water can only expand in the direction of the rotational axis.

Disadvantages of the RS machine:

- Very high rotational speeds are necessary (see figures 4 and 5), but possible in the context of today's technology.
- Isothermal acceleration (phase 1) and deceleration of the rotation (phase 3) may be very slow.
- Special materials recommended (maximum thermal expansion and low compressibility)
- Other operation than with conventional heat engines - isothermal acceleration of rotation at temperature T_1 (phase 1) and isothermal deceleration of the rotation at temperature T_2 in phase 3.
- Heat supply with an angular momentum as constant as possible (phase 2)
- In order to simplify the calculations, we assume that in phase 4 the working fluid is cooled from temperature T_2 to temperature T_1 without performing work.

Further development possibilities:

- The use of the phase change (liquid gas, solid phase gas)
- Use of residual heat at the end of phase 3
- Heating the working fluid without heating the whole container
- Optimising the geometry

6. Proposal for verifying the theory

The container with the working fluid must be accelerated at temperature T_1 to the angular velocity ω_1 . The necessary energy E_1 for this is measured. Then the system must be heated to temperature T_2 at a constant angular momentum. We call the heat necessary for this Q_2 . After this in phase 3, the rotation is completely decelerated to $\omega = 0$ at a constant temperature T_2 . The energy E_3 with drawn from this and the amount of Q_3 supplied is measured. The heat Q_2 and Q_3 should be obtained from a heat reservoir with the temperature T_2 . For test purposes only, the required amount of heat could be generated electrically or chemically directly in the system.

The efficiency can be determined from the measured data (see equation (22)).

$$\eta = \frac{E_3 - E_1}{Q_2 + Q_3} \quad (22)$$

The internal structure of the RS machine does not have to be known for measuring the efficiency!

7. Some computed results

Table 1: Common input data for all test calculations

Working fluid:	diethyl ether
Density:	738 kg m ³ at 273 degrees K.
Compressibility κ	1.84E-09 /GPa
Thermal expansion coefficient α	0.00162/deg K
Specific heat of the liquid Cv:	2310 J/(Kg. degree K)
Material of container:	aluminium
Density:	2700 Kg/m ³
Specific heat Cv _{cont}	896 J/(Kg . degree K)

Other data for the calculation: **Ra=0,5; H=0,4; D=0,015;**

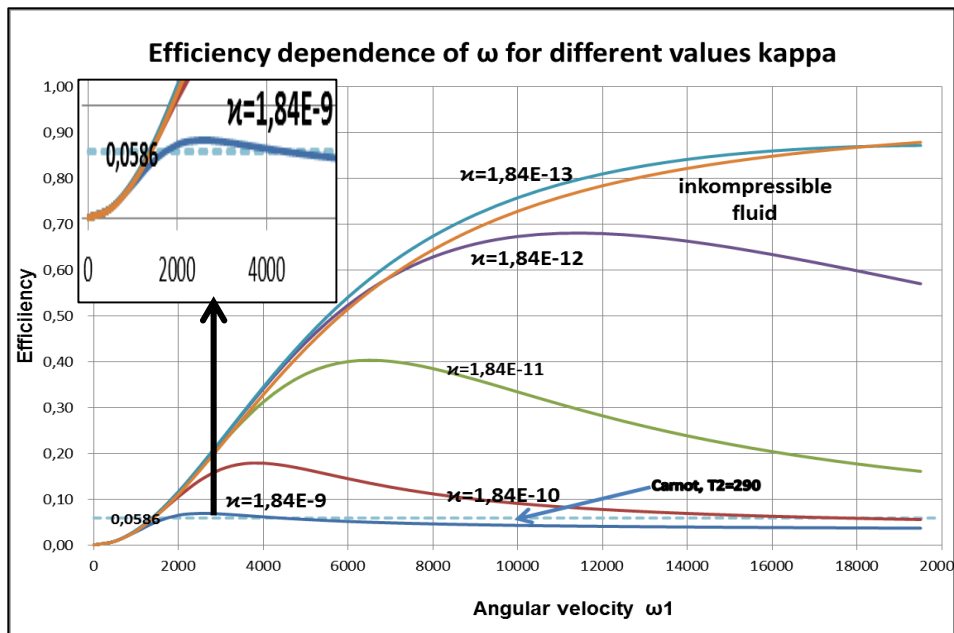


Fig 4: Efficiency dependence from ω_1 for various coefficients of compressibility and for incompressible fluid, $T_2=290$

Input data for calculation: $Ra=0,5$; $H=0,4$; $D=0,015$; $T_2=290$; various values of kappa

In Fig. 4 and 5 Carnot's limits were drawn as horizontal lines (horizontal means independent from ω_1). The maximum of the efficiency curve can be clearly above the Carnot's limits (e.g. for the temperatures $T_2 = 275$ and 290 K). For all ω_1 from interval [UGR, OGR], the calculated efficiency is greater than the Carnot's limit.

Table 2: Some important parameters of ω_1 -dependence curves of efficiency, from figure 5

Temperature T_2	320	300	290	275
Eta Carnot	0,146875	0,09	0,058621	0,007273
Eta RS machine max. value	0,11720	0,08758	0,06882	0,02296
Eta max at ω_1 approximately	4076	3100	2575	1275
Angular speed ω_1 , UGR	no solution	no solution	1700	475
Angular speed ω_1 , OGR	no solution	no solution	4400	5550

Input data for the calculation: $Ra=0,5$; $H=0,4$; $D=0,015$; $kappa=1,84E-09$

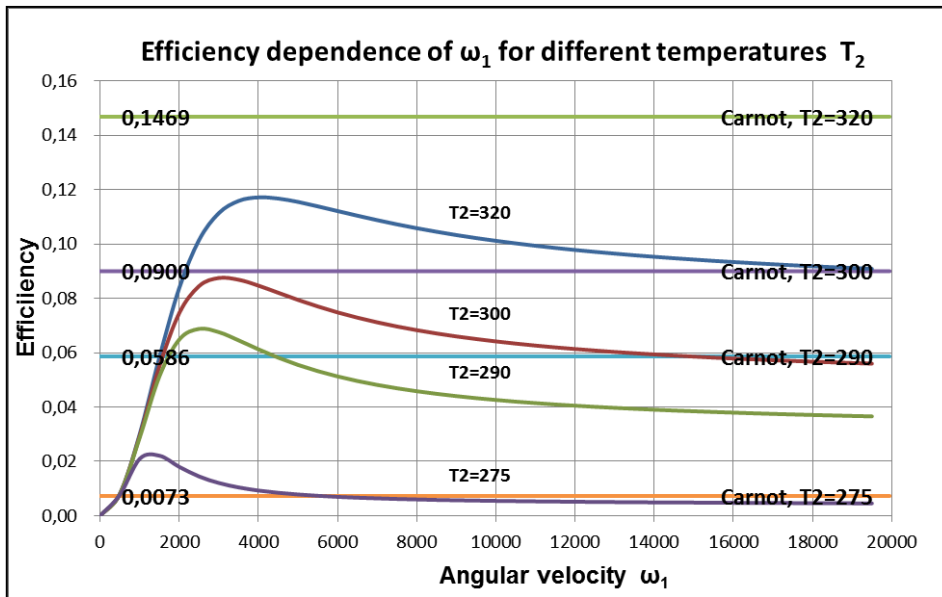


Fig 5: Efficiency dependence of ω_1 for different temperatures T_2 , comparison with Carnot's limit

Input data for the calculation: $Ra= 0,5m$; $H= 0,4m$; $D= 0,015m$; $Kappa= 1,84E-09$

Figures 4-5 show that the efficiency of an RS machine increases as a function of the angular velocity ω_1 up to a maximum value. Reducing it after achieving maximum efficiency is thereby explained because the difference $(E_{dekompr} - E_{kompr})$ increases in comparison to the energy growth in phase 2. For the increasing rotational frequency ω_1 , the RS machine is more similar to conventional heat engines in terms of efficiency.

At the temperature $T_2 = 320$ and $T_2=300$ K (s. the figure 5), the Carnot limit cannot be exceeded only by the change of ω_1 , at constant value of other selected parameters R_a , M_{Flu} , height H and wall thickness of the container D

Exceeding the Carnot's limit is easier at low temperature T_2 (at low Carnot's limit) than at higher temperature T_2 (see. figure 5).

8. Conclusion

What makes it possible to say that even heat engines with a better efficiency than Carnot are possible?

In the patent application, the basic principle of RS machine has been presented. The efficiency of this machine can be described through formulas, which are transparent, trivial, and comprehensible. It is an attempt to simulate the working cycle of the RS machine. The simulation of the processes in nature is now a standard tool in natural science and in technology.

The most important feature of this simulation is that the efficiency of the RS machine is explicitly dependent on the rotational speed ω . It is by no means possible to eliminate the parameter ω . The calculations carried out show that the calculated efficiency can clearly exceed the Carnot's limit in many situations.

In combination with an ideal heat pump, it is possible to extract heat from the surroundings and convert it into mechanical work.

9. Acknowledgement

I am particularly grateful to J. Pimiskern for many helpful discussions, for many interesting references to this topic, and for his help in the design of this publication.

10. References

- [1] Patent application DE 102011104914 A1
- [2] Kuchling, Horst: Taschenbuch der Physik, 20th Edition, Carl Hanser Verlag Leipzig 2011, ISBN 978-3-446-42457-9

Epilogue

As last words, allow us to quote from Phillips Brooks:

“Do not pray for easy lives. Pray to be stronger men. Do not pray for tasks equal to your powers. Pray for powers equal to your tasks. Then the doing of your work shall be no miracle, but you shall be the miracle.”

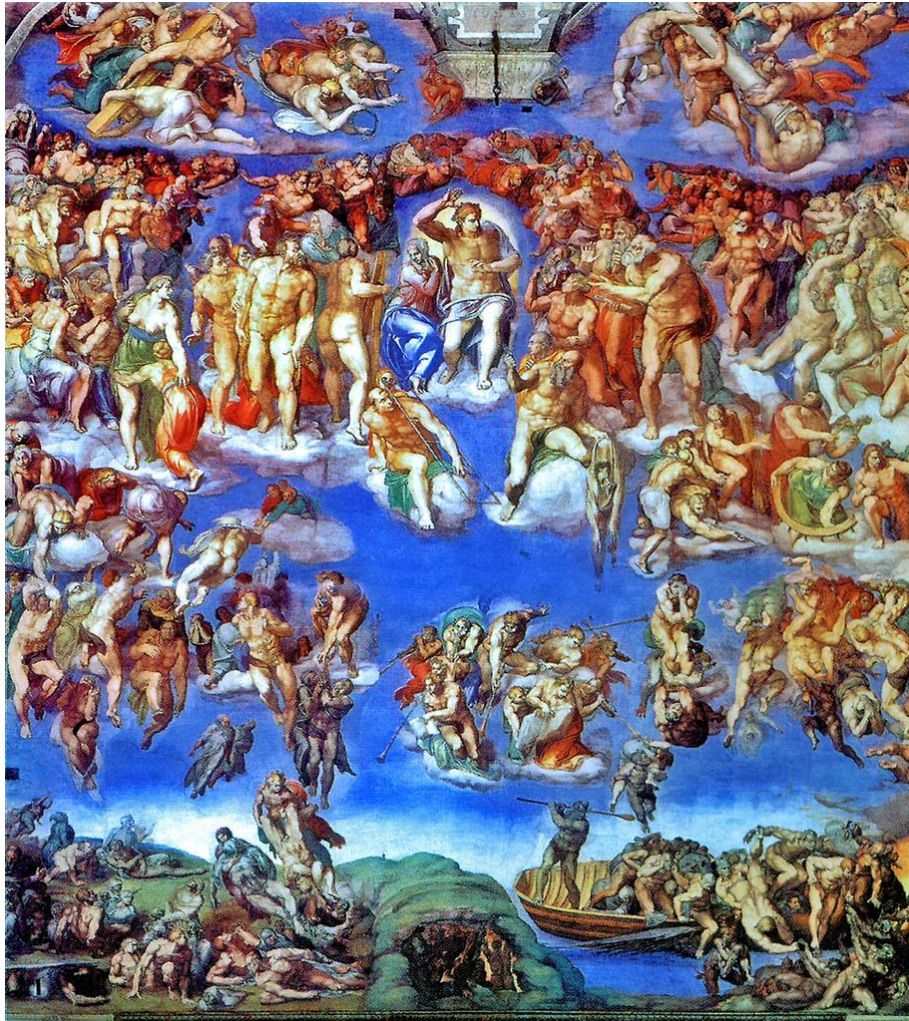
— Phillips Brooks

“Pray the largest prayers. You cannot think a prayer so large that God, in answering it, will not wish you had made it larger. Pray not for crutches but for wings.”

— Phillips Brooks¹

Therefore, only if we fill our life with love and care and the best efforts for mankind, then may be *—just a little may be—* we can stand without being ashamed before the Last Judgment.

¹ https://www.goodreads.com/author/quotes/232518.Phillips_Brooks



The Last Judgement is the name of the **fresco** located on the wall behind the altar of the **Sistine Chapel** in **Rome**. It was designed and realized by the Renaissance master **Michelangelo Buonarroti** between **1533** and **1541**.

It depicts the Second Coming of Christ as well as the final and eternal Judgement by God on all humanity according to the Christian religion. Altogether there are over **300 figures**, with nearly all the males and angels originally shown as nudes. Michelangelo's masterpiece was **inspired** by Dante's ***Divine Comedy***.¹

¹ <https://www.florenceinferno.com/the-last-judgement-michelangelo/>