To Understand The Universe: "Follow the Qi"!

Lucian M. Ionescu

July 17, 2023

Abstract

The role and importance of EM 4-vector potential extends beyond physics theory. It is conceptually connected with the concept of ether, biofield and qi.

Instead of finding an "umbrela theory", we would benefit more from understanding all this knowledge as a Network of Theories, with correspondences and translations, and implications ... This is reminiscent of Topos Theory.

At experimental and technological level, the Superconducting Quantum Computing area provides a valuable lesson.

At the other level of complex biological systems, the theory of chakras, meridians and acupuncture incites to find a common framework, in the sense of Cybernetics, enriched with Quantum Computing (Hardware and software).

An contribution to the EPR debate is included: time-sync needs supplemented by space-alignment.

In conclusion matter defines and "follows" the QI flow as a reference frame", in the spirit of General Relativity, but at a gauge theory connection level.

Preamble

$F = ma, F = dA$ and $E = h\nu, E = mc^2$ are emblemas of theories that led to Scientific Revolutions; yet a new era is (will be?) ushered by realizing that:

$$Quantum\ Information: \qquad QI = qi \qquad Chi.$$

The progress in classical computing and AI meets the exponential advancements in Quantum Computing, using Quantum Integrated Circuits (mesoscopic quantum systems) at low temperature; together not only we will understand what life and biological systems are, but will be able to compete with "Nature" ...

The present article-compilation-essay is an attempt to bring together the pieces of a larger puzzle (fundamental and complex, micro and macroscopic), and suggest some ways to connect them.

1 Introduction

Modern Sciences show a convergence tendency in recognizing the importance of EM in Physics, Biology, Medicine and Sociology, with initially basic concepts named and modeled differently, now unified via correspondences showing their equivalence: scalar and magnetic vector potential corresponds to life force (chi / prana), with an abstract model as Quantum Information.

This is demonstrated by the progress in QC, especially via Superconducting QC Technology (SQC).

In what follows, the bridges between various theories will provide useful lessons to be learned and applied, translating knowledge from one Science to another, similar to commerce between countries as traditional units, initially separated by language and specific activities.

1.1 From High Energy Physics to Low Temperature Physics

After breaking down matter to pieces and modeling (separatetly) different classes of observed events, we started to see a parallel between quantum phenomena at high energies and those at low energies: quantum hall effect, supraconductivity (a version of Higgs mechanism) etc.

Currently, the "missing link" is provided by implementations of Quantum Computers in superconductivity regime, based on Josephson junction. This is a "mezoscale" domain for quantum phenomena that allows to control that we understand what is going on in the quantum realm, by checking that we can reproduce it; not just experimenting: building it!

The importance of EM was known since the presence of the vector potential is already a quantum aspect. We will explain how our metric models (Riemannian) and geodesics (suited for bosons) is a "shadow" of the $U(1)$-gauge theory of EM with its "electric geodesics (suited for fermions).

1.2 Classical Physics evolved into Quantum Physics

It also prompts to reconsider how quantization is done. The winding road of Quantization (after QM was "imposed" as a framework for studying Complex Systems - graphs vs. functions) started naturally with quantization of Newtonian (Particle) Mechanics, since Maxwell's equations were too difficult to handle, in the beginning (even not well understood in themselves). After the QED and QFT era, quantizing the fields and formulating gauge theories based on symmetries, we finally started to design a "quantum theory from scratch", but taking advantage of the theory of electric circuits from a quantum perspective (lump elements represent a discretization to be scaled down) [1].

This trend goes in parallel with the technology for building quantum computers based on superconductivity (see later on).

...

- Etc. - main point: chi flow rules matter, radiation & biology & Medicine, sociology (TBD); - The "divide": LAB Galilean Time vs. Einstein's Rel. Time, which predated QM, so it was not clear that it is ess. Q-Phase. Also predated GT so "align space" was not considered . . .

1.3 What is Syperconductivity

- Supercond. Vacuum Theory . . . etc. - Geodesics: neutral (=¿ metric) vs. electric particles (connection);

- Is ¡¿ a torsion? $\nabla^-\nabla^+$?

- Physics, Biology, Med, ancient and modern science altogether converge towards a unification: EM vec. pot. = chi ; QC and AI + robotics and growing tissues in vitro =¿ we may fabricate "Adam" rather than resuscitate Frankenstein...

1.3.1 The Kayak Model of Superconductivity

Electrons in a turbulent magnetic field (B is the total local average over quantum domains), exhibit radiation (photons) interaction with the nuclear lattice of a solid - hence heat etc.

Meissner effect is a result of streamlined A-flow (qi) with no magnetic field (intensity) B, which due to conservation is pushed out of the SC domain, as if it would be an obstacle for the B-flow. Then e motion is streamlined.

1.3.2 ... and local time

And not only the A-flow is streamlined but also the electric potential is constant, with local relativistic (Minkowski) time proportional to the quantum phase:

$$\oint_C \phi dt - A dr = \phi T - e/h\Delta\theta.$$

1.3.3 ... and Cooper pairs

But in order to have it completely "A-linear" (follow the A-integral lines) its own magnetic field responsible for spin $s = eB$ needs pairs of antiparallel spin electrons to couple, resulting in a zero B-field for the pair of electrons (like coupling two N/S "curved" magnets in a loop). The coupling of the two electrons is similar to the occupation of an orbital with two anti-parallel spin electrons in an atom (e.g. a complete s-orbital). The interaction between the two electrons is of magnetic origin (not "phonons"). Then the pair has "bosonic privileges", like a BEC.

1.3.4 What about quarks?

Why two quarks can't be viewed as a boson, forming a BEC?

For mesons, a quark-antiquark pair is similar to a Cooper pair, except at the level of "Space" ($SU(2)$ generator: R,G or B, with the corresponding quark field of EM type!).

For a baryon, from the three RGB $SU(2)$ generators that define the corresponding $U(1)$-quark field, two may have anti-parallel spins (spin 1/2 baryon octet) and close some field lines ... Is it like an SC ring through the baryon core?

1.3.5 What is resistance?

In essence: the KINETIC billiard that slows electrons is due to A-vortices (B-field) which cause radiation (interact. with atoms / inner electronic shells of the solid / metal etc.); totally similar to a kayak on Colorado river, down AND up (pot. barriers which need voltage: E-field to provide work)

1.3.6 The "kayak analogy"

Hence the "kayaking" of an electron pulled by voltage through "rocks" (ions of the solid) and EM vortices (periferal orbitals will generate "radiation", i.e. interactions with the ions electronic shells and the conservation of generalized momentum will imply a diminishing of its kinetic energy [1]. The photonic interactions result in a rise of the temperature of the ionic lattice and radiation outside, perceived (measured) as heat.

1.3.7 Photons or Phonons?

A perhaps simpler model is to consider phonons (quasi-particles) instead of the fundamental electron-photon formalism. At what threshold of distance between sites and electron there is no actual photon, which implies radiation, EM propagation through "free space" and absorption, and there is just an EM compression similar to sound waves (phonons), is a technical, yet relevant issue for computational aspects.

In fact at high frequencies, the electronic orbitals may just deform and oscilate, with no actual *free electric current*, and only displacement current being dominant:

$$Maxwell - Heaviside\ Variables:\ D = E - P, H = B + M.$$

hence modeling the exchange of energy via phonons.

### 1.3.8 What are Cooper Pairs? Another analogy ...

The conduction electrons originate, or al least are similar to valence electrons in molecules (micro-systems / cell units, when compared with solid state [2].

The affinity of electrons to couple as a pair of opposite spins, implies a high degree of order, compared with the usual temperatures, where spins from totally random directions maybe polarized by an ambient magnetic field.

But in the absence of such a control device" (magnetic field), the spin direction just characterises a helicity" / procession of the electrons in relative motion, similar to the procession in orbitals (think of their winding trajectory as parts of orbitals, swinging by several ions of the solid lattice, like a pin-ball game" (analog of cosmic slingshot of a probe in gravitational pull of the planetary system):

---

[1] I learned that Feynman would close his eyes and visualize; Farady also visualize etc. But then Maxwell came and formalized the phisics; unfortunately we focus on the mathematics and forget the visualization ...

[2] ... where they are aligned as in the army; or marching band as "bunching" with the same momentum
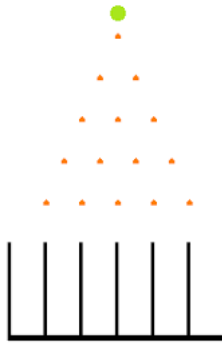
1.3.9 What is Electron's Spin?

The correct approach is: Will we benefit from a complex, structured (Mathematically and conceptually) model of the electron, or we should keep this simple, pointwise, as infered from strong measurements?"

Electron spin is of magnetic origin (there is a fluxon involved, hence there is a need for a model of the electron with a structure, to cover the various instances: orbitals, bonds and conduction, helicity etc.) and interacts with the ambient EM vector potential (the EM geodesic").

1.3.10 "Trust the Force Luke"

Now when SC-state is achieved, freezing, or rather reducing the external interactions bellow the coupling energy between mechanic motion and EM flow ($P = mv + eA$)[3], the mechanic geodesics" governed by macroscopic metric coincide with the EM connection geodesics (A-flow streamlines), and the electrons fall free" (or phonons at higher frequencies) orthogonal to the constant quantum phase (quantum equipotential") surfaces, which means they are (vibrating") in sync, with no destructive interference[4]. [5]

1.3.11 How to Calm-down" the Magnetic Vortexes?

The room-temperature SC is achievable, as demonstrated by the special abilities of some of us (meditation Guru's): control of the coherence of our aura, mind etc.

So, since we cannot achieve a strong guardian chi" barrier for a inert material"[6], the best we can do is to align the nuclear spins as much as possible, to achieve a SC Space between sites, within a material.

Controlling the nuclear spin is also the way to build G-polarized materials, with applications to 3D-transportation on Earth.

1.3.12 Dynamic Nuclear Orientation and Superconductivity

The idea is not to start with a chaotic spin distribution and hope by lowering the temperature to get to the point where there is a natural alignment of spin directions, but rather proactively create such a state in materials with hysteresis at the level of nuclear spin.

Recall that this is also a problem for achieving cold fusion, and it may depend on our ability to achieve spin-geometry isomers of isotopes of some chemical substances (see spin-glass etc.).

---

[3]Sort of a surfing / roller coaster, not bumping carts game ...

[4]Compare with Bohm's Theory and the Implicate Order, a revival of Plato's viewpoint vs. Democrit's, QC (al least local, when particles are entangled) or present in holography / holograms and many more physical phenomena, micro or macro etc.

[5]Unfortunately the term force" is reserved since Newton's Mechanics, and it's not about brute force", but a rather opposite: relax and have $curl(A) = 0$, even $div(\varphi) = 0$, i.e. no bulking and diverging" quantum time lines.

[6]... or can we?

1.3.13 Nuclear Engineering and Spintronics

Hence Nuclear Engineering would be the science of controlling spin and fabricating materials with prescribed spin geometries and statistics (enriching, polarizing etc., analog to the industry of magnets: neodymium etc.)

1.4 On Preferred Frame Theory

The Prefered Frame Theory is an alternative theory to Special Relativity Theory, based on a critique of the synchronication prescription, with an alternative prescription using LASErs leading to Tanglieri Transformations etc.

Of course the main point is not that we can synchronize in various ways the clocks of a reference system (it's subject to a a $U(1)$-gauge function - see [10]), but that Einstein use of EM leads to correct transformations: Lorentz transformations correspond to conformal transformation viewed as Mobius transformations of the Bloch sphere (QC / spinorial formalism).

But then, is there an ether? and hence a "Preferred Frame"?

Yes, "matter", composed of interacting baryon nodes, defines a local / micro-connection via the RGB A-flows, which corresponds to a Cartan Moving Frame geometry (tetrad / telleparalelism theory of Einstein etc.).

This *is* a "Preferred Frame" attached to the matter structure. If the phase is liquid or gas, then obviously such a frame is much more complicated, not "linear", with curvature (B-field) etc.

But it turns out that the "dragging theory of the ether" had some intuition behind ... Analyzing Michelson-Morley experiment is more elusive than investigating the quantum Hall effect and SC at low temperature.

Then, in between the baryon nodes of the ion lattice, there is a "vacuum", full of EM energy, which becomes SC at low temperature, compatible with SC vacuum Theory.

Then, how far apart the baryons can be for these considerations to hold? Planetary size distances? Since Quantum Physics is conformal (QC / MT), we expect that the "distance does not matter": qualitatively the same phenomena will take place.

Hence "ether", qi flow or EM vector potential of the three quarks define a "Space-flow" with local curvature (magnetic fields) at normal temperatures: the Ether Flow.

1.5 Quantum Network Approach

The Quantum Network model provides a better quantum description, that balances the mechanic aspects and EM "internal" aspects of energy and momentum: $P = mv + eA$.

For an intro to Quantum Network Theory, see Yurke & Decker [5] and Wikipedia: Quantum Network.

The Network Model is mandated by a "holistic approach to Quantum Physics" [26].

2 The Story of Quantization

After QM provided the general framework for modeling complex systems, I/O Network models based (matrices and the S-matrix Theory as a "preview" of QC), the need to "upgrade" classical Physics led to the method of quantization: from commutative / functions and DE based mathematics, to non-commutative, operator based framework.

"Quantizing" continuous models started, as expected with Newtonian Mechanics (particle dynamics). Followed by QFT quantizing Maxwell's framework for field theory led to the SM.

But "practice" showed a different "truth": engineers are building Quantum Computers by *rescaling Electric Circuits* (Electronics). The modern leading technology for QC is based on *Quantum Integrating Circuits* functioning at low temperatures [1].

The advantage (importance) is that it mimics matter interactions in Superconducting Vacuum, blending quantum phenomena at mesoscopic level with classical control and measurement: the emergent "reality that we observe".

This approach will allow to "see" the Quantum Network around us, while still placing it in the context of man-made environment that suggests Space-Time (an illusion, yet a persistent one![7]).

2.1 Metric vs. Geometric Connection Approach

Euclid's Geometry, as a paradigm for modeling Space at least, is based on the fact that most matter particles are *almost* neutral, hence "almost" follow light geodesics, if it were not for Gravity to bend trajectories [8]

The "true geodesic", i.e. for particles *with electric charge* is observed in conditions of superconductivity (no turbulent motion, with vector potential streamlines as connection geodesics).

Recall that the magnetic field B is not a Newtonian force, but a geometric force, akin to centripetal or Coriolis force; what it describes is the curvature of the vector potential lines of flow (not force), with their orthogonal equipotential surfaces of constant (periodic) quantum time, modeled as quantum phase (Each particle comes with an "Einstein clock" for its "reference frame", per the intuitive interpretation given by Feynman [10]).

Recall also that a change of gauge $A \mapsto A + df$ is just a local change of such a proper quantum time, by changing the "origine" of the quantum phase; differences are not affected: $\Delta\theta = (h/e) \boxed{+} A dr$. It is just an extension of redefining "time" according to the geographic meridian (GMT, CST, PST etc.). The use of EM waves to sync locally (in a local chart, without matter that can define a non-trivial topology of the connection's monodromy), is in essence the idea originating with Einstein, and, in the author's opinion, the central idea and contribution of Special Relativity (as an "umbrella" unifying many other already existing facts, Lorentz transformations, and other concepts etc.).

2.2 Quantum Information Technology

It is instructive to see how quantization can benefit from the progress in the technology of building Quantum Computers in super-conductibility regime [3, 2, 1, 4] (and LC / Josephson elements), to better understand that "size is not the reason we don't experience macroscopic quantum phenomena ... rather it is because of separation and focus on a mechanistic point of view (position and number of parts etc.).

While Space and Time can be obtained as emergent from a Gauge Theory formalism (SM) [7, 10] the "ultimate" understanding what nucleons are "made off" (and electrons) remains a pertinent, philosophical question: "Is our Universe a simulation on a Quantum Super Computer?" ... which can be turned into a practical one: "Can We simulate our Universe as a QSC?"

3   The Multi-facets of Qi

There are deep connections between EM vector potential, ether, qi and life-force, with further sub-ramifications, with a common basis: QI (quantum information theory).

In order to see the connections, one has to agree to adopt the Network Model for modeling subsystems in interactions, as part of a I/O-system (Quantum Turing Machine).

3.1 The Fundamental Language

QC basic language of qubits and quantum gates is general enough (universal) to model any process that involves creation and annihilation of states. It is based on quantum logic, the foundations of QM (Birkhoff and von Newmann).

It also formalizes the idea of *tao* of anccient chines philosophy.

Measurement reduces structure to a list of outcomes (basis), on which classical understanding and logic is based.

The "problem" is how to relate the abstract QC with EPP; the development of superconducting QC and quantum software provides an answer in this direction.

---

[7]Paraphrasing Einstein ...

[8]yet neutrons have an electric charge structure and spin polarization leads to Gravity as a weak correction to "mass zero geodescis".

3.2 Quantum Information is qi: How can we prove it?

Progress in biology and medicine have shown the importance of biofield, as a macroscopic network of the same type as orbitals and entanglement 'bridges".

This makes EM as a $U(1)$-gauge theory a primary math-physics framework, provided topology is involved via the concept of Network.

The identification of the vector potential and its magnetic flow (fluxon as a quantum) can be evaluated via its capability to explain apparently different phenomena. Otherwise, there is no "proof"; only a practical benefit.

3.3 On Chinese Acupuncture

It is instructive to compare the ancient chinese accupuncture view of a human with a technological counterpart, e.g. electronic circuit or Quantum Integrated Circuit (e.g. based on superconducting elements L, C and Josephsom junction), while keeping in mind that these are just hardware components to build PCs and Q-Computers with many other subsystems for a full functionality (to operate like a Quantum Turing Machine on its environment).

Below we will only hint at some points, and let the reader "connect them" ... A more in-depth study of the relations between these aspects would be of significant value.

3.3.1 The Phantom leaf effect

Chirilian photography led to the theory of Morphogenetic fields of Rupert Sheldrake: qi flow, biofields, QI channels and programs.
  • The "phantom (limb) effect":
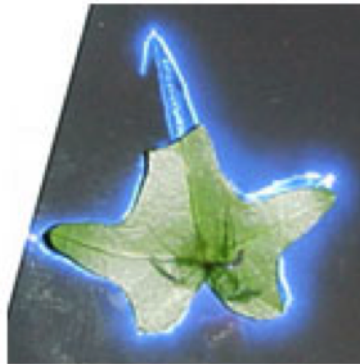
This went a long way from baker's "Body Electric" remarkable book.
  • The energetic matrix: it was reported that when a plant germinates, a biofield of the mature plant can be photographed.

3.3.2 Bong-Han Theory of Primary Vascular System

The support of the energetic meridian system has been identified, and called *primary vascular system* [11, 12].
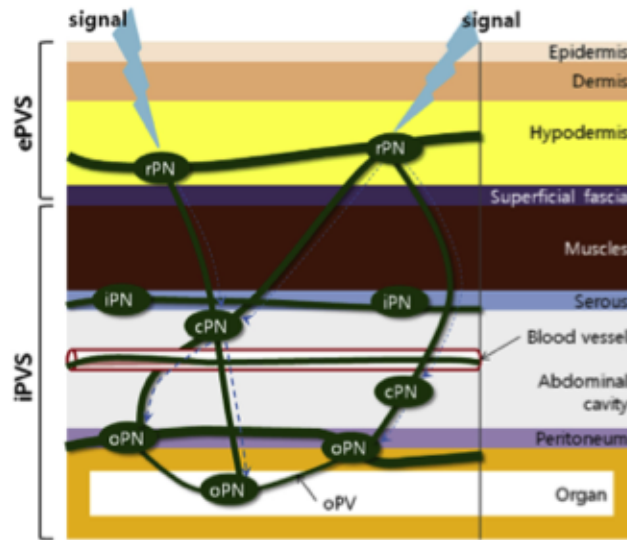
Figure 3   Topographical distribution of the primo vascular system.

This was described as (compared with) an optical network conducting biophotons (a.k.a quantum information), among other key materials (DNA etc. see / Google for references).

3.3.3   Biophotons carry information

Communication within and inter-organisms via biophotons has been experimentally demonstrated (biophotons studies: A. Gurwitsch [13], bacterial biophotons and viral infections etc.).

The experiments studying biophotonic activity and contamination via such photons, show / suggest that they carry quantum information, in a complex quantum digital form, which affects life functioning (analogy: Wifi, firewall, cyber-virus etc.)

3.3.4   ... and electro-photonic channels

In a previous works the Network Model includes unification of gauge bosons (e.g. photons) and fermionic channels (e.g. chemical bonds, entanglement "wormholes", 2-slit experiment 2-punctured torus electronic channel etc.). The transient aspect of formation of such network structures can be seen in other experiments, e.g. Baron Von Reichenbach's experiments on *odic force* and more recently by Wilhelm Reich on *orgone* [14, 15].

Reichenbach experimentally determined properties of the odic force (a dynamic version of orgone), its magnetic origin and speed of propagation (formation of channels). How to enhance one's aura and stimulate qi flow were more recently studied and documented by several researchers, e.g. [15].

The topic is classified as pseudo-science since it is not systematically studied, nor the theories well correlated with mainstream science (EM, SM, medicine).

3.3.5   A Common Foundation: EM

Yet considered overall as a body of knowledge yet to be organised on solid foundations, it suggests a common trend: EM vector potential (e.g. $U(1)$-gauge theory framework) as a common origin, in a Network Model framework adding the topological aspects which are crucial for resonance at micro and macro scale (emission, reception, specific channels of communication and frequencies as "signatures": "Quantum Wifi" etc.).

3.3.6   "My space"

We've heard this a few times ... The aura of animals, plants etc. is an extension of the EM network (not just "fields") of a body. It was also called "animal magnetism" etc.

It is a macroscopic manifestation and analog of chemical bonds and less permanent electro-photonic channels (think the fog at the surface of a hot bath; the more life in the body, the more extended and powerful the aura).

3.4   Bio Quantum Computing

The current hardware solution of QC use Quantum Integrated Circuits in superconductivity regime (l, C and Josephson junction: [17]).

When we compare with a human as a cibernetic system, we see the capabilities and the complexity of the solution to implement a *self-maintenance, highly-adaptative, pre-programmed, multi-functional Quantum Information and Action System* ...

3.4.1   What is Conscience?

We have three brains (reptilian, emotional and rational / cortex) which provide a good solution for a system to be successful in "nature and society"; note that this "conscience" is largely acquired through education, living experience etc. although it is originally connected to the emotional system and "pure initially".

3.4.2   The Emotional System

The "energetic body" of a human (or other living system) is in fact a quantum information system based on EM theory as described above[9]. It is known experimentally and theoretically since antiquity, as the system of chakras and meridians, through which qi flows and accumulates:
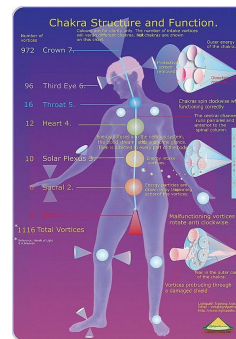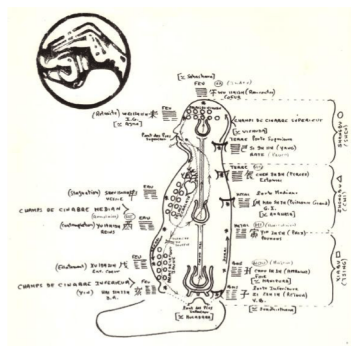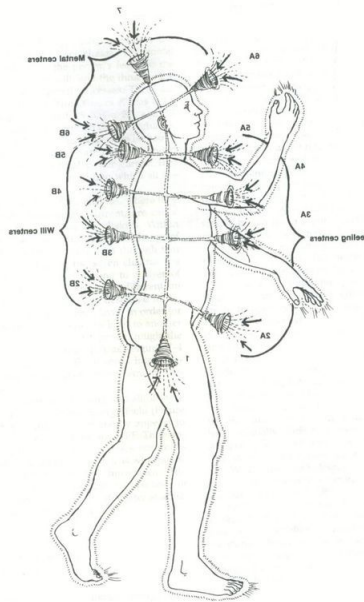

3.4.3   The Chakras

Chakras are "pools" of magnetic flow (circulation of vector potential), producing a magnetic flux, and connected by meridians as channels. On each meridian there are many "control points" as gates, having also the role of access / interaction points (acupuncture points)[10].

Such rotating quantized magnetic flow [11] produces a magnetic flux ($B = \nabla A$), represented as funnels opening out; hence the name "chakra", meaning "rotating wheels of energy".

---

[9] Experiments demonstrate even cold fusion in biological systems, is possible.

[10] They may have role of intake when needed, or release of excess qi.

[11] The modes correspond to specific resonant frequencies.

3.4.4 The Meridian System

The primary vascular system plays a role of "optic fibers" and channels for transfer of other resources.

The Chakra System is connected with major organs that have a role in their functioning and as a control system of the organism.

It is interesting to establish a parallel with the much better understood systems that we can build successfully (electronic, informational, classic and quantum, robotic etc.).

3.4.5 AI: from Classic to Quantum

The question is how to design an analog of the *chakra system*, including the system of meridians, when moving from classic AI to quantum AI ...

This is an essential part of the *control system* of us as cybernetic systems, which amazingly ancient Chinese medicine new how it works and how to repair it (where did they get that knowledge?).

3.4.6 The Subconscient ...

This is a common network, if we follow Carl Jung, and has "input" from various sources; different opinions, debatable, but with a common trend: there is more to reality "than meets the eyes" (or our instrucments).

Note that Science is highly technologically oriented: we don't want our PC to have "moods" and "maybe it works today ...". But para-science studies are needed and unavoidably it will involve "us" as a measuring, processing and reporting, instrument.

3.5 Health: from Tesla to Alternative Medicine

Tesla studied aspects related to EM beyond the usually recognized achievements: cold electricity, longitudinal Waves and wireless transmission of energy etc.

Such aspects involving qi / EM potential are nowadays used in alternative medicine, and maybe thought of as "Q-flow amplifiers/stimulators".

The use of technology aims to replace old practices (qi-kung, tai-chi, Reiki etc.), e.g."rotating the dantien" in qi-kung (or chi gong, translates as "life-energy work / practice").

Note that it is more than "energy"; it is rather the inner (internal states) component of generalized momentum $P = mv + eA$.

3.5.1 Chakra System and Acupuncture

Acupuncture is concerned with the balancing of qi flow in chakras, qi-pools by redistributing qi flow through circulation via the meridian system. The placement of special needles at acupuncture points, for instance, play also the role of "antenas" [12]

3.6 The Chinese 5 Phases Theory: A Cybernetic Approach

These considerations are a result of reinterpreting Traditional Chinese Medicine techniques and theory, based on the general philosophy emerging from the previous work of the author. As a source for the technical info a textbook on TCM was used [18].

Our goal is to better understand the method of supplementing or draining meridians corresponding to organs affected by diseases[13].

3.6.1 What is a "diseasses"?

As a generic term, disease refers to the result of poor functioning of the organism overall, which includes simple "malfunction", but quite often followed by an "invasion" of external factors (biological etc.) leading to a lack of autonomy and control in the original direction, of a "healthy organism" (system of organs, constituting a "whole" etc.).

3.6.2 Excerpts of the Main Points

We include a brief summary of some of the main points f the method, for further discussions (TBA).

The main stumbling block is the traditional (archaic?) terminology, difficult to relate with modern terminology regarding cybernetic quantum information systems. The general "feeling" is that there is an analogy with traditional electronic circuits, which can then gain from a comparison with the theory of Quantum Integrated Circuits using superconductivity, as in modern Quantum Computers (hardware and software).

The main goal is to gradually bridge the gap between terminology: qi and qubits (phase qubits, charge qubits etc.; see superconducting quantum computing and the related considerations in this article), ancient knowledge and modern.

Basic Terminology. Qi flow in meridians and interactions between organs via meridians are modeled using the 5-Phases Diagram (*engendering cycle* and *control cycle*).

• Yin-Yang (ancient concept for qubit, as a superposition of opposites / polarities) *coupled organs* correspond to *nodes*; e.g. WOOD: *Yin organ* is liver, with meridian LV; *Yang organ* is gallbladder, with meridian GB.

• The *transporting points* on each meridian are ordered cyclically using the same "5-elements" order. The "phase point" of a "phase" is the first point in the table of transporting points; e.g. for a liver disease, the "Wood" point of wood is LV2, because Wood refers to liver (Yin organ), and the "wood point" on its meridian is LV-1 (see table "Five Transporting-shu Points – Yin Channels p.41, [18]).

• "Mather-child" relationship may refer to "phases" (Yin/Yang organs) of the engendering cycle, or control cycle, or to "points", e.g. transporting points ordering.

Diseases (due to imbalance). Our main first goal is to understand how repletion or depletion imbalance between meridians (in whatever way determined via diagnosis), is treated by draining or supplementing appropriate meridians, using certain acupuncture points (acupoints). The second goal, is to implement an amplification method to "cure" *generic depletion*: "old age", by using the electronic flow – qi flow analogy, and the above examples analyzed from the point of view of electronics and cybernetics (methods used in alternative medicine).

Supplementing or *draining acupuncture points* (Pair of Points), is Very sensitive to practitioner's technique.

Types of Treatments.

---

[12]It is much more than this, and research into these aspects is needed.

[13]This should not be taken as advise or part of Medicine, Health etc., but rather as an *exploratory "brainstorming session"*, to stimulate research into the subject.

- Prevent "illness" from spreading from the affected channel

- Balance one channel, two channels (if "illness spread") or coupled channels.

- Example 1 – Treating liver repletion:

  Goal: Prevent repletion from changing and spreading Method: supplement the channel of the controlled organ, then drain the replete channel of the affected organ. Liver -¿ Wood, controls Earth -¿ Spleen (+2 node in the 5-elements cycle); therefore:

  1) Supplement the phases' own point, the "Earth point of Earth", i.e. Yin channel transporting point SP-3; then, supplement its "Mother point" (next to Earth is Fire; so, the Fire Transporting Point) SP-2;

  2) Drain the "Wood point of Wood" (the phases own transporting point), i.e. LV-1; then drain its "Child point" (next to Wood is Fire; the Fire Transporting Point of Liver) LV-2.

- Example 2 – When two consecutive channels are affected (Mother-Child p.137)

- Example 3 – When coupled organs are affected (Yin/Yang pair: Brother-Sister p.137)

  2-Points Methods To supplement a depleted channel, for example, as part of one of the treatments enumerated earlier (prevent spreading, 1-channel or 2-channels affected):

  A) Choose the "phase point" (Transporting-shu Points Table) as a "grounding point" on the affected channel;

  B) Supplement the "Mother point" of the above phase point on the "Mother channel" of the affected channel. Example – Supplementing a depleted Lung (Phase: Metal)

  A) "Grounding point": "Child point of Metal" on Lung's T-shu Points Cycle, i.e. LU-9

  B) Supplement "Child point of Metal", i.e. Earth (same "differential" on the cycle) of the "Mother Phase" meridian (engendering cycle), i.e. Spleen; this is SP-3.

- Korean 4-Point Method A monk improved the technique. A table of "solutions" was produced.

- Chinese 6-Point Method - More points are used.

- Nan Jing Point Selection: Defines some general principles, but practice seems to come first (experimenting), and then "justifying" intuitively or just for mnemonic purposes (to be easier to teach and learn, perhaps).

Disclaimer. The above "samples" of terminology, concepts, relations and operations are for exemplification only; for a detailed explanation see the textbook [18].

3.6.3   Partial Conclusions

The terminology and practice reflects a structure and dynamics of the chakras and meridean system, that would benefit from a "translation" into modern language and models (Networks, electric and electronic circuits, Kirshoff Laws and Maxwel's Methods etc.).

3.7   From Electronic to Infotronics

In order to understand the motivation and effectiveness of acupuncture, towards a scientific framework and theory, we will speculate via an analogy with electronic circuits theory.

3.7.1   Amplifiers: how they work

Electronic Amplifiers rely on the transmission dichotomy *carrier* modulated by a *signal* (via amplitude control).
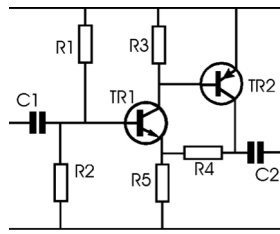
One should compare this with the quantum interactions / transmissions paradigm: "probability" amplitude $Pe^{i\omega t}$.

The term "probability" has a historical origin in *Copenhagen interpretation* of QM, which is used in for pedagogical purposes, in combination with the Schrodinger Wave Mechanics, as "classical theory friendly".

3.7.2 Modern QM

Instead, the modern approach, growing in scope together with Quantum Computing (soft and hardware), is that of Heisenberg's Matrix Mechanics [20], which is a very early QC formulation, before Classical Computing was well established.

Now the essence of quantum phenomena is *quantum feedback* of the QI in that process via a loop, with several benefits: 1) constructive or destructive interference (amplification or filtering); 2) resonance: discrete spectrum; 3) Adaptive Network capabilities (change of topology is a huge leap in modeling from the Space-Time Action Principle of Classical Physics).

An example of macro quantum loop is an interferometer based on a beam splitter, e.g. a Max-Zehnder Interferometer:
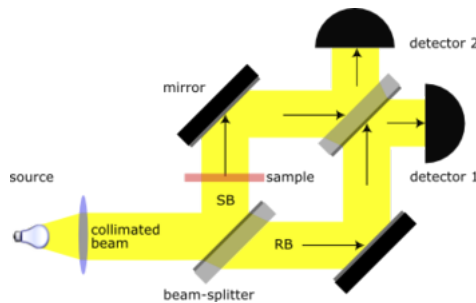
An example quantum experiment involving several loops and feedback (like in an amplifier) is the delayed-choice-experiment, or *quantum eraser*:
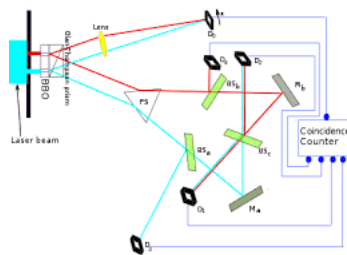
The analysis (explanation) may vary from author to author [21].

These examples aim to show a parallel between electronic circuits and principles, and quantum information circuits: *infotronics* [25]. It contains a more recent brench of science operating with the spin of particles: *spintronix* (see: *spin glass* (ice), spin currents etc.).

Remark 3.1 *It is notable that manipulating the nuclear spin (Dynamic Nuclear Orientation) affects the respons of a body in gravitational potential; in fact it changes its gravitational "charge" (mass) [22].*

3.7.3   Resonance and bound states

This leads not only to bound steady-states, on closed (orbitals) or open Q-circuits (2-slit experiment), but also to allow a transition regime *before* the Q-system "finds" and reaches the steady-state regime. Such bound states of higher energies have different lifetimes (lifetimes of excited states of an atom, or transient states); this pattern is quite general, e.g. long-lived particles vs. resonances in EPP; or intermediate states in an orbital quantum jump (TBA: [24]).

3.7.4   Healing through resonance

An application of the general principle of resonance, which governs the "quantum world" (the real one), has important consequences in Medicine in general.

Raymond Royal Rife discovered the healing method using specific resonance frequencies that cause the "burst" of pathogenic agents, including cancer. The frequencies were determined by using a powerful chromatic microscope [57] (see also the history of R. R. Rife [55]). His work was discredited during, and mostly after his death [56], although the principle behind the method is quite reasonable.

3.7.5   Applications to TCM

Taking the pulse on a meridian is similar to observing the signal in an electronic device, at a measuring point, on an oscilloscope (How far can the analogy go!?). Here both the carrier and signal are involved.

A living body (system) is in particular a quantum network; meridians form the large-scale structure through which "life force" / QI (quantum information) is flowing and it is being processed. It is just a part (layer) of a regulatory system which is comparable to an operating system, in complexity (except it is being also implemented "hardware", with capabilities yet to be tentatively explored in our attempts to replicate life).

It is interesting to look ate some presentations of transistor amplifiers and compare with the above practices in acupuncture.

What is the "big structure" of meridians, head-2-tail, from head to toes? (and back, into the ground, and above, to the crown chakra ...).

What are the "exterior connections" usually plugged in (dynamically changing, "dialing" to different sources), into the acupuncture points? Some maybe blocked, other drained, or even fed with "negative energy" (there are various forms of qi: see the experiments with ice crystals of Masaru Emoto).

3.7.6   Dynamics of Qi Flow: The Chinese Clock

To achieve an amplification effect beyond "fine-tuning"/balancing the qi-flow, the diurnal pick of qi-flow must be used.

This is perhaps in achieving efficiency ("daylight savings"), distributing the resources as needed, according to a timing and scheduling of activities (work, maintenance, supplying: resources / rewords, "free time" etc.)

Traditional and modern medicine address some of these aspects, one way or another, explicitly or implicitly.

3.8   On Tai-chi, Qi-Gong etc.

Life force exercises are present in all martial arts. These practices can be taken aside, as efficiant ways to enhance life-force/energy and implicitly promote health.

Theya re usually viewed as relaxing activities, sometimes called *moving meditation*, but they are in fact a direct way to increase and balance qi-flow.

3.8.1   Qi ball, rotating chakras etc.

The stances and tranzitions in a tai-chi form target a change in muscle tension together with the "geometry of the body" (the practitioner), in order to block, accumulate and release qi-flow as if

operating with a system of "mini-dams" in the complex network of qi pools and meridians connecting them.

Activating muscles transform chemical energy (mostly electric potential) into magnetic flux (qi/A-flow). The change in tension affects the capacitance and inductance of various parts of the body, with a complex system of byproducts (change of EM coupling between closed circuits, change of resonant frequency etc.: analog to a change in the L/C/R components of an electronic ciucuit).

Moreover, a fundamental issue is the intake of qi-rich air through breathing, as well as direct qi absorption via resonance at the level of the skin and acupuncture points.

3.8.2 Qi-Gong Examples

The typical examples of easy routines the can achieve the above in a direct, repetitive manner is building a *qi ball* (standing wave between palms, with a light pumping via changing the distance between hands), "hugging the tree" and "harvesing qi" etc.

3.8.3 The Measurement of Qi

The effect of these exercises can be felt dynamically while performing them, with a clear perception of the flow, even for a beginner, after a few sessions.

There are also some devices that can measure the qi flow (can detect acupuncture points), video record aura in real time etc.

Training people with higher sensitivity ("talent", like in sports!) can lead to the ability to actually see the external chi flow or the blockages and deformations of the aura of a patient; again, because of mistrust and sometimes abuse, it prevents the development of, and leads to labeling them, as "pseudo-sciences".

An interesting such account from earlier times, is that of Baron von Reichenbach studies of *oddic force* [27]. [14].

3.8.4 Is Qi-Gong Science Based?

The typical mistake when critically dismissing such claims is the ingrained idea that measuring must be made by an aparatus that we can build, without biological components. On the other hand the extensive and documented studies and theories concerning these aspects clearly form a "Science", using the scientific method, except the specialist is in charge both of the theory, experiment and observation / measurement. The level of expertise is beyond what we might call "subjective"[15]

So, the answer is "Yes", *Qi-Gong and Qi-Medicine* are new sciences emerging from TCM and other historical sources.

3.9 Emoto, Plants and Biosphere

Jung's collective unconscious is a much more complex aspect of our interconnectedness ("follow the qi").

3.9.1 We are all connected ...

The levels of connection between systems (living or just capable of histeresiz", i.e. recording / storing quantum information) are so diverse that are not well defined in a precise enough manner to be studied in a scientific (modular) way; nevertheless several isolated studies point towards a unity principle: "we are all connected".

Benveniste and Emoto experiments on water memory (frozen or liquid) [29] support the fact that thought interactions happen at a deeper level, between various levels of organization of matter.

Cleve Backster's experiments with plans went both ways[30]; it is not a "classical logic" based "talk" (language), but rather the primordial universal communication via QI (qi). We can tell if it is a

---

[14]Such experiments are usually attempted to be reproduced to invalidate them! see [28]

[15]The schools of thought, theories, opinions etc. in Sciences are in fact more diverse, with mainstream science a certain set of theories and experiments correlated with education and funding, which in turn have in many cases a "Standard" (e.g. in Cosmology and Elementary particle Physics).

"good vibe" or not, but that we can "project thoughts and emotions (empathy: capability to resonate and conceptualize etc.). Most of us "know" (experience of life and folklore) that we can talk to plants and that they with thrive; animals are much more "trainable" to learn our language on top of the emotional carrier, our thought forms.

Science strives to formalize the practices and behaviours that have "good effects" (education, health etc.), without concern for now regarding the underlying mechanisms and technology related infrastructure.

The main point is that QI and EM A-flow maybe modulated to carry various types of qi, prana etc., whatever the popular term we use.

On the other hand the human response to good words or threats involves obviously an internal response (prep for fight or flight, worry etc.); the above examples go beyond these aspects.

3.9.2   EM and sound

Communication through sound has a less known EM substrata, which involves a longitudinal component (torsion wave or scalar wave: dominant in the near field regime, as called in radio transmissions; also present between sensors of a detection gate at stores).

This hidden content is referred to as "thought form", and is the underlying mechanism explaining Emoto's and Backster's experiments, and perhaps Benveniste's experiments (homeopathy etc.). It is consistent with many other accounts of the power of the word (tone of voice correlated, famous orators, motivational speakers etc.).

This content affects, possibly in a large extent, the health and mental changes of an individual, animal or plant; it can also be "stored" in objects (e.g. ice crystals etc.).

These studies, experimental and theoretical, among a wealth of other not so well known, set the scientific foundations of healing practices like Reiki, Energy Medicine, Sound healing, the role of blessing, prayer etc., in addition to the benign, but powerful effects of dance and music as anti-depressive, life busters etc.

3.9.3   The Biosphere

The biosphere maybe subject to general intangible influences from collective thoughts of a certain kind, which then may lead to recognizable transitions towards collective or individual manifestations[16] (Maharishi effect etc.).

Pyramid strategies of promoting "good thoughts and actions" may be thought as counter-actions to the opposite reactions due to stress, disagreements etc. These are ready for systematic scientific studies and to be integrated in the education system [40]. Cleaning the Biosphere is a multi-dimensional process, starting from the source [41] ...

3.9.4   ... and stability, improvement ...

In order to achieve stability, society strives to regulate the system, to avoid such uncontrollable variability in system's behavior; yet recognizing the underlying phenomena allow to build beneficial structures that improve it.

In order to bridge the gap with "fundamental" Physics, we will examine the traditional basic concepts of Space, Time, Matter and Interactions, with outlook to see the role of the primary underlying structure: the EM Network (magnetic flow, not the B-field), captured in Physics as $U(1)$-gauge Theory, as part of an underlying $SU(2)$-gauge theory (Spinor EM; QC).

But before that, let's explore an intermediary "teritory": Magnetism[17]!

---

[16]... aside from other global, tangible aspects: politics, economic interests etc..

[17]Then we will understand better Space-Time etc.: as "above", in the gauge theory description, "so below", on the base manifolds.

4   What is Magnetism?

The dawn of Science, with Galileo, Newton, Maxwell was initially concerned with motion, change involved, hence it is a study of forces that incur change" (space-time based physics).

With the developments in Quantum Physics (including EPP), it is worth re-examining EM from the point of view of the (quantized) magnetic flow ($P = mv + eA$), not just the force / curvature aspects of it ($F = d\mathcal{A}, \mathcal{A} = (A, \phi) : E = div(\phi), B = curl(A)$), as we've learned that quantum aspects result at the level of the vector potential and quantum phase (Aharonov-Bohm, entanglement etc.).

4.1   Zoom in to Quark Structure

A modern approach, even at the level of a qualitative interpretation, should take into account the quark structure of nucleons, since this allows to zoom in into the structure of electric charge.

The next level is to include the other" three $SU(2)$ *fields of EM type*: the quark fields [32, 10, 7][18]; but for now, we will restrict to the electronic EM" (classical EM, chemistry, atomic physics). A unifying approach consists in including the electron fermionic field as a 4th color" T, associated with time, or in fact with quantum phase, from which time emerges.

4.2   How 1+3=2+2 changes our view of EM

It is clear" that EM (classic, scalar or spinorial) cannot accurately model the true form of electromagnetism", since the negative charge e^- is not the opposite" of positive charge of a proton, not even at the level of EM interaction (e.g. electron-neutron scattering): the fractional charge structure of the total positive charge" makes a difference, which we need to understand better.

The $3 + 1 = 2 + 2$ is just a mnemonic for the two viewpoints: space-time vs. quantum physics, well combined in the gauge theory paradigm, via principle bundles (loc. cit.).

4.2.1   Follow the Qi

So how does the vector potential flow looks like, out of which we derive our force oriented theory", the *magnetic field intensity $B = \nabla A$* (the analog of angular momentum / velocity, $L = \nabla p$ or vorticity vector $\omega = curl(v)$[31], in $P = p + eA$)?

We will describe two less known findings: one modern and one ancient.

4.2.2   The Magnetic Flow of a Magnet

Magnets can have quite complex magnetic flows. The usual pictures show the *lines of the magnetic field B*[33]:
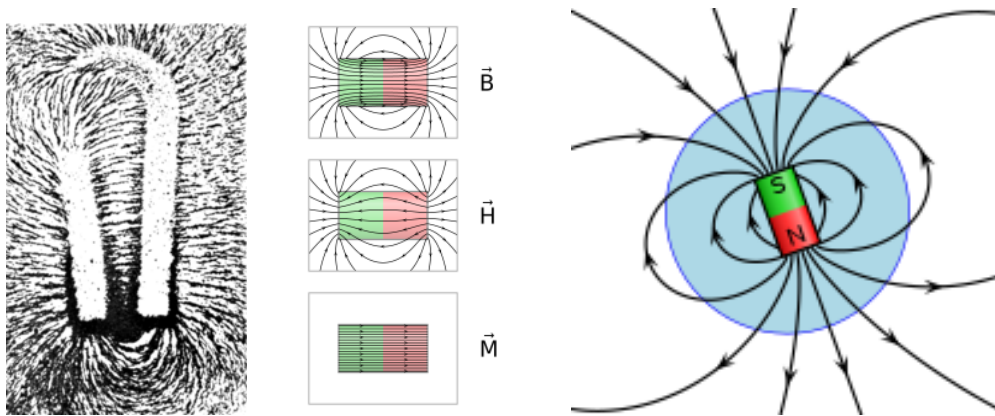
B is the vector field that enters in the Newton-Lorentz force $F = e(E + v \times B$, at "parity" with the electric force field (intensity)[19]

---

[18]See also refs. within; each of the three quarks of a baryon has an associated field of EM type, with vector potential (connection form) A_R, A_G, A_B.

[19]It is a separation into work capable component E and geometric curvature capable component B.

The horse-shoe magnet with ferromagnetic iron fillings gives the "wrong impression" of what a magnetic field physically is: they orient in the direction of the corresponding *angular momentum* of the magnetic flow (the *A*-field), perpendicular to it (along the rotation axis given by the *B*-field)[20].

Same with the schematic representations in the other two pictures. Note that Maxwell-Heaviside Equations including matter sources, require several force fields of intensities (per unit of charge): *E* and *H* for "free space" EM fields, separated into work / curvature components, and *D* and *M* including "bound contributions" from matter (displacement current from polarization / deformation of bound states, and magnetization from spin direction polarization, both at the electronic and nuclear level):

$$D = \epsilon E - P, \quad B = \mu H + M.^{21}$$

But what about the *A*-flow? *"Today, however, it is quite evident that filings do not show magnetic fields as they are, but that they show what little pieces of magnets do in magnetic fields. The two are about as much alike as a Venetian blind and a blind Venetian.* [37], p.2.

A fine structure of the magnetic field (still the *B*-field?) was obtained using a 3D-frame of Hall effect sensors, scanning the space around a magnet with small increments [37], p.10 (see loc. cit. for details):

THE DOUBLE VORTEX
WITH THE SPINS ALONGSIDE
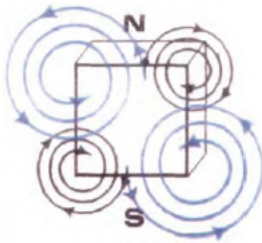
Here is the picture which recorded the discovery of the Double-Vortex

Noticing the last illustration, it is evident that the "whirlwind" or "tornado" effect is present and that there are two vortices present at each "pole".

An interesting and important piece of information, though, is that these vortices are not all the same, as is shown in previous illustration for clarity. Notice the distribution of the spins:

Recall that the term *magnetic field* is almost universally used for the *vorticity field B = curl(A)*, of the vector potential (quantized) magnetic circulation $\oint A dr^{22}$. In the above picture it seams that the dots should be connected in the direction of *A*, as showing the circulation of a fluid in a whirlpool vortex, rather than yielding the magnetic field lines, which are the axes of the rotation (curl) of the *A*-field (also referred to as the *magnetic momentum*, to suggest its relation to mechanical linear momentum, part of the generalized momentum: $P = p + eA$). The HE-sensor measures the Hall voltage perpendicular to the electric current and a magnetic field orthogonal to it $V = cont.J \times B$, conform with the Lorentz force $F_B = ev \times B$ [38].

---

[20] Prove this from basic principles ...

[21] I could not find a good account of this mish-mash of classical and quantum contributions ... The microscopic or "in vacuum" formulation [36] does not include sources (density of sources or currents), and is generic for any force field, not necessarily EM, which usually implies constitutive laws like Coulomb's Law.

[22] The unit h/e is called *fluxon*; see superconductivity, Meisner effect and Abrikosov vortices for additional details. The physical effects of *A* are measured even if the magnetic moment flow is laminar: $B = 0$, e.g. Aharonov-Bohm effect.

But since there is a gradient of the magnetic field (and of A in Lorentz gauge; not in the Coulomb gauge: $\nabla \cdot A(r,t) = 0$ [23]), together with a moving charge (electric current), the analysis is more difficult to be done, to identify a possible contribution from $E_{ind} = -\frac{\partial A}{\partial t}$ (via a change of frame). Yet in the magnet's frame, E, B fields are static, at least macroscopically ...

4.3 The Double Vortex

But the double vortex is clearly seen and such spin-whirl combinations are typical of toroidal structures, e.g. Hopf fibration, quantized magnetic flux model for fermions and baryons (see Herbert Jehle work), or even studies of 3D-shapes of sound produced by vocals [39] (3D-cymatics).

4.4 The South and North elements

The double vortex suggest a "duplex channel", as in other instances (electronic bonds, nuclear pionic bonds etc.).

The two opposite flows were attributed to a "South element" (Yin qi / blue color, pleasant at touch: see odic force); and a "North element", stronger field (Yang qi / red color, irritant at touch).

A different name is needed; the relation with A and A^* (Hodge dual) needs investigation (e.g. self-dual YM equations / Witten-Seiberg etc.).

Since the toroidal structure becomes clearly the solution (Jehle; theory of the electron; Hopf fibration etc.), the two parameters "spin and whirl are probably responsible of these two types of qi (Vector potential A).

Why they form a closed structure, reminiscent of a Klein bottle (3D-unorientable; $SU(2) \rightarrow SO(3)$ 2:1 related, perhaps; the electron "belt trick" etc.), is not clear, but expected (unitarity, CPT, C-numbers etc.).

The ingrained trust in pointwise Maxwell's eq., and even Pointform Gauge Theory / QFT, leads to missing such aspects, and discarding as "impossible" ...

There are other sources referring to the same type of closed double helix flow, as a basic structure / motion in nature.

4.5 Flow of Anu

Hesitating to include un-orthodox sources and "personal views" may lead to ignore "clues" that are important in our quest for "Ultimate Treasure": what is qi/life (and everything, of course); yes, it may lead just to another clue, and so on ... (for now).

"Ether", banned from mainstream Science after Einstein's triumph (SR; Michelson-Morley Experiment is not entirely conclusive in this respect [42], and deserves further study, using a Mach-Zehnder interferometer [43]); but it is studied extensively by many groups of researchers, under various angles and theories. It even acquired a new identity: Dark Matter and Dark Enegy", for an easy adjustment of the input parameters in GR (total E-p tensor), to account for the observed dynamics.

The *flow of Anu* is defined by "Ether Science", a body of esoteric knowledge acquired "directly", or from ancient various sources; is in some sense at the opposite end of Scientific Method (yet ancient Greeks did not experiment at all! neither the ancient Chines, founding Tao philosophy etc.).

The structure involved, as a fundamental unit" (in various sense) is the Hopf fibration $U(1) \rightarrow SU(2)$ (mentioned elesewhere), with "flux tubes" that are fibrations of a toroidal structure, localizing topologically "fields and particles" (sources of holonomy / monodromy in a gauge theory approach).

---

[23]The gauge chosen corresponds to a choice of origin for the quantum phase, from which Lab time emerges [10, 7]; what is the "correct" gauge / "quantum phase synchronization prescription" is not clear at the present time.

"The one is like a spring from which water bubbles out; the other is like a hole, into which water disappears."
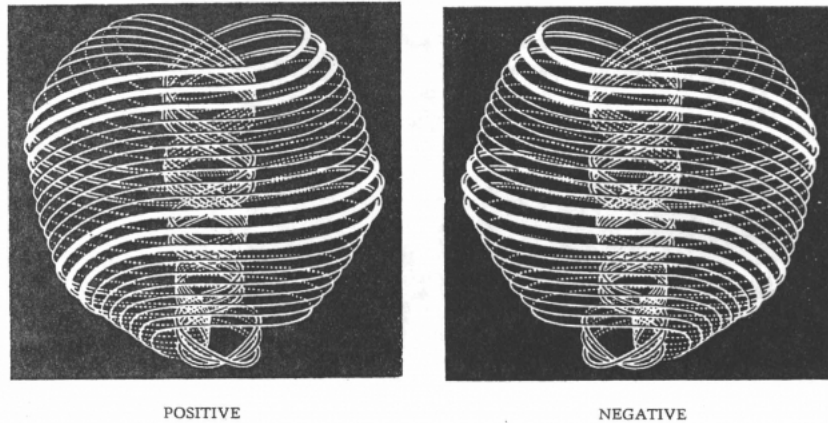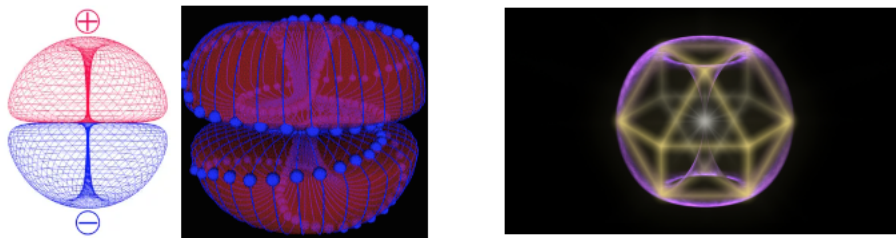

POSITIVE   NEGATIVE

FIG. 3. THE ANU

Credit: Besant & Leadbeather – Occult Chemistry

The double helix pattern is seen in "the Anu"; the left/right helicity is present. A Yin-Yang aspect is also present (qubits, tao etc.).

The 2nd row of pictures are related to: 1) the Red/Blue aspects of odic force; 2) elliptic and hyperbolic trajectories on the Riemann sphere (Mobius transformations); 3) Finite groups of symmetry (Platonic) and spherical modes of vibration (Archimedian and Johnson solids).

It is remarkable that such "insight" could be obtained via meditation ("clairvoyance"), like that of a channeling medium (Ramanujan reported similar experiences, but receiving mathematical info: his famous formulas, without a theory behind them).

4.6 From Vector Fields to Gauge Theory

A mathematical approach to model electrons and quarks, to derive electric fields, models of mesons and baryons, was done by Herbert Jehle (quantization of magnetic flux articles).

4.6.1 Wilson loop or String?

His idea was to construct the flow of a primary vector field, using "loopforms", i.e. replacing the point-particle (singular source) with a loop, as in String Theory, Wilson loop (Loop Quantum Gravity) etc., except aiming to define the vector potential this way, i.e. the connection in a gauge theory ("String Gauge Theory").

Such a loopform is just a closed line of a magnetic field, as expected; the idea to superpose them with "Feynman amplitudes", as for open paths, to build a "wave function" (which eventually will satisfy a wave function equation, like Schrodinger's eq., compatible with FPI) is a remarkable idea[24].

---

[24]In prior author's articles it was postulated that the baryon field corresponds to Hopf fibration.

4.6.2   Unifying E and B from A

Of course E and B are part of Faraday tensor $F = dA$, where A is also the EM connection 1-form (mathematically). But one remarkable fact is to be able to derive the electric and magnetic fields form this toroidal spinning and whirling fibration of Hopf type, i.e. from the VF flow itself (What A or connection, has such a flow?).

This unification of E and B fields avoids choosing what's primary, e.g. e charge and electric current (Ampere).

4.6.3   ... and 137

Another, is *to obtain* the fine structure constant as a condition for matching the observed/measured Coulomb field and Bohr magneton (fluxon), from counting the finite number of such fibrations (a quantization which is reminiscent of Platonic and Johnson solids, applied to the Hopf-Klein-Cartan local model.

We now know that the Platonic groups of symmetry TOI determine the 3 generations of quarks and their dual flavors, including electron-muon-taon as a 4th "quark color" T: just another VF/potential of EM type, for the 3+1=2+2 $P \to M$ correspondence between theories: QC and Classical Physics); hence this project maybe furthered and perhaps completed, actually obtaining α as "just a mathematical constant" (see also [8, 52, 51]).

4.6.4   ... and Lord Kelvin

Using knots and links of vector fields (of connections) to model "atoms", as proposed by Lord Kelvin [44], is a nice way to stay within the differential geometry framework (language) [47], Fig.9, p.12:

This a flow associated by Jehle to a baryon with an $S - quark$.

His construction of VF flows based on "loopforms" follow a toroidal fibration prescription around a "core", with a spin and "whirl" corresponding to angular momentum and Compton wave length; this is typical of a Hopf fibration.
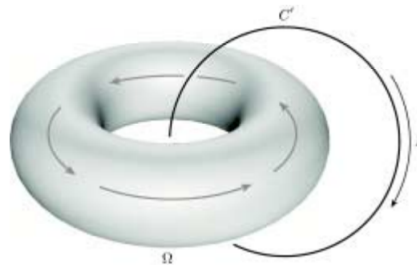

Figure 9: A linking current

The extra ingredient needed is a lattice/discrete symmetry group as associated with a Hodge structure [46] (or Belyi map for a dessins d'enfant).

4.7   Double flow?

Returning to the experimental analysis by HJ of the magnetic flow, let's try to understand the "message".

It seams that there are two types of lines of opposite orientation, "corresponding to two types of particles" (or charges? ±; since spin and magnetic field are related as $\sigma = eB$).
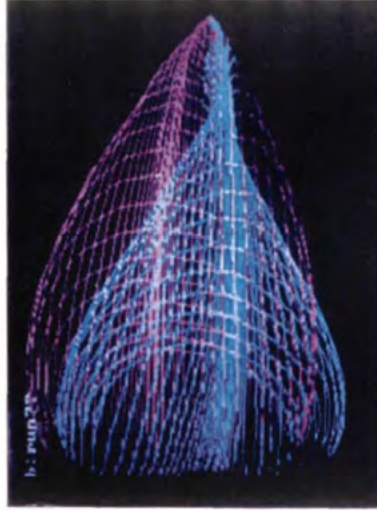

The Double Vortex of a different magnet
mapped at a slightly different angle.

One picture (p.13) is reminiscent of a Klein bottle ...

The cross-section of the magnet around a "zero point" (singularity of the VF) suggests a more complex behavior that the usual isotropic field of a Coulomb charge; a baryon field with three directions, e.g. in-in-out, as for a neutron (maybe with antipodal symmetry: 6 directions), would look similarly, except in 3D ...

This is what the direction of the lines of force really looks like, demonstrated with a cubical magnet having the top face for the north pole and the bottom face for the south pole:
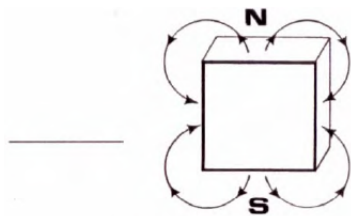
As opposed to this:
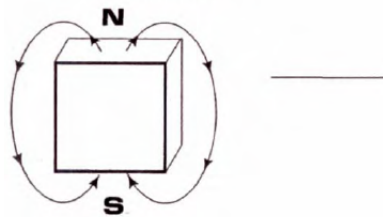
This actual graphic mapping of a magnet shows its lines of force by measuring the intensity of the magnetic field every 1/16" at each point on a grid, covering the entire magnet, as well as some of the field in the area around the magnet. (Sec page # 29 for description of method.) This measurement of the strength of the magnetic field is rated in gauss.

Here we see 2-In and 2-Out, from the "zero center"; if there are two more in flows from front and back, it would suggest a $U(1)$-relation with the electric component of a neutron $(-1/3, -1/3, +2/3)$; the directions would correspond to the d, d, u quarks of the neutron (but as "principal directions of the baryon VF, with the baryon at the zero-center).

Trying to describe such a VF in terms of H. Jehle theory, would be rewording ...

4.8   Superposition and Crystals

Since the superposition principle applies (additive effect), the overall effect shown by the magnet, will reflect the "unit cell", similar to how a crystal's macro shape provides info about its atomic structure and lattice / geometry.

The symmetries of a baryon field (and states) should be "read" from such pictures and other considerations regarding the structure of the nucleus (e.g. Dr. Moon's theory of nuclei and Platonic solids etc. [45]).
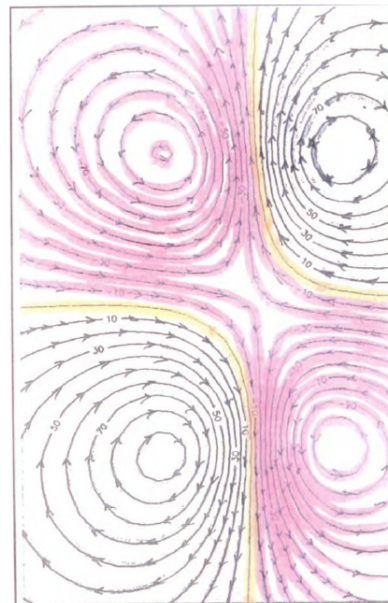
4.9   .... and Spherical Harmonics / Orbitals

The D3M0 orbital, in a vertical cross-section, would look like the following picture (loc. cit. p.20):
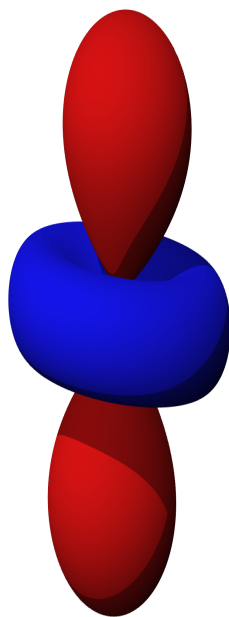
The evident bond of continuous spins from corner to corner that shows the linkage of the two north elements.

20

The overall main lesson is that the field of a "magnet" is a steady-state bound state ("standing wave"), hence capable of more complex modes of "vibration". How can we "excite" such a magnet?

4.9.1   ... and Odic Force

The sensitive subjects of baron Von Reichenbach reported seeing red and blue emanations from the two poles of a magnet, with emotional effects when "touched" (irritating or calming; Yin / Yang!). Same qi, different names, but striking similarities with the above report of HJ.

4.9.2   Unity in Nature

A compparison of high and low energy physics (particle accelerators or solids state physics, e.g. Hall effect, superconductivity and QC), as well as comparing atomic resonant states (bound) and macroscopical (2-slit experiment, magnetic fields vs. orbitals etc.) and large scale structure (neutron stars, pulsars, galactic filaments etc.) show the unity of Nature, expressible using Network Models and resonance/dissonance, transitory and steady-state phenomena.

4.9.3 Attraction and Repulsion

It is reported that opposite corners (e.g. North-elements) attract, and vortices next to each other repel (as expected). This is an indication of toroidal spin-whirl structure of magnetic flux tubes (intrinsic quantum description: spin an magentic momenta are related by charge $S = eB$).

For more info see [50].

4.10 Quark fields and Magnetism

At this stage it is apparent that superposition at microscale manifests a macro structure of the magnetic field.

Magnetism has two sources: a) electron orbitals and spin; b) nuclear fields of EM type. Recall that each quark is in fact a principal direction of an $SU(2)$-field of EM type, e.g. A_R (for each color RGB) [32], whirling into the baryon (proton or neutron), if the fractional electric charge is negative, or out, if positive.

The quark field of EM is not a force field, and the nuclear force is associated to $F = dA$ (the usual $B = \nabla A$ for EM), i.e. the vorticity of the field. In fact nuclear force is due to pion bonds (quark-antiquark), a similar duplex channel, hence a double vortex too (picture two toroidal doughnuts bonding a a genus two RS).

The unified picture in EPP (unifying EWT and QCD) is much more simple, but at the level of nuclear chemistry complex phenomena may occur (think Chemistry! Solid State Physics etc.).

4.10.1 The Index of a Vector Field

The *zero lines* in a magnet are typical of a vector field with a zero-singularity and more complex index then $(3, 0)$ or $(0, 3)$ of Coulomb fields, or of toroidal type (e.g. pulsars), reminiscent of a neutron $(-1/3, -1/3, +2/3)$ [49].

Pic. on p.21 (cross-section) suggests perhaps a cubic symmetry of the field ... (?). These studies need be continued and various shapes of magnets investigated.

4.10.2 Magnetic flows and mechanical motion

The text (loc. cit.) suggests several applications. Note that magnetic flow does not produces or uses work (energy), and its is as close to a superconductor, at room temperature, as we can desire! On the other hand it can make an electron rotate on a closed trajectory (accelerate if variable magnetic fields, of course).

This shows how the two momenta are related $P = mv + eA$, and exhibit macro-level quantum phenomena.

Using closed circuits of magnets and rotation may in principle lead to unexpected effects, at least at the level of mainstream science (e.g. Searl effect, "overunity" motors etc. - there are plenty of opportunities to extract energy from internal configurations or ambient "vacuum", not to worry about non-conservation of energy; we just don't have the right Hamiltonian and topological configuration of the state-space).

4.10.3 Quark Structure and Standard Theories

The byproducts of the quark structure of baryons (e.g. nucleons) include phenomena not accounted for by classical EM, EWT and QCD independently.

Remark 4.1 *The evolution of fundamental interactions from Fermi Effective Theory of beta decay, into Quantum Flavor Dynamics, and then branching into EWT and QCD reflects the separation at the level of experiment, scope and misinterpreting the role of SU(3), as well as the initial idea of Gell-Man that quarks are not particles.*

This is so much ingrained in theory (SM), education, experiment, technology and EPP culture, that one needs to consider the other inconsistencies in Physics.

A new paradigm (emerging) and "revolution" is needed.

4.11 Casimir Effect

A similar "redirection" of the original idea of Casimir to explain van der Wall forces, was caused by Bohr's suggestion that it has to do with "vacuum zero-point energy" [48].

Polarization requires interaction, and both aspects are caused by matter (and) fields. We claim that the phenomenon is another manifestation of quark field structure and double-vortex structure of EM quark fields.

4.11.1 Repulsive and attractive

Both types of Casimir force are consistent with a polarization involving both types of charge [53], which could be explained via quark fields (both types of fractional charges are present with one nucleon field; compare with the double-vortex structure).

The accepted explanations rely on "vacuum fluctuations" which any gecko knows how to use [48], refs. 48-50.

4.11.2 Left-handed meta-materials

A polarizing lens inserted between two plates may cause the force to become repulsive [54]. The explanation is based on the traditional model of Casimir force, initiated by Lifshitz.

Again, this relies on E/B version of EM, which does not include the actual structure of matter and misses some of its quantum behaviour (recently optical "cloacks" were devised etc.).

In a previous presentation, a comparison between magnetism, electron spin/current dependent, and gravity, nuclear spin polarization dependent, led to the speculation that permanent spin polarized materials may exhibit unisotropic response in gravitational field.

That gravity can be controlled by DNO of nuclear spin leads to a common framework for all these "residual" forces (casimir, van der Walls, "weak" nuclear force).

4.12 The Magnetic Current and Quantum Phase: The Quantum Space-Time

From the above general perspective, the flow of the vector potential, defining the "true" directions in space (EM geodesics; not the metric geodesics), plays an important role enough to define it the *magnetic current*. It flows in closed circuits: lines of gradient of the "superpotential", also called the *quantum potential*, which determines the local quantum phase. A change of gauge also changes the local quantum phase (origin in each fiber of the principle bundle), which determines local relativistic time $exp(i\omega t)$ (see Feynman and [10]).

Note that there are 3 independent such magnetic currents corresponding to the 3 quarks of nucleons as their sources. This determines the "space-aspect" at the quantum level, from which macro-Space-Time emerges via our historical concept of "straight path" (light geodesics and associated metric).

How the three quark fields and associated quantum phases correlate to yield a unified local time, requires further analyses.

In such closed circuits magnetic current is quantized (e.g. fluxons $\oint A dr = nh/e$), as is the local quantum phase $exp(i\omega t)$.

The Network changes dynamically and such a change implies a divergence which is associated with the electric force $\partial A/\partial t$.

In conclusion, the quantum potential (quantum phase) is the determining concept, which in turn defines the structure of Space and Time, and associated "forces" as curvature (electric, magnetic, centripetal etc.).

5 On Space, Time, Matter and Interactions

"Time" is a parameter to label "events" or flitting stages of change in a system made of "matter" (permanence) in interaction (exchanging properties: conservation laws etc.).

More fundamental then time is what is "change" and this requires to state what *is* that changes (From being to becoming: see Prigojine).

5.1 Types of change

The early stages of Physics focused on Dynamics of Particles (Newton), without concern to structure and how it changes due to interactions (Modern: decays, creation of particles etc.: Standard Model).

5.1.1 Change of Structure

There are two types of change, dual to each other: merger of two subsystems and separation / division (e.g. cell division, beta decay etc). Mathematically, prototypical for the first is composition (binary, e.g. addition, multiplication); for the second: decomposition (coproduct etc.).

But the evolution of a system is more complex, reminiscent of a "decision algorithm" or a Network, where history and feedback plays a decisive role.

Then a linear, ordered "time" is not appropriate for modeling change. yet the basic changes, as above, i.e. serial vs. in parallel (think switches/Boolean algebra), cannot be "sliced" into a product "Space" (parallel) and "Time" (sequential); and if feedback loops are present (as in any cybernetic system, for control) and matter has memory (states), then "time" is emergent as an external imposed ordering, and "paradoxes ensue", with "weird phenomena" talking place (entanglement, 2-slit experiment etc.).

What is even less accounted for, is the change in the hierarchy of the structure of the system (like unification of states and governing dynamics, politics aspects etc.).

In such systems there are different levels of "time zones": orders adequate for a subsystem, labeling its changes, vs. a "slower rate of periodic time" for its external level of hierarchy (e.g. nuclear spin processes vs. atomic chemistry etc.). Indeed, each system has a quantum frequency; an elementary particle has one too: de Broglie interpretation / Feynman quantum phase etc.

5.2 ... and Physics Theories

Particle and Field Dynamics considers one level of structure: "particles" and their trajectories under interactions modeled as "fields".

Biology, Chemistry, Nuclear Physics and Elementary Particle Physics take care of specific levels of structure, although related in a hierarchy; even within EPP for instance, the "System-Particle" paradigm is excessively used: nucleus is made of nucleons, a nucleon is made of quarks (as particles) etc. This misses the "interactions" between levels of structure.

The "Theory of Everything" should be a theory which should include the Theory of Dynamic Hierarchical Networks (see AI learning, from a Quantum Turing Machine perspective).

But Physics Theories (think software) need to correlate with each other towards an *Expert System*, which in turn relies on experimental facilities, education system (suppliers of specialists), companies supplying components and benefiting from applied research and new constructions / investments (LIGO, particle accelerators, DESI: Dark Energy Spectroscopy Instrument etc.). This influences in which direction theories grow, and usually ... there is no time for "rewriting software" (increase in computing speed takes care of this ...).

5.3 In Conclusion: "Time" is Not a Fundamental Concept

Time is rather a "theme" referring to change and understanding control (prediction) of systems. Each theory has its own concept of "time", usually in duality with what does not change: "energy" (conservation; Hamiltonian etc.).

It was explained in [10] that macroscopic time, reference frame dependent, emerges from quantum phase, a fundamental concept in QC / Quantum Information Processing.

5.4 ... and Entropy

Entropy is a concept "external" to the system itself, since it involves both the *external control* (feed of I/O) and internal "behavior" (memory/states, transitions, feedback; AI learning).

5.4.1 What is entropy?

The concept originated in Thermodynamics (?) and was related to temperature $S = kT$, which reflected chaotic kinetic motion. Later it was defined at a fundamental level by Shannon in terms of information.

Entropy is an *average* of *quantity of information* of a system, and can be computed from the Boltzmann particion function in order to relate it with energy levels and temparature.

Yet even the quantity of information is a poor measure of the structure of a system (automaton: software and hardware aspects); for comparison, think of the mass of a cell, or your computer's memory *size* (not what's in it and what it does ...).

5.4.2 On Thermodynamics and AI

Thermodynamics is such an "external take" of Particle-Dynamics (no fields). The "fundamental" Law of Entropy is very much limited in scope and application: if we look at the Universe around us, should be clear (or within us, our Universe)[25].

When Entropy decreases, it is because the system learns and grows; when it decreases, the system fragments, decoherence ensues and the system "forgets" its structure, and at a critical level ("temperature" of chaotic functioning), "dies", meaning that it ceases to function conform its previous identity, and becomes a collection of subsystems ... which may "die" also (change into "building parts/components etc.).

5.5 The Fundamental Law

The Universe "expands" because its structure grows in hierarchy and complexity (based on observation and history); then, there should be "source of learning" (not necessarily of "teaching"). Is it meaningful to say that because the "Universe cools" it also "structures itself" (self-learning capabilities)?

But this maybe an "chicken-egg situation": we interpret expansion based on GR (Doppler shift etc.) but perhaps *energy may turn into structure*, beyond Einstein's $E = mc^2$ and conservation of energy when change of Lagrangian (structure) is not accounted for ...

So rather then a "thermal death", the Universe may evolve towards a more and more complex and coherent structure, as it seams to prove the streak of discoveries in Cosmology.

5.5.1 ... and Cybernetic Systems

Perhaps the "fundamental law" for cybernetic systems in a rich interactive environment (not just thermal or EM non-programmable, i.e. with fixed network structure[26] etc.) is the "Law of Attraction" (via resonance and dissonance: constructive and destructive interference) which leads to growth in complexity (levels of structure and functionality).

5.5.2 Ashby's Law

The 1st Law of Cybernetics states that a control system is as complex at least, as the controlled system.

But then there is a "problem": it can't control itself and grow ... there would always be a need for external guidance ...

On the other hand "AI needs data to learn" [16]; so the environment is part of the "control system": adaptation for evolution.

6 Conclusions

Not only the vector potential has physical meaning, can be observed etc. but it corresponds to a better mathematical model (e.g. gauge theory) based on differential geometry connections, rather than the emergent theory of space and time based on a metric approach.

---

[25]The concepts of "Universe" in general (not like in GR) is not well defined; similar to the "set of all sets", yet a more delicate issue if taken at higher levels of considerations ...

[26]... even the 2-slit experiment is a learning system, tending to its steady-state topological configuration for maximization of communication of QI!

In fact not only Space emerges from the Cartan Moving Frame approach in Gauge Theory, and Time from local quantum phase, but also the metric emerges from the GT interacting picture.

This picture interconnects the levels of description in Sciences (EPP, Chemistry, Physics, Biology, Medicine, Sociology, Politics etc.) and is studied by what are usually called pseudo-sciences (It's hard to experiment and measure qi)[27].

Considering the roles of EM vector potential in basic Physics, with its interpretation as a qi flow on meridians that are QI channels, we can understand life in scientific terms.

The QI processing network model is present at several levels which constitute layers of interface and implementation of a hierarchy similar to that of an operating System (software and hardware): 1) nucleons and pion nuclear bonds; 2) nuclei /atoms and chemical electronic bonds; 3) organelles, cells, 4) organs and interconnections / organizing processes defining etc. (hierarchy has many more levels beyond a human for instance, as an "individual system").

A parallel between related sciences: electronics, infotronics, QC using superconducting Quantum Integrated Circuits and biology, medicine, studying living systems, was meant to show the similarities and that we now understand the living systems in terms of QC or qi flow, with the EM vector potential (together with hardware aspects: optic fibers, fermionic channels, meridians etc.), playing a decisive role.

Finally, "time" is a theory dependent concept, one of the most volatile and diverse concept in Sciences; one may say that *not what time is*, is The question, but *how a system is born (generated), growths, functions, maintains itself (if capable of such a function) and decays, under the interaction with the environment*.

6.1   What is a "good" reference frame?

A reference frame was initially associated with a Lab equipment, rulers and clocks (from Galileo to Einstein and LASER beam alignment). This is a metric approach to geometry and dynamics, which has its limitations: time originates from quantum phase and space directions from quark fields of EM type. As explained in the Appendix, §A.2, the ultimate coordinate system is given by matter vector potential geodesic flow (EM connections for electron and nucleons). These determine Space, Time and the metric connection (soldering process). Thus an upgrade of Einstein's GR is natural: Cartan Geometry for baryon field and frame.

As discussed in relation with EPR debate, each *irreducible quantum system* (entangled / non-separable), generates and has its own "reference frame" (connection geodesic flow), which, from the observer's point of view (depending on its knowledge about the Q-system), may be correlated with the observer (Lab), or not; hence the need for a probabilistic interpretation for certain types of measurement (Copenhagen Interpretation), unless the experimenter performs QC on a superconducting (preferably) QC that he *prepares*, has built and knows how to "read" (extract the output of the QC to feed in another QC process; unless chooses to classically measure and "destroy" / collapse the wave function). [28]

6.2   Follow the Qi

A theme emerges from this: motion, life and everything, tend to follow, flow and grow, in the direction of the connection geodetic flow defined by the Network we refer to as matter, with its QI blueprint (biological aura as a network, system of meridians, electronic shells and bonds of a molecular or biological system; at fundamental node level: spinning baryonic fields and electronic, pulsating, "cloud"[29]).

At the level of gauge theory, this "qi" is the EM vector potential flow, (magnetic current), which defines a natural local reference frame in the sense of General Relativity, with a normalization compatible with the quantum phase as a local time. The monodromy and holonomy of magnetic current and quantum phase determine the force fields and their sources (matter "particles").

---

[27]Even the opinions about the vector potential and other aspects in physics, are quite diverse!

[28]This is reminiscent and partially justifies the "dragged ether" theory; also it shows the relation between the "Natural Way" of Tao and "Artificial Law", based on "True or False" - Mathematics, Classical Physics, Court of Law etc.

[29]Same combo: chakras and cycles, matter, space and time aspects

A   Miscellaneous

A.1   On The Genealogy of Theories

Theories exhibit the structure of a Genealogy Tree, with branching out as a main feature, and occasional unification under a unifying or even "umbrella Theory".

A.1.1   True or False?

The conclusion that a theory is "True or False" is obviously a reduction of the analysis ("measurement") to dichotomy, classical Logic, akin to the language with the logic that we use to describe Classical Reality ("Court of Law" approach).

Hence claiming that Quantum Reality is fuzzy, weird and "undertermined" is just a reductionist approach, limited to a certain means of thinking and perceiving it. It is very much determined, as it can be demonstrated if we are in position of controlling it ("having all the data" and being able to isolate it from outside, unknown to us interactions).

As an example, the "Electron" is not a pointwise particle which can be anywhere with a probability given by its wave function, but rather an "umbrella concept" common to several Theories biased by preferred modalities of investigation and experiment.

A.1.2   ... and its Users

Theories are learned and then used by various categories of people, with specialists on top of this (dynamic) hierarchy; but background education and preferences lid sometimes to conflicts and judgements as if ONE theory must be "True or False" ... unless "Not Even Wrong" is amicable substituted.

The merits and weak points of a Theory are a multidimensional space, akin to the main structure used in QM.

It is more important that some of us understand the relationships between them, and how to translate an idea from one theory into another theory language and explain it like the famous Solomon judgement (a qubit of wisdom).

A.2   Is Quantum Mechanics "complete"?

The historical debate initiated by Einstein-Podolski-Rosen paper addresses a fundamental question: "Is QM a complete description of reality?". We will address this briefly here.

QM started as a new framework for modeling complex phenomena exhibited by complex systems, made of parts that not only interact, but functioning together as a whole.

A.2.1   Spacial alignment issue

For example, an entangled pair of "particles" $Sys = \{a, b\}$ as in experiments discussed in connection with Bell's Theorem, form a correlated subsystem, with spin as an observable. Spin is an observable that is defined in a reference frame of the two particles, but which is *spatially not correlated* with the directions defined by the Lab, or "Alice and Bob" $Obs = \{A, B\}$ that may measure it, which form a 2nd system (classical/macroscopic).

Therefore, although the two spins are anti-parallel, the corresponding direction determined by the configuration of the 3 quarks frame or polarization frame if photons are considered, are not "aligned" / related to the magnetic field of the Lab that may be used to measure their spin.

This is an aspect *similar with time synchronization* that was the basis of Einstein's analysis leading to theory of Special Relativity.

Hence the Lab observable "spin direction" is "hidden" and not well defined in the description of the two uncorellated systems: the QM model is not "complete", and Einstein was right.

In order to have a common description of space directions, we need to know the EM connection, which defines the parallel transport (space alignment); the Euclid-Riemann-Einstein metric model, determining the Levi-Civita connection is not enough.

A.2.2   Entanglement without communication / post-interaction

The unknown relation between the two 3D-spaces, of Sys and Obs, even if there is a common time defined (conform Einstein's prescription for synchronization), leads to a probabilistic description of the measurement of the spins, which *are correlated* without any communication between the two particles needed!

This resolves the misunderstood "paradox": 1) The spin direction of the two particles *a* and *b* are not Lab-defined, but are *relatively defined*, with a direction unknown to the observers A, B.

This unknown direction is physical, knowable, corresponding to the orientation of the system of three quarks (if baryons or mesons etc.) or to the orientation of the 3D-frame corresponding to polarization of EM, e.g. photons.

The Aspect-Clauser-Zeilinger experiments study a coherent system (one 3D-frame), and yield violation of Bell's inequality, which assumes classical results only (0 or 1), involving the usual projection ("collapse of wave function") when the quantum system cannot be modeled as spatially correlated with the measurement aparatus (Stern-Gerlach experiment).

A.2.3   Stern-Gerlach experiment

In fact SGE is prototipical to understand the "unpredictibility" of the outcome. The description of the incoming particle, say a proton, does not prepare a specific spin direction (or polarization), but the later is well defined IF we would know the quark direction orientations (baryon field).

The analysis of polarized EM wave is a different issue than entanglement.

A.2.4   ... and Hidden Variables Theory

We can conclude that the QM of the 40s-50s *was* incomplete, for good reasons: lack of understanding of spin origin and of the role of *space alignment*, as a partner of *time synchronization* issue, emphasized by Einstein.

First note that an observable of a system cannot be observed in the Lab (Observer) if not well-defined: preparing a polarization state amounts to a correlation of the Lab system and the studied system; without this, one may rightfully say that the spin direction or polarization parameters are "hidden", and the QM description of the combined system, Lab (observer) and system studied is incomplete: probability theory applies, on top of QM for each of the two systems (just like throwing a die: not God, but the physicist does).

A HVT stating that there are *unobservable variables* is right, in the above sense (compare: there is no absolute time, so if we do not know what the clock in a moving frame shows, that is a "hidden variable"; light signal communication for synchronization is needed, to have that time well defined in the theory modeling the combined system).

A.2.5   Misconceptions?

In connection with this, there are a few misconceptions, historically understandable [34]:

1) "The existence of fundamental indeterminacy for some measurements is assumed as part of the mathematical formulation of quantum mechanics;" (loc. cit.).

This is correct, but depends on what type of measurements we perform / refer to: a) if it is about directions as above, we understand why: the spin direction of a particle may not be *not defined* in the Lab (if not prepared / aligned with the Lab 3D reference frame: Space); b) if it refers to position (or momentum), Heisenberg's Uncertainty Law reflects what an experimental fact; but this is because what we measure is *not* a localized particle. We measure a distributed system (think music amplifier) and position of an orbital for instance is not well defined, because it is a complex part of the system (where is the piano note of the song entering the amplifier, with a positive feedback loop correction? etc.). Generically, HUL shows that macroscopical Space-Time is not real, it is emergent from a QC process. c) "Per its mathematical formulation, quantum mechanics is non-deterministic, meaning that it generally does not predict the outcome of any measurement with certainty. Instead, it indicates what the probabilities of the outcomes." (loc. cit.); this was true in QM development around 1950s, when Copenhagen Interpretation dominated, and most measurements focused on position, momentum etc. (mechanic variables). With the development of QC (theory, hardware and software), we now know how to prepare a Q-process, control its development (it is deterministic from our point of view), and

we know what comes out of it, feeding it to another QC process etc. But if we ask the "wrong" question (classical), and force the answer via a macro-strong-measurement, we destroy the outcome (QI) and extract classical info (collapse/projection: Q-logic-to-classical logic)[30]

A.2.6 Early attempts at hidden-variable theories and "separability"

(loc. cit.) Einstein, although rejected the idea of a probabilistic reality ("God does not play dice!"), realized that to save determinism, non-separability of entangled parts in a system must be accepted; and he withdraw his critique of Schrodinger's equation. [31] But he was right: two entangled parts, form a coherent deterministic system, which is non-local in the Lab, as a 2nd coherent system, but probabilistic related, i.e. "separable" with the 1st.

A.2.7 Everybody was right ...

Regarding the declaration of completeness of quantum mechanics, and the Bohr–Einstein debates (loc. cit), a "Solomon quantum logic" (again) applies [32]: the early QM as a framework in the sense of Heisenberg (Matrix Mechanics: linear algebra over complex numbers as a "pre-QC" theory) was "definitive" as a "machine code language", but there was a lot to write as "software" for the Physics, to be a satisfactory description, "reasonably complete", of reality (extended: human experience and newly discovered discrete and entangled world).

Schrodinger's equation (Wave Mechanics) is too much anchored in a continuum Space-Time, yet DE deterministic framework, to be "close" enough to the quantum reality; but close enough to classical Physics, for the new Physics to be accepted (and not understood).

A.2.8 Metric vs. Connections; pre-sync/align: prerequisite for a common language

One clear stumbling block for understanding Q-Physics is to focus on mechanical concepts (position, momentum, energy, mass etc.; a step away from this: $P = mv + eA$, and to distinguish *Metric Physics* from *Connection Physics*, e.g. Gauge Theory, towards a QC interpretation).

"Any deterministic hidden-variable theory that is consistent with quantum mechanics would have to be non-local, maintaining the existence of instantaneous or faster-than-light relations (correlations) between physically separated entities." The first part is correct: the theory has to be a relational non-local theory, *but* this should mean we can't just model particles in interactions which exchange local properties only! There are *global properties* which determine the behaviour of the System, which are not, and should not be localized[33]. Reality is in fact a self-adapting Quantum Network ... much more that the forefathers of QM envisioned, but within the Linear Algebra framework (and group theory, Category Theory etc.).

The 2nd part is misleading at least: it does not have to maintain "faster-then-light" communications; it has to have prior established correlations, standards, for Alice and Bob to understand each other (unless we use RSA and an actual exchange of info is needed: THAT can't be achieved faster than "light" speed permits).

A.2.9 Micro-Frames and Expansion: separation

"faster-than-light relations (correlations)" is wrong to say: relations (entanglement, corresponding to non-separable subsystems) does not require communication! It requires a common history, where a "locality split-and-move-away", with speed $v < c$ is stably accompanied by sharing a "common key" (property), e.g. antiparallel spin (relative to their own concept of space direction: two 3D-frames, no matter how small, e.g. proton size, define a reference frame, which can expand at light speed under a photon EM interaction).

At this stage picture (gedanken experiment) the two particles a, b reaching A at the N-th pole, with its own "up-direction", and b reaching B at the equator, with its z-vertical direction, in the time when

---

[30]If breaking an egg, don't expect it to grow into a chicken.

[31]This is similar to trying to prove "parallel postulate" and then rejecting non-euclidean geometry, as a reasonable outcome of negating it.

[32]There is no Y/N answer which can be complete (not enough bits for this): a "picture" of a 1000 words (or more) is needed!

[33]Where is, precisely, the hole of the doughnut, please?

their Physics thought Earth was flat! They would assume the have the same "universal" verticle / up direction, and had confusing results when measuring the two spins (would not apear as correlated). This should show that what happens if there are 3 uncorrelated reference frames; but corelating A and B frames (Lab) is not enough to have a unity between the various variables of the Observer and Observed System.

A.2.10   Bohmian Mechanics

Bohm's hidden-variable theory has a "hint" towards what is missing: the moving particle carrying a de Broglie "wave" is, in the autor' opinion, a double hint: a) has a local 3D-reference frame associated to it (momentum and proper quantum phase as measuring time), which can be thought of as an EM connection that defines the connection geodesics of this frame (A-flow); b) This is not known / related to Lab reference frame (metric connection), because we don't know the initial conditions (polarization / spin and quantum phase) when the "particle" started to "move" (hidden variable), in relation with the Lab's Space-Time description.

On the other hand extending this idea to maintain the "particle" (local) aspects of the process is, in author's opinion, wrong; there is still "no particle" in the 2-slit experiment, but rather a Network with global properties, including electric charge emerging from the magnetic A-flow (see Herbetrt Jehle's work), and the double slit acts as a beam splitter for the photon in analogous optics experiments. In other words "The Electron" is quite an "enigmatic" concept in Physics: it is rather a complex Theory amenable to a mechanic description (particles and motion), with the help of Schrodinger's equation and Copenhagen Interpretation of QM.

A.2.11   Recent developments

One may ponder upon some recent developments (loc. cit.) ... but our conclusion is: QM (C-based) as a framework and fundamental language (QC, qubit based), is "complete" (universal): all that we need is to write the OS of the "Universe"; BUT the actual Q-Theory (concepts, code and interpretations) has a long way to go ...

Two crucial aspect show QP is "incomplete" as of now: a) The Network aspects: unification of fermions and gauge bosons, as "traveling" via QI channels; b) origin of "separable" / non-locality (space alignment/ EM connection role); there are a few other unifications needed [35].

There is a need for a unified "Expert System of Physics", correlating in a consistent manner the various partial theories developed rather as a knowledge network.

A.3   QM and Measurements

The "Measurement Problem" in QM (strong measurements in Q-Physics) received a lot of attention and generated many debates; the 'disagreements" originate from not considering the fact that preparing a classic measurement of the evolution of a Q-process S, e.g. detecting a photon / electron in a 2-slit experiment $I \rightarrow O$, changes the evolution of the system studied, because it makes it part of a larger system $S + O$, consisting of S and intruding detector D (as an alternative "output port"), affecting the prior outcomes (fringes of interference), in the *same way probing with a screwdriver a capacitor on inductor of a radio changes its reception and speaker output*! It is not about small or big, classically behaving component or quantum.

A.3.1   ... and Schrodinger Equation

The Schrodinger wave function of $S + O$ is different from the one for S only, and can be obtained as a "collapse" (projection operators involved): with a detector on "path A" after the 2-slit is like bringing a portion of the screen closer, to block 2nd path; or, if a photon scattering is used instead, than a new quantum experiment is in place (2 inputs, a scattering interaction and an output).

The way we collect the observational data is also characteristic of classical logic (lack of coherence electron gun and photon sourse / macro-size of detector etc.).

When we say "measurement collapses the wave function" gives a misleading view of what happens: it is not like we can immerse the detector in the S-wave flow of the 1st S-equation at a comparable

time scale; we study another system with an other S-wave (different geometry and topology of paths, output and input ports etc.).

A.3.2   The Copenhagen Interpretation

Saying that the probability of detection of the "electron" P is given by the wave function amplitude $|A|^2$ has to be understood as above: IF we change the system's hardware configuration including a detector THEN ... etc. IF we study the 2-slit experiment combined with an electron-photon scattering as a "modulator" (transistor setup) THEN ... etc.

A.3.3   Why is QM considered "weird"

It does not mean the electron IS a pointwise particle (physically localized matter) which can be anywhere (but forgetting Heisenberg uncertainty principle hinting Space / position is not a physical reality) and that we measure its presence (as a pointwise particle) with a certain frequency (i.e. we counted "it", the Newtonian electron[34], was in that particular place, as a whole object that number of times).

   Thinking in this way is obviously a mistake, mixing various preconceived ideas (our experience of reality, or Newtonian Mechanics etc.) from various Theories that are each of them of value and consistent within themselves (using a term with the meaning from one theory when applying another theory: it would be catastrophic in Software Design! ... and a computer to prove us wrong :)).

A.3.4   Quantum Phenomena are Complex Cybernetic Systems

Quantum Phenomena are as Natural as understanding an electronic amplifier, as long as we distinguish between phenomenon's Network and Functionality description (internal description) and our macro-Lab formulated description in terms of emergent Space and Time concepts.

   A *complex irreducible quantum system* is a system with parts which are subsystems, and cannot be modeled by "factoring" into separable components (parts) with *only physical interactions exchanging energy-momentum* at a rate less then the speed of light. It exhibits properties of a Cybernetic System (control and stability).

   An entangled pair of particles is such a "shared structure" system; the qi flow and meridian system is another example, at a different scale. The functioning of an electronic amplifier does not rely on such a property, if present; yet the presence of feedback loops, which defies a "space-time coordinate system" to map the changes from Input to Output, is a good pedagogical example to study (and then, move to Feynman diagrams).

A.4   Models of Reality

We are biased by oupossibility of perceiving and thinking about what we call "objective reality (Plato's cave; Kant's philosophy etc.).

   But we just need a "model" that we can comprehend, use to predict the behavior of the "original" (and here there is a problem: that depends on its *history*, which we can't model; or if it does not have a "long-term memory", at leas a "complete dump of its state"; usually the only way to achieve that is to "train" the system: prepare its state; even more: be able to build it, e.g. QC, in a controlled environment, e.g. particle accelerators, and prepare the state etc.).

   Bur what is really "out-there", e.g. that we call an atom?

   1) Bohr model is a useful sketch;

   2) Pion strongly bound nucleons in a tinny nucleus surrounded by a system of electronic clouds, a reasonable model (SM);

   Let's simplify and consider the hydrogen atom. What is the "electronic cloud", and is it made of "something"?

   1) If you are a mathematician, you might study a String Theory version of it;

   2) If you are a physicist, you may claim it is a "weird" quantum object: a) it is pointwise, having a mechanical mass and always the same amout of electric charge (Coulomb field), with a

---

[34]Even Elementary Particle Physics models the electron as pointwise particle in Pointwise Form of QFT, e.g. Weinberg's presentations of QFT.

magnetic moment in the direction of its "spin"; b) and when intercepted at a point via a measurement (pointy probe in an electronic microscope), it sometimes is there only occasionally, because it can be everywhere (wave function probability interpretation); c) if measured it will be bumped elsewhere, with maybe a known momentum, but its wave function will be no longer useful (has collapsed).

A fundamental question is the following: "Is reality simulated or not?"

A) If it is Natural (no creation assumed, just Big-Bang perhaps), then this "electron points" are weird ...

B) If reality is Mathematical, so are we ... and Who is "thinking" this Math?

C) But reality may be Mathematical because it's QC, discrete and it is a Simulation; then what is each piece of hardware, we can only guess, by replicating it.

A.4.1   Elements of Quantum Circuit

So, from a more practical viewpoint, we may require from the Scientific Method, not only experiment and theory to match, but also to be "engineerable" (constructible etc.).

Then, the Network Model theory needs developed on certain principles, abit like "Constructive Mathematics" (Pope etc.).

Principle 1: An irreducible quantum system is composed of the "usual" elementary (irreducible) elements of circuit called LC connectors and non-linear elements for control (like in QC).

Principle 2 etc. should define the "axiomatic properties" of these elements.

Then what is the hydrogen atom? It looks like L and C (capacitor), forming an oscillator with emission and reception capability. But where is the "control" element?

The quark structure of the proton, $+ + -$ with its 3 quark fields looks like playing the role of a "transistor" (control unit); how?

Better we take the neutron as our "pure" control unit; then understanding beta-decay, "unpacking the universal unit into our "quantum radio", is crucial; not just from scattering experiments and solid state physics, chemistry etc.

Mathematically should correspond to the Hopf fibration / homogeneous space $U(1) \rightarrow SU(2) \rightarrow S^2$, also as Klein geometry and Cartan homogeneous space, as a local model for the nodes of the Quantum Network in a gauge theory / Cartan Moving Frame, framework.

But physically, how does the neutrino interaction as a "command" triggers the "unpacking" into the LC-T circuit? How to model such a fundamental process in "universal terms"?

B   QM and Bayes' Theorem

The probabilistic framework around Bayes' Theorem applies to experiments that involve classical observables for a system that exhibits resonance.

Preparation of the spin of an electron, "conditioned" by passing through a magnetic field ("given A" as input), does not determine the state of the system (spin needs a more complex model than used presently), hence a 2nd measurement in a different direction (non-commuting operators) will provide a probabilistic correlation (incomplete theory and information).

The underlying cause for Heisenberg Commutation Relations reflect the incomplete description of the system at the level of the emergent phenomena (Space, Time and Lab measurements, defined at the level of the "base" of the gauge theory description in terms of principle bundle and QC $SU(2)$-connection $P(2,2) \rightarrow M(3,1)$). Position and momenta miss info regarding the vector potential flow $P = p + eA$ and topology of the Q-Circuit; spin is a "experimentally macroscopic defined" observable, via e.g. Stern-Gerlach experiment interaction with a magnetic field, and not an "intrinsic" QC-model (toroidal model / Hopf fibration).

Hence the QM framework and language may be universal, but the theoretical use of it, to build current Q-Theories are incomplete. For example the quark structure of baryons and mesons was absent prior to 1960s (roughly); the usual discussions around EPR, to this date do not take such a model into consideration. Even the "electron" or photon, with its $SU(2)$-gauge theory, is not treated in this context, when analyzing EPR or 2-slit experiment (or delayed-choice experiment).

Then the probabilistic data and conclusions exhibit a "Bayes' Theorem" aspects regarding conditional probability, where the information available, through preparation (conditioning) or acquisition

(measurement), usually consistent with the Lab time parameter (consistent to the direction of "propagation of mechanical signals - energy and momentum, at most with a speed of light), may correspond to an opposite "quantum time" order (quantum phase and monodromy of the vector potential), because of resonance due to feedback loops (the "problem" what "anti-matter' is).

C   Epilogue

From the accounts of various discoveries done by independent researchers, without being "noticed", hence not incorporated into general Science, but also sometimes opposed in various ways, results a general conclusion: "missed" opportunities for development exist, and they do not change the set course of mainstream science, which are well anchored in technology, education and scientific culture.

The need for a well organized infrastructure led to stability, but also to lack of flexibility and to willingly revisit weak points of the development of Science and Technology. The "structure of scientific revolutions" [58], seams not apply anymore, and a well controlled and concerted global development, from inside and outside, takes place instead.

References

[1] M. H. Devoret, Quantum fluctuations in electrical circuits.

[2] Wikipedia: Superconducting Quantum Computing; Quantum Computing.

[3] Wikipedia, Quantum LC-circuit, https://en.wikipedia.org/wiki/Quantum_LC_circuit

[4] M. H. Devoret and M. Martinis, Superconducting Integrated Circuits, Quantum Information Processing, Vol. 3 Nos. 1-5, Oct. 2004, https://link.springer.com/article/10.1007/s11128-004-3101-5

[5] Bernard Yurke and John S. Denker, Quantum network theory, Phys. Rev. A 29, 1419 – Published 1 March 1984

[6] L. M. Ionescu, Some unifications needed in Particle Physics, https://vixra.org/abs/2301.0142

[7] L. M. Ionescu, A quark fields emergent Space-Time and Gravity, https://vixra.org/abs/2303.0030

[8] L. M. Ionescu, "The Beauty and the Beast", colloquium presentation ISU, https://vixra.org/abs/2304.0051;

[9] L. M. Ionescu, Algebraic Geometry Tools for Particle Physicists, https://vixra.org/abs/2305.0001

[10] L. M. Ionescu, On emergence of relativistic time from quantum phase, https://vixra.org/abs/2303.0149

[11] Kwang-Sup Soh, Kyung A. Kang and Yeon Hee Ryu, 50 Years of Bong-Han Theory and 10 Years of Primo Vascular System, https://www.hindawi.com/journals/ecam/2013/587827/

[12] Vitaly Vodyanoy, Oleg Pustovyy, Ludmila Globa and Iryna Sorokulova, Primo-Vascular System as Presented by Bong Han Kim, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4562093/

[13] Wikipedia, Alexander Gurwitsch, https://en.wikipedia.org/wiki/Alexander_Gurwitsch

[14] Wikipedia, Orgone, https://en.wikipedia.org/wiki/Orgone

[15] James DeMeo, Orgone Lab, http://www.orgonelab.org/ ; search: "Orgone Lab".

[16] Amos Zeeberg, neural-networks-need-data-to-learn, Quanta Magazine, June 13, 2023, https://www.quantamagazine.org/neural-networks-need-data-to-learn-even-if-its-fake-20230616/

[17] Lucian M. Ionescu, Our Universe: To Model and to Simulate, https://vixra.org/abs/2305.0162

[18] L. M. Ionescu, Marginal notes on Traditional Chinese Medicine: "Acumoxa Therapy: Treatments of Diseases" by Paul Zmiewski and Richard Feit, 1997.

[19] Lo, Shui Yin, The Biophysics Basis for Acupuncture and Health, 2004.

[20] L. M. Ionescu, A note on understanding Quantum mechanics, https://vixra.org/abs/2201.0192

[21] L. M. Ionescu, On the arrow of time, https://arxiv.org/abs/0708.4180

[22] L. M. Ionescu, Alzofone-Ionescu Theory of Gravity Control, https://vixra.org/abs/2106.0056

[23] L. M. Ionescu, Alzofone Experiments on Gravity Control, https://vixra.org/abs/2201.0147

[24] L. M. Ionescu, "On quantum jumps, time and space", work in progress.

[25] L. M. Ionescu, Infotronics: Theory and Experiments, https://www.barnesandnoble.com/w/infotronics-lucian-m-ionescu/1113657110

[26] L. M. Ionescu, A holistic approach to quantum physics, http://www.aascit.org/journal/archive2?journalId=940&paperId=5323

[27] J. D. Kenyon, (editor), Forbidden Science;From Ancient Technologies to Free Energy, 2008; see also Wikipedia: odic force.

[28] Wikipedia, Odic force, https://en.wikipedia.org/wiki/Odic_force

[29] 1) Philip Ball, "The memory of water", https://www.nature.com/news/2004/041004/full/news041004-19.html; 2) Wikipedia: Masaru Emoto, https://en.wikipedia.org/wiki/Masaru_Emoto

[30] Josh Ells, "He talked to plants and they talked back", https://archive.nytimes.com/www.nytimes.com/news/the-lives-they-lived/2013/12/21/cleve-backster/

[31] Angular velocity and Vorticity: https://www.sciencedirect.com/topics/earth-and-planetary-sciences/angular-velocity

[32] L. M. Ionescu, On quark field and nuclear physics, https://vixra.org/abs/2212.0217

[33] Wikipedia: magnetic field, https://en.wikipedia.org/wiki/Magnetic_field

[34] Wikipedia: Hidden Variables Theory, https://en.wikipedia.org/wiki/Hidden-variable_theory

[35] L. M. Ionescu, Some unifications needed in Particle Physics, https://vixra.org/abs/2301.0142

[36] Wikipedia, Maxwell's Equations, https://en.wikipedia.org/wiki/Maxwell%27s_equations

[37] Howard Johnson, The secret world of magnets,

[38] Wikipedia: Hall effect sensor, https://en.wikipedia.org/wiki/Hall_effect_sensor

[39] EM and sound, Video Advice: https://www.youtube.com/watch?v=2VLXFb1KQBo, https://www.youtube.com/watch?v=n83PW7d-Qgs

[40] Kleinschnitz, Kurt Warren, "An investigation into field effects of consciousness from the perspectives of Maharishi's Vedic Science and physics", Harvard University, Ph.D. Thesis, 1997, https://ui.adsabs.harvard.edu/abs/1997PhDT........50K%2F/abstract

[41] Maharishi International University, "Maharishi effect", https://research.miu.edu/maharishi-effect/

[42] Wen-an Zhang, "1887 Michelson and Morley experiment: a new analysis with computer assistance", https://osf.io/27nxu/download

[43] Physical Chemistry Laboratory: Interferometry, https://www.tau.ac.il/ phchlab/exp-interferometry-theory.html

[44] Wiki: Lord Kelvin; see also https://phys.org/news/2011-11-revolution-theory.html

[45] L. I. and J. S., On Platonic Solids and Applications, work in progress, 2023.

[46] L. M. Ionescu, On Hodge structures and Periods – Part I: Algebraic aspects, https://arxiv.org/abs/2105.13115

[47] Jason Cantarella, Dennis DeTurck, and Herman Gluck, Vector Calculus and the Topology of Domains in 3-Space, https://www2.math.upenn.edu/ deturck/Hodge1.pdf

[48] Wikipedia, Casimir effect, https://en.wikipedia.org/wiki/Casimir_effect

[49] L. M. Ionescu, From Elementary Particles to Gravity Control, presentation to Tesla extraordinary conference, 2022.

[50] Howard Johnson, The secret world of magnets (spintronics), https://archive.org/details/howard-johnson-the-secret-world-of-magnets-spintronics-2006

[51] Hiroshi Okada, Morimitsu Tanimoto, Quark and lepton flavors with common modulus in A4 modular symmetry, https://www.sciencedirect.com/science/article/abs/pii/S2212686423000389

[52] F. Potter, http://www.sciencegems.com/Icosahedron.html

[53] J. N. Munday, Federico Capasso and V. Adrian Parsegian, Measured long-range repulsive Casimir–Lifshitz forces, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4169270/

[54] Ulf Leonhardt and Thomas G Philbin, Quantum levitation by left-handed metamaterials, https://iopscience.iop.org/article/10.1088/1367-2630/9/8/254/pdf

[55] Andras Szasz, Cancer-specific resonances, https://www.scirp.org/journal/paperinformation.aspx?paperid=120483

[56] Cathryn Morris, "Miracles or myth : the Royal Raymond Rife story", https://stars.library.ucf.edu/honorstheses1990-2015/247/

[57] Brian Bracegirdle, Rife and his microscopes, Quekett Journal o[Microscopy, 2003, 39, 459-473 459, https://www.quekett.org/wp-content/uploads/2021/01/Bracegirdle-Rife-microscopes.pdf

[58] Thomas Kuhn, The Structure of Scientific Revolutions, https://www.lri.fr/~mbl/Stanford/CS477/papers/Kuhn-SSR-2ndEd.pdf