Space, and the Nature of Gravity.

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Stephen H. Jarvis.
http://orcid.org/0000-0003-3869-7694 (ORCiD)

EQUUS AEROSPACE PTY LTD
Web: www.equusspace.com
email: shj@equusspace.com

Abstract: In taking up from the preliminary papers [1-11], the idea of gravity as a process of the nature of space shall be presented; the idea of space will be defined in a way that is able to support how Newton derived the equation for gravity using astronomical observations consistent with gravity being an "immediate" field force and not one travelling at "c", while accommodating for Einstein's "curvature of spacetime" theory for gravity. In using a definition of space that carries the notion of gravity being an immediate field force, a number of key features of quantum mechanics are able to be explained regarding the behaviour of light, this by defining "space" as "nothingness", and as a type of feature of "uncertainty" that a quantum reference would abide by, as though space has its own "program" as "nothing", putting everything within it as that which is defined as uncertain, not clearly definable, and thus must exist randomly, like a process of natural uncertainty. It is then highlighted how Einstein's special and general relativity is incorrect in its application of the idea of measuring inertial frames of reference using the speed of light in his assuming, through such a process, that gravity, and thus inertial frames of reference, operate at light speed, despite relativity theory being accurate with the idea of gravity as a curvature of spacetime. Finally, an update to the method of proof in paper 7 [7], "Golden Ratio Entropic Gravity: Gravitational Singularity Field Testing", is offered based on this new understanding of space and gravity, with associated confirmatory results posted.

Keywords: time; space; spacetime; nothing; vacuum; golden ratio; causality; inertia; Einstein; Newton; gravity; quantum mechanics; quantum gravity; loop quantum gravity; electromagnetism; special relativity; general relativity; redshift; conservation of energy; conservation of momentum; EM; light; causal dynamic triangulation; quantum mechanics; uncertainty principle; quantum entanglement; photon; gravielectric

1. INTRODUCTION

One last step of theory regarding the golden ratio algorithm for time shall be regarding the idea of space and the propagation of gravity. To understand the nature of gravity in space, one of the greatest and most under-estimated concepts in physics, namely the idea of causality, needs to be addressed. Historically, the idea of causality first appeared in classical physics care of Newton in his work *Principia* [12], where for Newton causality was a simple broad-stroke action-reaction idea and associated conservation of energy and momentum laws. In alliance with this is that he carried the idea of the force of gravity being an "immediate" field effect, despite distance through space, derived through astronomical observations. However, in order to repair the problem of the perihelion of Mercury, the idea of gravity as a curvature of space was presented by Einstein's ideas of relativity [13], in the process challenging the notion of gravity being an immediate force, putting it at the speed of light. Therefore, to explain light with gravity, the idea of causality, the key component of our use of the idea of light, needs to be examined, especially as it features so greatly in Einstein's ideas of relativity and inertial frames of reference, theory in which he assumed gravity to be light speed, when in fact it could be immediate *without* denying the idea gravity being a curvature of space.

The idea of causality is perhaps "*the*" idea that lead to Newton into his work on the force of Gravity, the effect of the apple falling from a tree onto his head, the causes thereof, the effects thereof. Yet "causality" should not be confused with the idea of "inertia". "Causality", "cause and effect", as shall be explained, is a process, where "inertia" is the resistance to that process. For instance, pushing a stone off a cliff is a cause, the effect being that it falls off a cliff. Inertia is required to push the stone off a cliff, the rock's resistance to motion being inertia, yet when in free-fall there is no inertia, only the cause of gravity making the rock fall, effecting the rock in its natural state of gravitational induced acceleration to the ground. "Inertia" as a concept has been presented previously in this series of papers, namely paper [9] where inertia was considered as merely a "reference" point of view, how to disturb an otherwise natural environment, "inertia" being the resistance of a body to being disturbed in an otherwise natural steady state system. Yet most theories in science are based on the idea of inertia, naturally because of the manner in which experiments have been conducted in researching material structures such as mass and particles, namely, "if we collide objects together, what happens to those objects, what forces of inertia are involved in those results, what energies?". That research though highlights the clunky nature of the idea of "inertia", and how ultimately it would not work in a grand unified field theory. So, what investigative tool of inquiry is left to examine the nature of objects and field forces and their inter-relationship? Here in this paper that investigative tool shall be considered to be the idea of "causality", cause and effect, as it marries so well with the idea of time, a fundamental quality of reality, this as opposed to the idea of "inertia".

In introducing the idea of causality linking the fundamental field forces, the link of the field forces in regard to cause and effect, the idea of causality needs to be discussed in the context of known theories of the field forces and associated particles. For instance, to say that causality ***is*** the action-reaction process between the field forces is to say all the field forces interact in a cause-effect manner, which may not be the case on closer examination of each of the field forces and their nature of cause and effect in regard to say for instance the idea of "time". Of course, in using basic Newtonian physics, "inertia" regarding gravity is a way of looking at gross mechanisms of bodies in motion affecting each other through material offensive interactions, yet the idea of causality there is covered by Newton's laws of motion as "every action has an equal and opposite reaction". With EM field theory a different process is in play. For instance, if an EM field is activated, it will affect a magnet based on the time it takes for that EM field to reach the magnet, and so on. Newton brushed over the idea of "causality" as "conservation of energy and momentum", that equilibrium, almost casting the idea of gravity into a realm of instantaneous force at a distance (which may in fact be a correct assessment, as shall be highlighted later in this paper), as per his astronomical calculations. Nonetheless, causality here in this example of an EM field is a process of the speed of light, how an initial cause travels through space at a fixed speed reaching its effect according to the time it takes for that effect to

make itself present. Simply, the idea of causality here principally lies with light travelling at a fixed speed. Yet in either case of causality with gravity or with EM fields, causality is arbitrary to what system is being considered in a cause-effect scenario, and it still doesn't consider a unified field force process, namely the causality for instance between light and gravity, and the effect thereof for each. The real question is, "would a unified field force process ultimately require a "more fundamental" steady state process ***upon which*** causality becomes a process, a more fundamental realm ***as*** an arbitrary reference of consideration, or is causality more fundamentally embedded in the relationship of the field forces?".

The proposal in this paper is that although the process itself of causality would be in regard to light, to "electromagnetism", "the ultimate basis of causality would in fact be the idea of "space", the pot in which reality is stirred by the *nature* of space in that pot. And so, this paper is to propose the notion that behind the idea of causality is the idea of a unified field theory best explained with gravity and space, as something more sublime than the idea of time and EM. To reach that notion, several contemporary ideas of causality shall be discussed. The topics to be covered therefore in this paper by section:

1. Introduction
2. Contemporary notions of causality
3. Space, and the golden ratio time algorithm
4. Golden Ratio Entropic Gravity: Gravitational Field Testing [7]
5. Conclusion

The aim in this paper is to fulfil the need to establish the causality relationship between light and mass, between EM and gravity, using the fundamental notions of time and space, as a development upon current theories for quantum gravity, yet in using what has lead this paper to where it is [1-11], namely the golden ratio algorithm for time; the important idea that is to be conveyed here is how "light" would interact with the idea of gravity, and upon what basis, and then therefore by what mechanism of experimental evidence, and thus how the idea of causality can be related to gravity and thus mass in regard to EM and a photon of light. If all the previous papers represented a type of still-shot view of different features of the proposed golden ratio algorithm for time, this paper will put those pieces together, "flicking the switch" on how everything is set in motion the way it appears to be based on all observed data.

1. CONTEMPORARY NOTIONS OF CAUSALITY

Causality, the relationship between causes and effects, is considered to be fundamental to all the natural sciences, including physics. Causality is also a topic studied from the perspectives of philosophy and statistics. It is thus a universal tool of thought. Regarding physics, causality prescribes the temporal requirement of "cause" to precede the "effect" in time through space. In classical physics, Newton prescribed cause and effect in a fairly even manner regarding his laws of conservation of energy and momentum, while focusing more on the issues of force and inertia. As a development upon Newton, Einstein in his theory of Special relativity [13], took upon the temporal requirement of cause preceding effect in time, which as a foundation of spacetime prescribed that causal influences cannot travel faster than the speed of light and/or backwards in time. In special relativity, the relativistic principle of causality proposed that the cause must precede its effect *according to all inertial observers*, or more simply that the cause and its effect are separated by a time-like interval, and the effect belongs to the future of its cause to prevent what is termed causality paradoxes such as the grandfather paradox, a paradox which asks what happens if a time-

traveler kills his own grandfather before he ever meets the time-traveler's grandmother. All these features lead to the notion that there would exist a type of "causal determinism" if the scientific laws of causes are in play with known scientific law-based outcomes. Yet it has been shown in quantum mechanics that some events appear to have no prior cause, appearing as it were from nowhere, much like the proposed theoretical big bang event. Therefore, in contemporary physics, the idea of causality has required refinement.

One key way to address the idea in quantum mechanics of causes being unknown has been the idea of "Causal dynamical triangulation" (CDT) invented by Renate Loll, Jan Ambjørn and Jerzy Jurkiewicz, and popularized by Fotini Markopoulou and Lee Smolin, an approach to quantum gravity [14] that like loop quantum gravity [15] is background independent. Although Loop quantum gravity (LQG) attempts to merge quantum mechanics and general relativity while incorporating the standard model particles in the aim to explain that space can expand while holding galaxies together using quantized "space" representing a vast spin-network arrangement of, CDT presents the idea that a reference under examination in spacetime does not assume any pre-existing arena (dimensional space), yet aims to show how the spacetime fabric itself *evolves*. At large scales, it re-creates the familiar 4-dimensional spacetime, but it shows spacetime to be 2-d near the Planck scale, and reveals a fractal structure on slices of constant time. CDT, in using a structure called a *simplex*, divides spacetime into tiny triangular sections. A simplex is the generalized form of a *triangle*, in various dimensions; a 3-simplex is usually called a tetrahedron, and the 4-simplex, which is the basic building block in this theory, is also known as the *pentatope*, or *pentachoron*. Each simplex is geometrically flat, but simplices can be "glued" together in a variety of ways to create curved spacetimes, allowing only those configurations where cause precedes any effect to be glued together. The thinking with that approach considers causality to lie in the foundation of the *spacetime geometry*. LQG thus, with its model, proposes that the structure of space ***prefers*** an extremely fine fabric (or network) woven of finite loops called *spin networks*. The evolution of a *spin network*, or *spin foam*, is from a scale on the order of a Planck length. The problem with LQG therefore is how those spin networks allow for the required freedom of movement of quantum events in space, especially on the scale of general relativity and associated astral phenomena. In a way, LQG is much like an "aether" model, the idea of space representing a type of structure interacting with light. The problem there of course is the idea of immediate action at a distance, such as quantum entanglement, and perhaps even "gravity".

One key overlooked contemporary theory in physics though regarding causality which lends to the idea of an evolving background "space" is the idea of a big bang, an initial cause sprung from the unknown, incurring all that exists. Yet the philosophy of such an enquiry represents placing a process "into the past" that is "completely" unknown, and this would violate the terms of causality itself on the whole, as the past would need to be evident in the manner of the laws that exist in the present to represent that cause-effect link according to contemporary notions of causality and time, unless of course laws of science like an initial unknown background event "change" in time, which as a concept is entirely questionable, and understandably so given the nature of the scientific process of inquiry. The question in focus in this paper though is, "*how is it possible to join light with gravity, quantum mechanics with gravity, using the idea of causality and the underpinning nature of time as light?*". Paper 11 ([11]: p11-12) highlighted that a key problem is misunderstanding the idea of the redshift of light, which in being considered incorrectly has warranted "general relativity", "Hilbert space", and all theories that aim to explain the stars in the context of the redshift effect of light such as *dark energy* and *dark matter*. Paper 11 ([11]: p11-12) highlighted that the Planck equation suggests a feature of light can explain the redshift of light is in effect. It would therefore be important to develop upon that idea of the Planck nature of the redshift of light in the context here of the idea of causality, and bring to attention the previously mentioned contemporary models of physics that use the idea of causality to bring the field forces of light and gravity to bear on each other.

The key problem that all new theories engaging in the idea of causality try to solve centres on the idea of expanding space and the redshift effect, and how to resolve that idea of expanding space with the perceived motion

of the stars. Einstein presented his idea for gravity as a curvature of spacetime in his General Relativity, and so the idea of expanding space presented the problem of how light must behave also as perceived from stars:

- This is why general relativity was introduced beyond Special Relativity.
- This is why the big bang model has been employed, namely to explain the cause of expanding space.
- This is why current models of the universe employ the use of constructs like dark energy and dark matter, to fix the equations.
- This is why current models of the universe present an "evolving" space, to accommodate for expanding space.
- This is why current models of the universe aim to explain the nature of light, quantum mechanics, with the idea of space and thus gravity being a part of this "evolving/expanding space" feature.
- This is why current research (CERN) of the Standard Model (SM) actively seeks the existence of dark matter particles via "supersymmetry" SM theory to account for the existence of dark matter particles.

There is a better way to explain the redshift effect though, a more accurate way that integrates the idea of quantum-entanglement, the uncertainty principle, and the nature of gravity being superluminal, and it is a way that is very similar to the idea of "CDT", yet at the same time very different in that **the nature of space is and must have a quality of complete "emptiness"** (as it shall be explained), as by utilising such a feature of space delivers all the necessary features of quantum mechanical description that all contemporary models of quantum phenomena cannot. To explain this feature of space, it is necessary to depart from contemporary models for time and space and introduce a model for time that is compatible with purely "zero" space. The underlying principle to discuss is to begin with the idea of light from the atom, and why the position of a quantum jump, the position of the photon, is uncertain such that a point of light from an atom radiates along a spherical wavefront.

3. SPACE, AND THE GOLDEN RATIO TIME ALGORITHM.

In this stream of papers [1-11] central to the golden ratio algorithm for time, the concept of space was first presented as the idea of a 3-d "nothing" in paper 1 ([1]: p1-3), then the second paper ([2]: p3-8, eq1-6) as a part of the geometry of time, derived thereof, as per the phi-quantum wave-function. Upon that basis the idea of time as the golden ratio algorithm with that model for space, space as a 3-d "nothing", was carried through to this paper. It was considered simpler to present space in such a fashion without any greater definition at that time of the theory generation, as the focus was primarily on the golden ratio algorithm for time. Now further definition will be added to the idea of space with that same golden ratio algorithm for time. The issue that needs rectifying is "what is the general ***reference-marker*** itself of space?" For instance, "what is up and what is down, what is left and what is right?"; namely, how does a particle know where to make a quantum jump and why, in a "zero" spatial field of an atom? This issue of definition for space is central to the idea of cause and effect, namely what is the cause of a location of an object in space, why would it appear somewhere and not somewhere else, or is the process designed to be random?

3.1 SPACE AS NOTHING

If we can depart from the idea of spacetime, from that idea of Einstein, for a moment, it would be true to say that if space and time are two separate ideas, if space is not time, if space can be considered on its own as a concept, it can only thus be "time-***less***". If space on its own as space is not "aether", it has no

aether, it is aether-***less***, and so on and so forth. It could also be true to suggest that if space is ***not*** time, is ***distinct*** from the idea of time, space as a construct would effect issues that would "***violate***" the idea of time, and thus perhaps propose the concept of ***reverse*** time, time from the future into the past, as a type of "***super-luminal***" construct. Yet without violating the idea of an object being able to travel back in time, space would need to be "objectless", as "***nothing***".

So, a few basics for space to propose in putting the idea of "***spacetime***" on hold:

- Space is not time, and thus is time-***less***:
  - Space would therefore on its own violate conditions of time:
    - Space would presumable therefore be an infinite speed, an immediate-effect realm.
- Space is not mass, and thus is mass-***less***:
  - Space would have no structure other than being a 3-dimensional "nothing".
- Space is nonetheless related to time, and vice-versa, as demonstrated in paper 2 ([2]: p3-8) regarding the golden ratio algorithm for time generating a 3-d spatial grid.

The new central theme here is positioning space and time as polar opposites as definitions would have it, despite their inter-relationship, that if there is a fullness as time there is an emptiness as space. Consequently, "space" here in this new regard, this new account, is considered as "*complete emptiness"*. Even if an aether is proposed in other theories regarding reality, there would need to be something that holds that aether, an emptiness of some description. The question now is, "*what is the point of that emptiness, of presumably space*, *to hold the fullness, as simple as that*? In short, the argument here is that ***pure empty space*** needs to be an ***ingredient*** of reality, ***as a concept that can be useful in describing a link between gravity and EM <u>and better explain causality</u>***. What is that personality of space though, how would it effect light for instance when the two are brought together, when space and light are brought together?

Take a sphere, any size, yet a perfect sphere. Now call that sphere a "unit" of nothingness, as though it is timeless, as though time is not passing, in that any point on that sphere could be equally anywhere else on that surface as much as the idea of "nothing" would have no reference, indeed if the entire construct is as one yet as nothing. In other words, any point on the surface of that sphere could be anywhere else on the surface of that sphere, because that sphere itself has no bearing of what north is, what south is, what left is, what right is. Thus, take a fixed central point "0" on a 3-d axis system, and now lengthen ahead a unit distance to point "A", whatever unit distance is chosen to be. It could be in any direction, along any axial coordinate stretch. Simply, as "space" here is as nothing, the point "A" could exist anywhere on a sphere a unit distance from that "0" point, because technically it is given no greater definition other than being a part of a unit of "empty" 3-d space and thus hypothetically could exist "anywhere" around the "0" reference point a unit distance from "0". This idea was presented in paper 2 ([2]: p3-8), yet for simplicity the idea of the constructed wavelength of time in that paper was held along a fixed axis. The real question now though is how this pure empty space interacts with the idea of time and thus light as a development from paper 2 [2] and the papers thereafter. Although as per paper 2 ([2]: p3-8) the implication is that time creates the idea of space, there were previous definitions assumed along that course of theory development ([1]: 1-8), mainly space being as nothing, and a part of the t_A (time-after of the golden ratio algorithm) process, and yet paradoxically, the idea of "light" can result in "mass" as a t_A event which is associated to this "nothing"

which would be it would seem gravity, as per paper 5 ([4]: p4, fig1). Can any contemporary evidence be therefore presented that would suggest the previous papers correct, to confirm the previous papers, put them together, with the suggestion that space as nothingness is the ideal platform for gravity and is associated to light through the idea of mass as the destructive interference of light as presented in paper 4 ([4]: p5-9)?

3.2 SPACE AS A PLATFORM FOR GRAVITY

The proposal is that space as "nothing" is the platform for an "immediate" field force effect of gravity, as Newton calculated, yet importantly, as was calculated in paper 2 ([2]: p3-8). The thinking of space being related to time suggests that a wave-function, the phi-quantum wavefunction, through destructive interference resonance, can give rise to the features of mass and thus gravity ([4]: p5-10) which as destructive interference would as mass and gravity take on the features of the "nothing" 3-d space. This was further developed upon in paper 5 ([5]: p4, fig1) detailing how mass and gravity would emerge from such a process from the atom. Is there any evidence that such could be so with this new description for space as a 3-d nothing realm, that gravity could take upon a "nothing" speed and thus immediate force field effect?

3.2.1 THE SPEED OF GRAVITY

Conventional wisdom using light as inertial frames of measurement reference for different bodies in motion suggests that the speed of gravity would be the same as the speed of light as derived from Einstein's version of relativity, which therefore demands nothing exceed the speed of light. Yet there is a sizeable amount of evidence that disputes Einstein's assertion of Gravity not being superluminal;

- Newton's laws [12] declare gravity to propagate instantaneously as per Newtons astronomical calculations.
- *Tom Van Flandern*, in *Physics Letters A* [16], argued that the visible light arriving from the Sun to Earth comes from a measurably different location in the sky than the point that the Earth is accelerating towards in space owing to how light propagates at light speed while gravity would propagates at infinite speed.
- *Sir Arthur Stanley Eddington's* orbital calculations rely on gravity having an infinite speed.
- *Pierre-Simon Laplace* calculated gravity to have a speed of at least 10^8 times the speed of light.
- The fact that the Earth is not accelerating toward the visible location of the Sun, but rather 20 arc seconds in front of the visible Sun (where the Sun will visibly be 8.3 minutes in the future), the same light delay seen in the positions of stars.
- Calculations highlight that If gravity propagated between the Sun and the Earth at the same speed as visible light, the Earth would double the distance from the Sun in 1200 years.

3.2.2 THE UNCERTAINTY PRINCIPLE AND QUANTUM FLUCTUATION

Introduced first in 1927 by the German physicist *Werner Heisenberg*, the uncertainty principle (also known as Heisenberg's uncertainty principle) circumscribes any of a variety of discrepancies to

the precision with which certain *pairs of physical properties* of a particle such as position and momentum can be known. More simply, it states that the more precisely the position of some particle is determined, the less precisely its momentum can be known, and vice versa, Importantly, *the uncertainty principle is central to a fundamental property of quantum systems and is not a statement about the observational methods of precision*. Associated to the uncertainty principle is the idea of "quantum fluctuation", the temporary change in the amount of energy in a point in space. Quite simply, the uncertainty principle and associated quantum fluctuation principle represent, on the elementary particle level, how for instance the photelectric effect can't be captured from one reference despite hunting the electron responsible for that shell jump; essentially, the electron jump could have happened anywhere on the atom, anywhere on a spherical location, with location and energy being mismatched, which fits completely well with the above mentioned idea of "space being nothing", causing such uncertainty of location, the effect of "space" as a 3-d "nothing".

3.2.3 QUANTUM ENTANGLEMENT

Quantum entanglement is defined as being a physical phenomenon that occurs when pairs or groups of particles are generated, interact, or share spatial proximity in ways such that the quantum state of each particle *cannot be described independently* of the state of the others, even when the particles are separated by a large distance. Quite simply, as Einstein put it, "*spooky action at a distance*", action that experiments demonstrate is an immediate effect linking/entangling the quantum states of two separate particles.

In the context of this new definition for space, if space is the immediate conduit, and light is fixed at "c", and light is not gravity, then gravity would have to be a process of the immediate effect of space. Yet it wouldn't be so simple, for if gravity has an immediate effect as G throughout the universe, each construct of mass would be in a type of immediate arrangement with other mass constructs on a universal scale, a type of gravitational shape of reality. Yet "associated" to each mass would be "quantum effects" associated to the atoms of each mass, thus indirectly involving the quantum effects of each mass construct, atom, to other mass constructs, atoms, immediately. It's a simple and new way of explaining the idea of "quantum entanglement" care of this new theory for time and space. This was presented in papers 2 ([2]: p15-18) and paper 5 ([5]: p4-5). Essentially, the idea of quantum entanglement is relevant to how the quantum state of one mass would be of the different time quotient in the golden ratio algorithm to that of another quantum location of that other mass-atom.

3.2.4 THE PHOTON

The idea now of a "photon" of light gains more focus in this new context of space. According to quantum mechanics, the **photon** is a type of elementary particle as the force carrier for the electromagnetic force, the mass of the photon being as zero, always moving at the speed of light in a vacuum. Here, similarly, the "photon" would represent light "***associated***" to space, and given space represents the feature of "gravity" in this new description for space and time, this would indicate a photon of light would have mass-like qualities in it travelling through a medium that has mass-like qualities (owing to gravity being associated to space). Nothing different, just a simpler way of explaining how it, a photon of light, would behave with this description of space.

3.3 GRAVITY AS A CURVATURE OF SPACE

Given space is as nothing according to the aforementioned defined “unit” of space, a “spherical” unit, and that this effects the idea of gravity, there would exist a natural curvature to space regarding the idea of gravity owing to the “spherical” nature of “nothing” space, as determined by the notion of drawing a point “A” a unit distance from a reference point “0” in the as-defined “nothing” 3-d space, and how in drawing that point “A” a unit distance from that reference point, it could be located anywhere “on a sphere” a unit radius length from point “0”. Thus, gravity, in being related to space, in being related to an infinite array of spherical determinations of space, could only be regarded as a representative of that curvature of space “as gravity” when other conditions of light become apparent, as the necessary destructive interference to produce mass and the associated effect of gravity upon space, as it has been explained to operate as per paper 5 ([5]: p4, fig1). Quite simply, mass being the destructive interference of an EM wavefunction, of the phi-quantum wave-function, as per paper 4 ([4]: p5-10), then gravity according to paper 5 ([5]: p4. fig1) is the electrical component of destructive interference which itself would curve to the nature of the immediate nature of space, not as an electrical component, yet as “gravity” ***associated*** to space. It therefore follows that “greater concentrations” of mass as EM destructive interference would produce greater spherical field back-drops and thus concentrations, and thus spherical gravity zones. Simply, gravity being a curvature of spacetime is better explained with the suggestion that gravity would represent a gradient of curved space, the greater the concentration of gradient with more mass (and thus EM destructive interference). Therefore, the reason why light would bend into a gravitational field along the line of the gravitational spherical front owes itself to the fact that such a spherical front is in fact “along the line of the light wavefunction that generated that mass and thus virtual spatial construct as gravity”, as per paper 4 ([4]: p5-10). This formed the basis for the research of paper 7 [7]. The proposal thus that space as “nothing” would be the platform for gravity has significant evidence, provided the speed of gravity is “immediate”, as it could only be if space were simply as “nothing”. Note also that the idea of gravity as a curvature of space and still immediate (as Newton proposed) will fix the issue of the Perihelion of Mercury as it did for Einstein and his notion of gravity being a curvature of spacetime.

3.5 CAUSALITY: EM AND GRAVITY

The idea of space as a 3d-nothing realm, a general infinite-speed field platform for gravity, is in a sense the idea, compared to light, of space travelling back in time, giving space and thus gravity a type of “origin” quality, that which would appear to pre-date time itself. It could be thus suggested that space itself would be a realm that represents “the extreme beginning” if indeed gravity through space is immediate as a field force effect. On that point, the idea of gravity being immediate as a field force, an extreme event of the past, as though it has happened, always has happened, places the idea of using an inertial frame of reference to calculate bodies in regard to light as incorrect, as an inertial frame of reference regarding relativity requires “light”, and thus inertia here is really a mention of “c”. Essentially, if gravity is indeed “immediate” as a field force, then the change between two objects as a force of gravity would also be immediate, yet light as the information carrier of that change is fixed at the speed of light, not immediate, according to any nominated observer reference, meaning that change would have already happened and light would be trying to catch up with that change, like a snake chasing its tail, forever. Such would be the problem with relativity theory. The other problem is why it was in fact contrived, relativity theory, namely to explain the idea of the redshift of stars, which if properly accounted for with the idea of space and gravity

being an immediate field force effect, while applying the idea of $E = hf$ to a spherical propagation of light, then space is in fact not expanding, not requiring the notions of special and general relativity at all.

The conclusion therefore reached in use of this upgraded definition of space *as nothing* and time *as the golden ratio algorithm* is that everything would exist in a universal mass-gravity immediate balance, the only feature of flux being light-time and the necessary uncertainty in play there on the quantum level owing to the nature of space. Moreover, the idea of gravity being an "immediate" force grants it "*super-elementary*" status, upon which light would operate, presenting the case that "in the beginning was nothingness", which would be correct in one dimension of thought, namely if space is everywhere, and gravity effects through space "not" as cause and effect, "inertia" cannot be as "gravity" yet a "way" of looking at simple gross events of cause and effect regarding observation. Simply, for mass to incur an effect on another mass as though immediately, the idea of mass would also suggest it is a part of an immediate shape of space and time, a general shape that it is everywhere, if not eternal, as much as space would act as the immediate relationship between the attractive effect of mass in space keeping that shape of reality in effect, without end. The issue therefore of causality can be neatly summarised by focussing on this process of space, and how that would relate with mass, gravity, upon which light would play its role. It could be argued that if mass attracts itself without end, what keeps the planets separated, and furthermore why would not everything collapse into to a central mass construct? The answer to this was alluded to in paper 11 ([11]: p12-13) regarding the behaviour of light as it passes from a central light source, namely developing a singularity through the redshift-effect of light in space, and thus as it would seem a type of "nothing shell" effect of space in the outer limits of light, as though stretching everything out, preventing a collapse of mass in space. The big ticket here for research therefore is demonstrating how creating a destructive interference of EM, a virtual EM line, can develop a gravitational spatial distortion, as presented in paper 7 [7]. What needs to be paid particular attention to though, according to paper 2 ([2]: p3-8), is the different spatial dimensions regarding the phi-quantum wave-function that the electrical component of an EM field represents compared to the magnetic component, a feature that was not fully presented in the EM resonance research paper, paper 7 [7].

4. GOLDEN RATIO ENTROPIC GRAVITY: GRAVITATIONAL FIELD TESTING [7]

The idea of creating a spatial and thus gravitational distortion was presented in paper 7 [7]. There, the idea of creating an EM resonance field was presented with the right intention, yet what resulted to be a problematic process of resonance in mind for the type of antenna in play in order to prevent electrical arcing, for in paper 7 [7] the antenna wind and associated chamber diameter was calculated for the "electrical" component ($-\frac{1}{\varphi}$) inside the solenoid/wind, and not the magnetic component (φ), and in doing so brought into effect an explosive feed-back of electrical arcing in the antenna ([7]: p15, fig16).

As an alternative therefore, as according to paper 2 ([2]: p3-8, fig.10), in considering the magnetic component (φ) is of a different spatial dimension to the electrical component ($-\frac{1}{\varphi}$) when creating an aerial that seeks a "magnetic" EM destructive interference resonance, the right ratio of EM field and wind diameter needs to be installed in regard to space for the magnetic component. Thus, as an extension to the research of paper 7 [7], EX-3 was conducted with all the same parameters and materials of EX-2 as per paper 7 ([7]: p13-16), except for the following amendments/changes to figure 12 of paper 7 ([7]: p13, fig12) regarding the chamber diameter and wind diameter of the coil/antenna, namely taking the coil wind diameter to 36mm and the chamber to 74mm according to the fact that

the magnetic field spatial component as a ratio with the electrical field spatial component is $\frac{4.605}{3.141}$, and thus a factor of 1.466, as per figure 1.

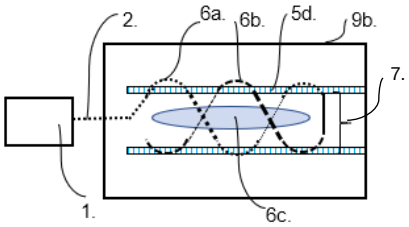

Figure 1: amended from paper 7 ([7]: p13, fig12):

Figure 12 < *AMMENDED* >: RF source (1.), connecting coaxial lead (2.), one solenoid (6a.) ~5 winds forward (image 7), another solenoid (6b.) ~5 winds back (image 7), solenoid winding Perspex tube bulkhead (5d.) attached to ~~51.7~~ ~74mm ID aluminium pipe structure (9b.), EM destructive-interference field region (6c.), solenoid wind diameter ~~25.8~~ ~36mm (7.), see images 6-9.

EX-3 was run 12 times, each of 30 seconds duration, without any electrical arcing, stopping each test at 30 seconds to prevent over-heating in the chamber. A final test was run for 40s, the images 1 and 2 showing a before and after frame of the spring-suspended system, time 0 (fig. 1) and time 40s (fig.2). Diagram X proposes what is happening in the chamber to bring such movement into effect, an amendment of figure 14 paper 7 ([7]: p13, fig14), the theory being that the gravitational field effect would be perpendicular to the magnetic field destructive interference resonance axis (as was highlighted in paper 7 [7], namely along the electrical destructive interference path). A video link for EX-3 is available at the following link: https://www.youtube.com/watch?v=pdrxeaQ2Psw [17].

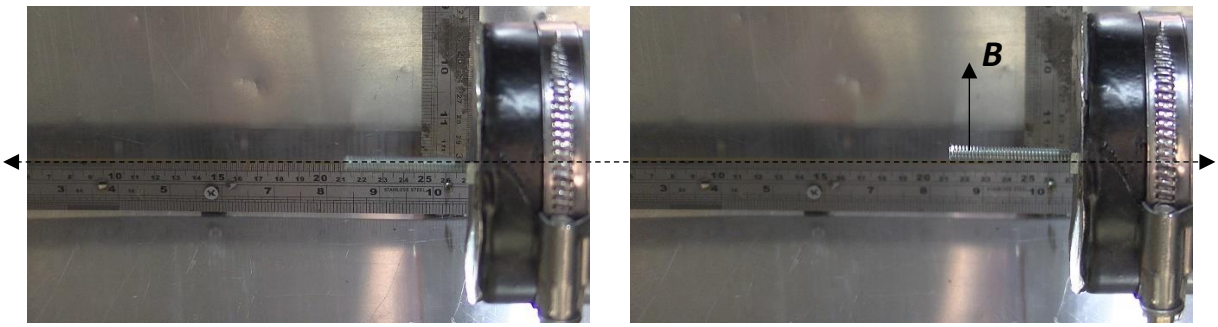

Image 1. Image 2.

Images 1-2: EX-3 result of movement of the suspended system upwards at end-"B" (see fig.2) owing to movement downwards at end-"A" (see fig.2), considered to be due to a "mass-effect" in the antenna EM destructive interference resonance region, image 1 representing time 0s, and image 2 representing time 40s in the application of the RF specified in paper 7 [7].

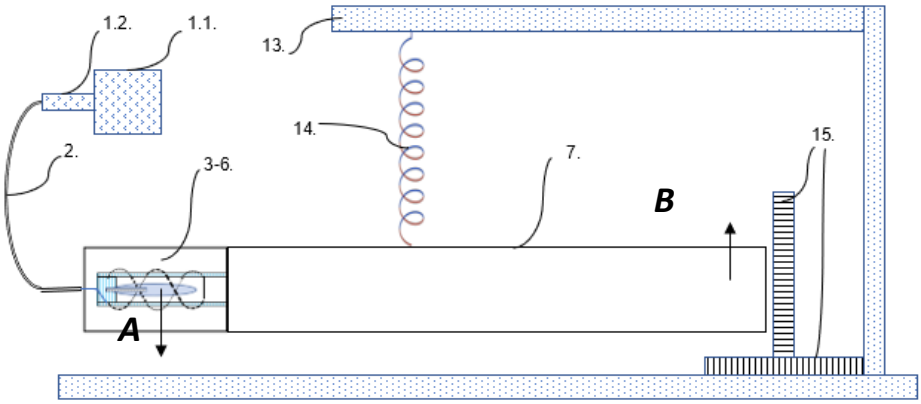

Figure 2: amendment of fig.14 paper 7 ([7]: p13, fig14) using new movement markers "A" and "B" owing to the mass-effect in the aerial resonance chamber region "A".

The testing yielded a detectable although minor amount of movement in the suspended system, seemingly as though the end of the suspended system housing the aerial system was becoming slightly "heavier" in the context of the Earths gravitational field, yet completely absent of electrical arcing, which, the movement despite being minor, could be considered to confirm the following:

(a) creating a "magnetic" EM destructive interference field appears to represent a "mass" effect, as proposed in paper 5 ([5]: p4, fig1), and this a local issue in space appeared to ***yield to*** other gravitational forces present, namely the Earth's gravitational field.
(b) it thus appears to be the "electrical" component of destructive interference resonance that yields the optimal gravity-field results, as the "gravity" field effect is yielded by the "electrical" resonance component ***directly*** ([5]: p4, fig1).
(c) there nonetheless exists "different" spatial dimensions for the electrical and magnetic components of an EM field, as proposed in paper 2 ([2], fig.12) given that when using the magnetic field spatial codes for the RF EM field source, there is no electrical arcing yet a "mass" effect, yet when using the electrical field spatial codes with the RF EM field source, the electrical arcing is paramount with apparent explosive thrust ([7]); p13-16).

The results of paper 7 [7] therefore are in no way being discounted, as the results there clearly show an electrical arcing effect yielding a propulsive result, the immense arcing being the key problem though. It is important to note that as the gravitational field effect would be perpendicular to the axis of the magnetic field destructive interference resonance, it could be logical to suggest that this could be supplemented by an electrical field, given the electrical field is perpendicular to the gravitational field in an EM field, and that according to paper 5 ([5]: p4, fig1) the golden ratio value for gravity would be $\frac{-1}{\varphi}$, and thus ultimately an electrical component, which of course is what was sought for in paper 7 [7]. The problem there, as mentioned, was the arcing in the antenna, despite the explosive/propulsive effect it gave in line with a gravity-effect. Here in this testing, EX-3, the effort has been to demonstrate the magnetic component as destructive inference, which yielded a far different result, namely a "mass" effect vulnerable it would appear to the Earth's gravitational field. The greatest technical difficulty therefore in demonstrating the gravity field effect from EM resonance is the management of the electrical component of the aerial and that destructive interference resonance, as it appears the "mass"-effect would require a far more amount of energy to effect a gravity field result of its own.

These are results contemporary models of scientific theory are unable to predict or explain. Furthermore, the results clearly highlight the distinct difference between the spatial scaling of the electrical component of an EM field to its magnetic component, as theorised in paper 2 [2], and further highlighted in paper 5 ([5]: p4, fig1), in that one particular wind diameter and chamber diameter gives vastly different results to another, as proposed according to the different spatial dimensions of the electric and magnetic components of the phi-quantum wave-function, the electrical gauge giving electrical arcing, and the magnetic-gauge giving what appears to be mass-related movement. Further research is being pursued to further refine the "electrical" component of EM destructive interference resonance to yield a gravity field effect, the key issue being using material that won't have a tendency to short the system in an explosive fashion as highlighted in paper 7 [7].

5. CONCLUSION

In a broad sense therefore, how does gravity link with EM? The answer is based on accepting their fundamental difference as a propagation ***in*** space, as the context of that difference, space, as their link. In explaining this, the key concluding point in this paper is that gravity can only be the idea of space itself conveying the idea of instantaneous force between mass objects that affect each other according to the equation of gravity as Newton calculated with his astronomical observations. Alternatively, in considering two bodies in motion in ***using light as a reference with the idea of inertia and thus gravity***, such a process of examination ultimately becomes a process of sheer uncertainty, as the relativity between two bodies exists immediately according to gravity and thus the idea itself of inertia, and thus using the idea of light to describe their interaction, the interaction between two objects, as the idea of inertia and thus gravity, always must fall short of the precision that is sought as a location in space, as that reference of light would in not being instantaneous as gravity, give the incorrect temporal account of inertial frames of reference, and thus create an incorrect body of scientific knowledge.

Conflicts of Interest

The author declares no conflicts of interest; this has been an entirely self-funded independent project.

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