Temporal Mechanics (E): Time-Space Logistics

Stephen H. Jarvis

email: shj@equusspace.com

Abstract: This paper, the fifth in a series of 5 papers summarising Temporal Mechanics, presents the over-arching and underlying idea of a "logistic" of time-space, as a process of having proposed new definitions for time and space to then deliver via theoretic modelling more ideal results than achieved by Einstein's special and general relativity, quantum mechanics, and the standard model of particles, namely delivering the same basic constants and metrics for known particle and associated field phenomena, while then proposing a next step for theoretic development, namely quantum-based and Planck-scaled particle mass and associated gravity; here, Temporal Mechanics is able to derive the lightest particle by understanding how a DIR (destructive interference resonance) of a Planck length would lead to particle formation, and not just particle formation, yet the formulation of a basic Planck scaled theory of gravity, correctly deriving the value of "G" from the elementary particle level.

Keywords: temporal mechanics; temporal calculus; quantum gravity; particle pair production; symmetry-breaking; destructive interference resonance; Planck length; X17; DIR; PQWF

1. Introduction

In many regards our developing understanding of reality prescribes the theoretic building of a set of certain laws that work together in creating a certain holistic formalism, a certain holistic formalism that over time per a certain logistic process results in a certain set of scientific principles of simplicity, all of such in seeking a "grand" theory explaining all the laws of nature.

Physics theory seeks that codex, as an understanding of the laws of nature.

http://orcid.org/0000-0003-3869-7694 (ORCiD)
Web:www.equusspace.com

Yet is such a codex a syntax itself for the emergence of consciousness, of life itself, and if so how does physics assume to use consciousness to then decipher what it seeks to determine (the laws of nature and thus consciousness)?

In addressing this question, Temporal Mechanics [1-34] presents the case for a new theory for time that is based on our temporal perception ability, one that presents the case for the laws of physics that work together to present a reality central to holistic laws that our perception is entirely adaptive to and a part of.

This paper is paper 5 of a general set of summary papers [31-34] describing the main body of Temporal Mechanics [1-30]: each of the papers in this series of 5 papers represent an overall interlinked process that is used as a general summary for Temporal Mechanics.

Einstein's Special Relativity (SR) and General Relativity (GR) theories [28] have been cornerstone principles for the definitions of time and space that both Quantum Mechanics (QM) and the Standard Model (SM) for particle physics have built themselves upon. Einstein's GR has been the primary description for gravity, yet it is still unable to link with QM and the SM of particles, and more fundamentally, unable to account for a link between electromagnetism (EM) and gravity (G). The question is why, and does it have anything to do with how the idea of consciousness, the observer reference, is being employed by its scientific methodology?

The question that shall thus be asked is, "*is Einstein's Relativity Theory (SR and GR), a theory considered as the current cornerstone definition for time and space, the most accurate way to define time and space given its inability to properly accommodate for QM and the SM of particles, and thus link G with EM?*". Other questions such as, "*is Einstein's relativity theory contradictory, and if so how, and thence how would that impact current theoretic norms of QM and SM*?" will also be asked in addressing known issues with Einstein's relativity theories, and how that relates to our fundamental ability of physical observation and theoretic design.

Although Bell's Theorem [29][35] exposed a number of inconsistencies with Einstein's Relativity theory and the limitation of measurement Einstein's Relativity theory finds regarding particle location and the phenomena of light [25][26], the question presented here in this paper is if there is an underlying *a priori* issue itself with Einstein's definitions of "space" and "time", and have those terms been defined and put to work as fundamentally and as well as they should, as much as our conscious ability should allow, and as much as the phenomena of reality would warrant?

This paper shall analyse Einstein's Relativity Theory (SR and GR) for any flaws and inconsistencies thereof, going to its very primal historical footprint of context and development. The proof of Einstein's relativity theory shall also be examined and whether other models can more completely prove the same phenomena. As shall become apparent, the underlying theme of both Einstein's Special and General Theories of Relativity is his notion of the "*primacy of mass*", a notion which as shall be demonstrated leads to a series of unresolvable theoretic gaps and inconsistencies in regard to our conscious ability to perceive phenomena and be theoretic.

A "next step" approach to the theoretic design of *spacetime* will then be proposed, here as the core argument of Temporal Mechanics, by first exposing the logistics of Einstein's Relativity theories, and

then developing upon those apparent design limitations to deliver a more efficient and complete outcome. Specifically, the questions that will be asked of Temporal Mechanics shall be:

- What are the *logistics* involved in Temporal Mechanics compared to *spacetime* theory?
- What is the *specificity* involved with Temporal Mechanics compared to *spacetime* theory?
- Where is the proof of Temporal Mechanics compared to *spacetime* theory?
    - Does Temporal Mechanics prove everything SR/GR/QM/SM can prove?
    - Can Temporal Mechanics go beyond those proofs in demonstrating something new?

The key presentation here is what Einstein's work does not address, namely the idea of "time" and how that relates primarily to the idea of consciousness, to the idea of an obsveror, as a mathematical caricature that resembles our conscious ability of temporal perception, then thereby developing a new *a priori* for time and space to better account for physical phenomena.

This paper will be divided into the following key chapters:

1. Introduction
2. Reaching Einstein's spacetime
3. Spacetime Logistics
4. Quantum Gravity
5. Intended Phenomenal Design (IPD)
6. Time-space IPD
7. Charge-EM IPD
8. Mass-Gravity IPD
9. Particle IPD
10. Thinking "inside the temporal circle"
11. Gravity as a spatial derivation from the Planck scale
12. Cosmological IPD
13. Perception IPD
14. Conclusion

The question therefore being asked, the primary criticism of Einsteinian physics, is in asking how our perception most basically interacts with reality.

Indeed, contemporary science does not know what consciousness is or how it is formed other than through metaphysical terms, yet uses it nonetheless as an assumed ingredient to the construction and supply of a theoretic device to match experimental data that is true to perception, true to what perception measures.

In the absence of a proposed/formal model for consciousness, using the idea of light with perception it seems is an intuitive thing, a common-sense approach, given how our sight works, sight being our primary register of reality, of seeing 3d space with the changes in it that are apparent as the

flow of time. Yet the question being asked is if light is the most fundamental feature of perception, or is there something more fundamental still to perception, more fundamental yet intrinsic to light itself?

2. Reaching Einstein's *spacetime*

It can perhaps be confidently assumed that an objective system of measurement needs numbers, granting numbers the status of being a tool to ultimately measure the dimensions of space *and time*, as per via mathematics and associated systems of dimensional analysis. The question though is *why* is there our conscious need to measure space *and time?* Is the idea of *needing* to measure the dimensions *beyond* the idea of numbers alone? Can indeed numbers alone perfectly describe the dimensions and associated particle and field phenomena?

Of course measurement is important, but the question being asked is *why do we measure things, what is the logical if not philosophical drive to measure*?

Paper 2 presented the case that measurement is instinctive to the idea of consciousness itself ([2]: p22-23), that consciousness represents the missing link between the idea of mathematics as numbers and the dimensions of time and space. To propose that though is to know how that could be possible. To know how that could be possible is to consider the fundamental relationship between numbers and the dimensions of time and space. And to know that is to, in the first place, *measure*. Quite simply, the exercise of measurement would appear to be a natural process of accounting for reality, if not reality accounting for itself.

For instance, the earliest civilizations are considered to have needed measurement for purposes of their own basic social communication *logistics*, measuring things such as agriculture, construction, and trade, as a basic process of communication and social congress whereby the systems of measurement there would have been arbitrary to each community, ultimately though with growing social connectivity between people requiring a standardised system of measurement, which is what we have today, as a way of managing supply-demand essentials, such as a process of ***logistics***.

With hindsight aside, the question remains, namely, "*why count, why measure?*".

In a basic sense, calculating/counting is a way of extending oneself to one's world, even having one's world apply to oneself, with what can only appear to be a heightened if not exterior type of *conscious* paradigm of relating with reality, of not being tossed about, yet stopping and calculating, going beyond oneself to measure what exists around and about.

Fundamentally though, the importance of measuring reality correctly is central to upholding a core concept of correctly adapting to and working out the functioning of the world, of getting reality right, of going beyond mere survival instincts to appreciating basic ideas of cause and effect. For instance, to measure something as vast as the stars incorrectly, to develop an incorrect theory of cosmology, could of course have its implications on not just we as a species making errors in general, yet society entire as an endeavour with reality, in exposing society to faulty ventures, faulty forecasts, faulty assessments, and wasteful exploits.

What has happened therefore in the history of measurement with the sciences?

The sciences began with basic measurements of structures using pictorial geometry and associated mathematics, usually in examining gross structures, which then became more refined to the atom, as a trend. This is considered to have taken its beginnings from the systems of Ancient Egypt to that of Ancient Greece, to then Galileo, then to Newton, finally as it seems to Einstein, diving from the greater structures to the smaller structures using basic and simple ideas for the atom relevant to basic and simple terms and ideas, terms such as “atom” or even “aether”. Along this process were bridging ideas that have become superseded, discarded, ideas such as the *particle* aether, phased out with a growing understanding of the *atom* and its further refinement with optics.

In view of historical records in our recent history in the physical sciences, it became evident where the luminiferous particle aether theory was heading, namely the photon, a particle of light; there, the only thing that changed was that the wave idea as a primary description was discarded to focus entirely on the photon replacing the luminiferous particle aether.

Eventually this process came to the forefront with Einstein who made the great leap to defining what space and time would be by primarily considering what the momentum of an object is in space in regard to time, according to the current data set available to him, yet above all by making the concept of “mass: something that precedes in importance to the concepts of space and time. Was he absolutely right though, or can his theory be improved upon? The only way to know is to test his theory and assess how well it works with known compilations of data.

There are many ways to look at the process of Einstein’s *spacetime* as the idea of a theoretic device delivering a solution to a data puzzle via a process of numbers in the context of measurement.

For instance, the idea of “perception” is assumed to concur with the idea of light, more precisely with the speed of light, with c, evident most clearly in Einstein’s SR account of how a person is aware of time in different trains travelling at different speeds from their subjective reference. Thence the idea of relativity took shape as time-distortions maintaining a constant c. Subsequently, the idea of momentum was included to ultimately explain the idea of gravity, as per his GR. In short, modern physics is now completely dedicated to the photon, as though the luminiferous aether was merely given c *wheels* as the *photon* by Einstein, becoming the new microscopic scale of measurement. The question then was how the *photon* as that basic measurement device can explain the atom, and associated constituent particles.

3. *Spacetime* Logistics

The logical step for physics was in putting all the data it has together with the photon. This had two immediate effects, namely the basic new theory itself for the photon as a light particle (Special and General Relativity), and *then* how the photon can explain the atom (Quantum Mechanics, and thence the Standard Model of particles). To know how all of this has fared is to take a closer look at Einstein’s new scale of measurement, namely his theories of Special and General relativity and associated *spacetime*, all of such presented in paper 28 [28], noting the achievements ([28]: p6-8) and failures ([28]: p8-9).

Yet what should be more closely looked at are the attempts of making space a mathematical construct, a mathematical staircase, of *spaces within spaces* ([28]: p5-6) and so on and so forth, in its

hope of delivering a more fundamental theory of sub-quantum particle phenomenon, and whether or not such an approach has merit. There, the question is, “by that process of theoretic inquiry, can a solution be forged?”.

The term *logistic* is considered to prescribe the detailed organization and implementation of a complex operation. The term has many applications, although mostly used In a general business setting as the management of the flow of operations between a point of origin and the point of consumption to meet the requirements of customers, ideally a process functioning as efficiently as possible with minimum cost and resources.

Rarely is “logistic” used to describe a process of physics theory, *until now*.

For instance, the term *logistic* as an infrastructure process in physics theory could be considered as how a physics *a priori* is defined as *the point of theoretic device origin to how well that theoretic device provides an equation and theory that matches known physical data according to the greatest efficiency of equation use and associated explanation.*

Thus, Einstein’s *spacetime logistic* could be considered as the infrastructure in play between the perception reference of the observer and the natural flow of temporal events in reality; it can therefore be considered that his overall *spacetime logistic* was central to the photon, light as both a particle and a wave as the key descriptor of what is to be “observed”, and not just that, yet what “is” the reference of the observer, namely the idea of c. This then gave rise to Quantum Mechanics (QM) as that way the photon could measure the properties of the atom. This though led to problems nonetheless relevant to the actual pixilation (metric with space) of the photon and how that relates with particles and their placement in space (highlighted by Bell’s Theorem [29][35]), together with not accounting for particles that existed on a sub-quantum scale (as per the Standard Model of particles, as per the “Yang-Mills existence and mass gap” problem [25][26]).

Essentially, the real question for Einstein’s photon particle/wave model and the general wave-particle Quantum Mechanics model is the pixilation it offers, or rather, “can’t offer” to the Standard Model (SM) of particles, and how indeed a photon of light (whether described as a particle or a wave) is unable to precisely account for the location of a particle, such given the issue found with Heisenberg’s Uncertainty principle [36] as described by Bell’s Theorem [29][35] and the requirement of non-local particles, all of which Einstein’s relativity theory has been unable to account for. Beyond these two key problems is then a third over-arching problem, namely the absence of a theoretic link between gravity and EM, which is no surprise if indeed there is a disparity between light and the location of a particle (a particle presuming to have mass in space). All of this points to the idea of pixilation and how gravity, and thence presumably mass, can get involved with light, with EM, namely the photon.

In the absence of proof for a complete gravity theory associated to the photon model, to date it is widely accepted that two *field* theories for gravity exist, one whereby General Relativity models gravity as a curvature of *spacetime*, and the other where Quantum Mechanics and associated Quantum Field Theory formulates a flat *spacetime* field. The third option is to consider gravity, like EM (photon), as a particle, namely the “*graviton”* which in being required to follow the quantum mechanical description present themselves well under the radar of observation owing to their comparative field strength to the photon.

It would be natural to think that the step ahead for relativity physics (SR and GR) would be along the line of what Einstein proposed, namely focusing on *space*, as per a proposed metric/geometry of space, especially so in the context of his 1955 *spaces within spaces* amendment, and thus perhaps if not higher dimensions of space, as presented in paper 28, "*Temporal Calculus: Resolving Einstein's Theory of Relativity (Special and General)*" ([28]: p5-6).

To face this general issue directly is to face the idea directly of *Quantum Gravity*, namely how a theory of *Quantum Gravity* can be presented to stitch all the problems of SR and GR together with QM and the SM of particles.

4. Quantum Gravity

The idea of *Quantum Gravity* theory is currently executed in making QM the primary theoretic investigative device while still nonetheless abiding by the basic principles of Einstein's SR, all in the context of the apparent incompleteness of Einstein's GR.

Black Hole physics has been used as the platform for *Quantum Gravity* as a way to describe distances very close to the Planck scale, namely distances close to the center of a black hole, the thinking there being examining any quantum break-down in the black hole and how that would relate with the idea of gravity as the presumed curvature of *spacetime in that black hole*, namely to analyze what happens there when that happens and to put a theory to it, thus linking gravity with EM.

Therefore, the key difficultly in formulating a successful *Quantum Gravity* theory is that quantum gravitational effects are only proposed to appear at length scales near the Planck scale, around 10^{-35} meters, a scale far smaller than what research can currently make available, despite the difficulty of creating a miniature black hole in the laboratory.

One approach here is in considering how, in the case of the centre of a massive black hole, ultimately curved *spacetime* can form a complete *spacetime* loop, and how then gravity can be defined as a temporal particle-moment on that Planck scale. For instance, Einstein presented the case with his SR and GR theories that the past and future can exist in the one geometric object, such that "all time" can exist *all the time*. The next step is finding that one *geometric* object.

One novel approach is to consider extra dimensions in using a complex number plane, more specifically, in using complex number $Lie\ groups$ [37] which can provide a model for the concept of continuous symmetry between 3d spaces requiring rotational symmetry (in order to capture known particle properties and associated data); $Lie\ groups$ (a form of gauge symmetry transformation code) can be employed to act as extra-dimensional fibres as curvatures ***on*** 3d space, and so to consider the proposed idea of *spacetime* geometry as a curvature, then $Lie\ groups$ can be employed as circular arcs from 3d *spacetime* as a 4d multidimensional complex (5 dimensions upon the 3) creating a general spatial matrix that makes time symmetrical as a circle in that $Lie\ group$ context, which fits with Einstein's "all time" idea and also his 54th amendment *spaces within spaces* ([28]: p5-6).

An innovative team of physicists based in California, *Quantum Gravity Research*, as presented in their research papers [38] and associated descriptive filmography [39], have proposed that:

- a particular construction of $Lie\ group$ "$circular\ fibres$" as an extradimensional construct to 4d space can produce an overall $E8\ Lie\ group$ crystal construct, as an $E8\ crystal$,
- that then translates to a lower dimension (4d), and thus not as a pure crystal per se yet a 4d *quasicrystal*,
- which can then derive a 3d quasicrystal representative of a tetrahedron complex of crystals called the $Qausicrystalline\ Spin\ Network$ (QSN), a network of tetrahedrons the sides of which are proposed to represent the *Planck length*, considered to be the smallest possible length that can exist.

The idea proposed by *Quantum Gravity Research* (*QGR*) is that "reality" (4d and 3d) can be explained as:

- a lower dimension quasicrystal as 3d,
- which takes instructions ultimately from a higher $E8\ crystal$ encoding, an 8d crystal projected to 4d, then converted to 3d.

QGR considers the cell shape of the $E8\ crystal$ lattice is an 8d shape with 240 vertices called the Gosset Polytope, and when the Gosset Polytope is projected to 4d, it becomes two identical shapes of different sizes, the ratio being the ***golden ratio***, which as 4d is projected to 3d.

Integral to this is that *QGR* concurrently proposes that the *circular fibres of the Lie Groups on the E8 Lie group level* are responsible for the *curvature of spacetime*, and thus the idea of motion and thus more fundamentally *gravity*.

In other words, here is proposed a system that aims to mathematically join the scale of gravity (E8) to the Planck scale (3d), and thus is considered a good model for discussion here.

To add weight to this idea, *QGR*, specifically as per its digital media "*What is Reality*" [40], @ time 21:16, considers the idea of a massive curvature of *spacetime* in the context of a black hole reaching the level of the Planck scale, and thus :

- *using known idea of the golden ratio as the precise point where a black hole's modified specific heat changes from positive to negative as per* $\boldsymbol{\varphi = \frac{M^4}{J^2}}$,
- *together with the golden ratio being part of the equation for the lower bound on black hole entropy as per* $\boldsymbol{\varphi = \frac{8\pi S l_P^2}{ekA}}$,
- *together with also being associated to the loop quantum gravity parameter of black hole entropy as per* $\boldsymbol{\varphi = 2^{\pi\gamma}}$.

Basically, the proposal of *QGR* is that the $E8\ crystal$ as the concept of gravity and those associated $Lie\ group\ threads$ are related to the Planck scale via the golden ratio, a scale known to be associated to Black Hole phenomena.

In short, *QGR* presents the case for:

- the golden ratio existing on the 4d level (GR, *spacetime* theory),
- which then relates to the 3d level (QM, matrix theory),
- which then suggests the golden ratio exists *everywhere*,
- and thus leading to the conclusion that there would exist a process of linking EM to G via the basis of the $E8\ Lie\ group\ crystal$ lattice.

The obvious issue with the 3d "reality" level with this *QGR* approach is ***replicating*** *the laws of physics*, most basically describing the *motion* of particles and those associated field forces, and thus as a 3d quasicrystal lattice, explaining the *movement* and *behaviour* of the components of the QSN lattice in a syntax known to particle (SM) and field physics (QM and QFT).

The fundamental question with that overall platform, as well thought as it is, is "*motion*", namely *temporal activity*, ***how*** each of these tetrahedra "*move*" in time, and not just move, yet are related to a principle of movement itself concurrent with known particle characteristics and associated field forces, which as a pure mathematics is proving to be the current task ahead, namely deriving that pan-mathematics in the context of their proposed $E8\ crystal$ theoretic platform, similar to the work undertaken regarding Hilbert space and a metric expansion of space in that space is being modelled as an $a\ priori$.

An underlying feature to establishing this mathematics though, as QGR proposes, is for the motion of the particles associated to the QSN to represent the effect of consciousness itself, namely that if the state of one tetrahedra is determined, by the alignments of the surrounding tetrahedra associated to that known tetrahedra state, the states of other tetrahedra can be also known *by the act of observing those states* in the context of the $E8\ crystal$, a view similar to if not modelled on the *Copenhagen Interpretation*.

The subsequent idea presented by *QGR* is a case of *determinacy*, namely choice of states, hence using that $E8\ Lie\ group$ mathematical model to capture the ideas of choice by using the idea itself of the ***observer***, of "***consciousness***", and thus bringing the idea of consciousness into a mathematical model with this entire $E8\ Lie\ group$ process, proposed by *QGR* as an emergence (consciousness) from a causality feedback loop of Einstein's "*all time existing all the time*", explained in detail in its filmography [39].

To construct this mathematical model of consciousness, *QGR* tags consciousness to the *Planck length, as a concept of pixilation,* as a system of tetrahedra codes as geometric symbols to organise reality with rules and syntactical freedom as a language requiring the concept of a "chooser" in that language *as a free step*.

Yet the problem exists that if consciousness is tagged to a Planck length, and the entire system is self-organizing as a Planck length, and then the entire system is self-creating as a causality feedback loop, then the problem surfaces that in that process of self-creating it happens that each *reference* of that

self-creation (as an *effect* of consciousness) can only be *unknown* (simply because each reference is already in play in being conscious of something else, of another tetrahedra), and thus the ultimate achievement of conscious theoretic awareness of linking the Planck scale and *spacetime* could never be *fully known*, as per by such a tagging of consciousness with the Planck length.

All of such limitations are known by Heisenberg's uncertainty principle [36] and Bell's Theorem [29][35]. Basically, to create an 8d ultimate structure from *spacetime* theory as a curvature as gravity using circular $Lie\ groups$ that build the 8d structure that relays the properties of time to 3d as space and to *then consider* that specific encoding of 8d>3d ***as reality***, then such still depends *on* Einstein's premise of the ultimate measurement concept of the photon ***as light***, and therefore because of that, the Planck scale is being proposed there as an ultimate floor as the side-lengths of the tetrahedron which require modelling with known particle data (characteristics and field properties).

Yet *QGR* proposes, in seeking to solve this issue, the idea of *co-creation*, simply as one conscious system creating the other to ensure that an objective spatial reference of consciousness is being accommodated for. Yet even in that scenario, in an advanced sense, ultimately only one possible condition of co-creation would play out as a *singular reality* event *in time* as that process of co-creation, which, according to the underwriting of the *QGR* theory, would need to uphold the golden ratio condition being expressed (on their 4d level).

The obvious conclusion therefore would be to tag the golden ratio *with consciousness*, however this then detracts from the idea of tagging consciousness with the Planck length, as that process of information co-creation.

Despite the sheer ingenuity of the *QGR* model, is there a solution to this process, namely, *can consciousness be tagged to the golden ratio as that sought for "something else" factor other than the Planck length that can be tagged with consciousness, something other than a tetrahedra quasicrystal, perhaps something with an "ultimate" pixilation, well beyond the Planck length, if not to an infinitesimal scale*?

5. Intended Phenomena Design (IPD)

From 1999 Temporal Mechanics began with a process of using complex number based time-circuits to attach to 3d geometric space and thence seek to resolve Einstein's proposal for "*all time existing, all the time*", yet it was found that the problems with loop causality there, of time-forward and time-reverse, lead to a series of spatial metric incursions on the quantum scale that could not be resolved, together with not properly accounting for the entropy of time as time's arrow and the idea of symmetry breaking with particle pair production, namely that ultimately particle phenomena in reality is not a symmetrical thing with time, a clean causality loop, yet a process of *symmetry breaking*.

In needing to finally resolve these issues, it was considered that the use of $i^2 = -1$ could be replaced with the idea of the golden ratio ($\varphi \cdot -\frac{1}{\varphi} = -1$), as presented in paper 1 ([1]: p4, eq7). The issue

was *how* that golden ratio algorithm was to be implemented as a *construct*, namely whether to space or time.

It was decided that the logical process of implementation was to resolve the entropy of time by using the golden ratio tagged with time, as a feature of temporal perception, as a theoretic device.

Through a series of reckonings with time and space and the human temporal perceptive ability, the mathematics became apparent for the golden ratio as an algorithm for time, as presented in paper 1 ([1]: p2-5).

Simply, the approach Temporal Mechanics takes is tagging *consciousness* to the idea of the 4th dimension, to time, *as the golden ratio*. To achieve this, Temporal Mechanics proposes a theoretic realm of infinitesimally small time points, non-local time points, as a veritable *time aether*, employing the idea of consciousness derived to be related to the golden ratio, as presented in paper 1 ([1]: p2-5). This was summarised in the previous paper, "*Temporal Mechanics (D): Time-Space Metrics*" ([33]: p8).

The issue is defining the "metric" of time and space, how time and space are *related* via a particular metric system. Such was the purpose of the summary paper, "*Temporal mechanics (D): Time-Space Metrics*", namely summarising the underlying relationship between time and space [1], how that relates as a geometry for a wave function in regard to an atom [2], and then how that relates to consciousness [3], and then how that relates to a set of atomic particles [4], how that then through a series of papers derived all the known fundamental phenomenal equations of particle physics and field phenomena [25], and how that then through subsequent modelling from the microscopic scale to the macroscopic scale related to cosmology [33].

Along the initial process of the first four papers [1-4] was one key fundamental idea that was not clearly pronounced, namely what was the actual ***mathematical logic being put in play***; for instance, "what was the spatial transformation code being used to relate particle phenomena from one location in space to another?".

The important thing to note there is that the ***mathematical transformation (matrices) codes*** being exercised by $temporal\ calculus$ (time-point mathematics) are already implicit in a non-local time-point *field* in regard to space, which was obvious by the close of paper 2 [2]. Yet, what was not clearly obvious there was what such a concept fundamentally *entailed*, namely the allowance *for a perception feature as an "intention" to concur with what human perception considers as* ***real***.

Let this be considered as the ***Intended Phenomena Design*** process, the IPD of Temporal Mechanics, namely the in-built feature of pointing the construction and exercise of $temporal\ calculus$ *to accommodate for known real data and associated equations*.

Einstein used a similar process, principally that Einstein considered his Theory of Relativity to belong to a class of "principle-theories" employing an analytic method, namely that the elements of his theory are not based on hypothesis but on empirical discovery, or rather, data that is already observed and known. The IDP is the same concept, yet relying not just on data, yet the equations behind the data.

An example of this is forming a mathematical equation for gravity.

For instance, if gravity is known to represent a certain equation through prior calculation requiring clear perception ability, that equation is considered as an IPD, and so $temporal\ calculus$ sought to cleave to that equation design, yet as a $temporal\ calculus$ analogue of that known phenomena. Such was the

case for the formulation of the equations for gravity and electromagnetism as per paper 1 ([1]: p11-14) and paper 4 ([4]: p6-7, eq1-2).

By such an IPD process, and in using known scales and measurements of the atom, such as the Bohr radius and Compton wavelength, all other known equations relevant to physics, as the primary phenomena equations, were derived, as listed and summarised in "*Temporal Mechanics (D): Time-Space Metrics*" ([34]: p13-15).

It could be argued that such is a process of back-engineering physics, taking known equations and applying them to a new calculus, to a $temporal\ calculus$ central to the golden ratio time-equation. Although that may be true in one sense, the difficulty was, as was evident in the papers, creating the $temporal\ calculus$ analogue equations *themselves*, and how the bridging analogue process required the development of an *altogether new process of time-space circuits, constants, and manifolds*, a theoretic design process throughout the papers summarised and expanded upon in papers 31-33 [31-33].

Quite simply, Temporal Mechanics did not investigate reality through trial and error, yet depended on the entire data set of physics knowledge, which is a good thing, one would consider, and to demonstrate that fact, well over 300 unique references and been accounted for through the papers.

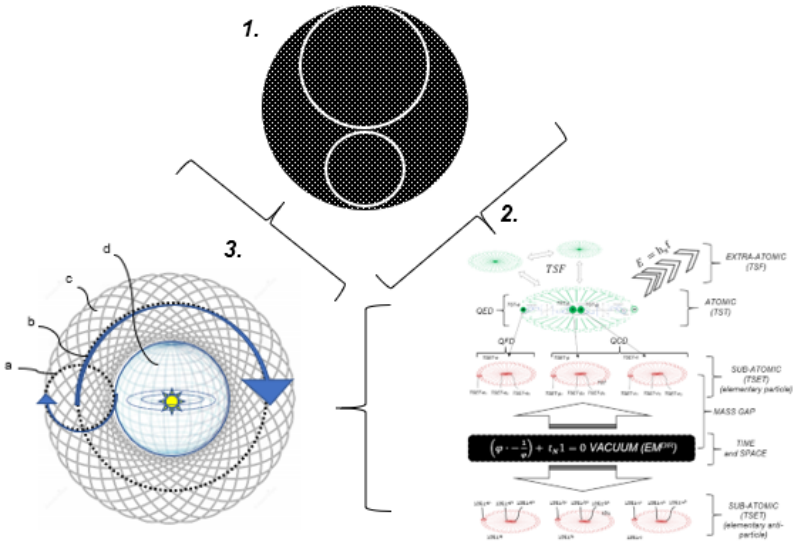
And so, although in using the Temporal Mechanics IPD for SR and GR, for QM, and for the SM of particles, by the very design itself of Temporal Mechanics and associated $temporal\ calculus$, it was understood that using light as a photon as an $E = hf$ scale doesn't have the proper pixilation required to measure actual locations of particles in space, and that a non-local time-point is required to correctly not just measure yet also derive particle and field phenomena, of course using the appropriate golden ratio scale with time.

All of such is presented and summarised in paper 34 "*Temporal Mechanics (D): Time-Space Metrics*" [34].

An important feature to note through this process is that all the spatial transformation equations common to SR, GR, QM, and the SM of particles, were no longer required owing to the transformation codes held already as the basic time-point relativity design of $temporal\ calculus$, namely how time-points are related with space, and how that leads to a wave function, and how that wave function then generates an agenda of relativity with other wave functions, and how that then relates with an underlying interoperation of time-points with space.

Essentially, with Temporal Mechanics, an infinite time-point lattice ultimately derives, through the relativity of those time points according to the golden ratio code of temporal consciousness, 3d space, thence the microscopic scale to the macroscopic scale, as presented in paper 34, figure 3 ([33]: p17, fig 3):

Paper 34, figure 3: an amalgamation of the non-local time-point golden ratio field (1.; from figure 2), accompanied to the microscopic scale (2.; ([33]: p11,fig2)), and then applied to the macroscopic scale (3.; (25]: p48, fig15)).



Fundamentally, Temporal Mechanics does not consider a primary geometry for space as the Planck scale, yet considers space as a pure void defined by the golden ratio nature of time-points according to the human temporal perception ability, yet more primarily, defined by the only logistics available for the proposition of a universal time-point aether having time-points seeking relativity with each other via space in using c as a measure of that relativity as presented in paper 1 [1], and *not* as a basic standard of axiomatic definition per se. As Temporal Mechanics holds, the Planck scale is merely the derived and calculated value of the limitation of the phi-quantum wave function ($PQWF$) ([3]: p3).

As such, Temporal Mechanics does not construct *higher* dimensional *spatial* objects, yet a higher dimensional *non-local field of time-points*; the observer in Temporal Mechanics is the time-point aether applied to space as the golden ration algorithm for time which meets with the specifications required for temporal consciousness as it is understood to be, as presented in paper 10, "*The Conception of Time*" [10].

So here with Temporal Mechanics is a recognizable caricature of conscious awareness constructed with the golden ratio temporal perception facility, not a geometry per se, yet a type of emergence from the otherwise incompleteness of the *locality* of reality as per the *non-local* time-points from which *locality* bases itself in interacting with space per the golden ratio scale; such was initially presented in papers 1 and 2 [1][2], then given greater scope of definition in paper 3, "*The Emergence of Consciousness from Chaos*" [3], and thence furthered in paper 10, "*The Conception of Time*" [10].

Therefore, Temporal Mechanics and associated $temporal\ calculus$ is not an analogous theory to SR and GR, to QM and the SM of particles, despite the equations being analogues themselves, as the theory itself requires *a completely different* $a\ priori$ *for time and space*.

Thus, in Temporal Mechanics using a *wave* model for light primarily, a wave through a spatial related time-point aether, and how such is related through destructive interference resonance (DIR) of the wave to space, as gravity ([21]: p16-20), such is not to presume that Temporal Mechanics is a type of

acoustic metric of *spacetime* either, is a type of *gravitomagnetic* theory, as it is not; Temporal Mechanics is not an *analogous* ***theory*** in any form as much as it requires the replacement of not just the tenets of SR yet also GR, both of which QM and the SM of particles rely on as per the basic premise of the *photon model*, a model which Temporal Mechanics completely voids in considering it, the photon, a *secondary* feature of the more primary temporal wave function feature of light ([2]: p8-10).

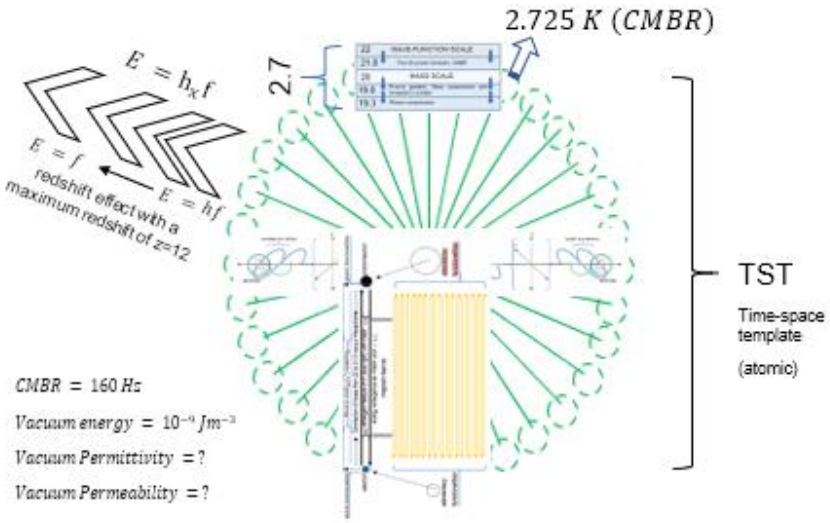
6. Temporal Mechanics: Time-Space IPD

The process of the Temporal Mechanics time-space IPD, namely heading towards explaining known particle phenomena and associated field forces through correctly explaining the more fundamental interaction between a new proposal of definition for time and space, first required the establishment ***of*** a new *a priori* for time and space in the form of a basic mathematics, number relationships, and hence geometry (1-d time and 3d space), as per paper 2 [2], and thence the construction of the analogous equations, in then asking how all those equations fit together via a *time-space template* (TST) as an atomic reference IPD.

The time and space IPD proposal was outlined in paper 1 [1], and then furthered in paper 2 [2], where paper 2 gave the core description of how the basic time-algorithm became a wave function ([2]: p3-19), the phi-quantum wave function ($PQWF$), namely how it is constructed, both monopole (electric) and dipole (magnetic) features (thus solving the "Monopole Problem"), and how that then is related to a time-space template, an atomic reference. There also was explained the *secondary* particle nature of that *primary* temporal wave function.

Thus, along with those proposals of time and space construction, namely suitably fitting an atomic scale (Compton wavelength (λ), Bohr radius (a_0) and fine structure constant ($\frac{1}{137}$), as per paper 2 ([2]: p11-13) Temporal Mechanics sought to find how that proposal for time and space, different from Einstein's *spacetime*, could nonetheless work towards accommodating for the basic equations of gravity and EM, the basic dimensions of the atom, together with being analogous to the basic known properties of particles and their associated field force phenomena.

One thing that became apparent through all of such modelling was the development of what was termed a time-space template (atom) (TST), a focus for how the temporal wave function ($PQWF$) developed its own complexity in its own interaction with space and with other temporal wave functions superimposing on it. This is represented in paper 24 ([24]: p20, fig3):



Paper 24, Figure 3: time-space template (TST) showing the general functions from figure 16 paper 2 ([2]: p16, fig16), figure 6 paper 14 ([14]: p23, fig6), and figure 10, paper 23 ([23]: p24, fig10).

This time-space template became the focus of investigation, as an "atomic" time-space template (TST), a focus for what happens with and central to that atomic time-space template and what happens beyond it in terms of wave function involvement. Subsequently, it was possible to derive all the basic known equations and associated physical constants for known physical phenomena, their weights and measurements and associated field force interactions, as summarised in the previous paper ([34]: p13-15).

Through the development of the Temporal Mechanics theory central to the time-space template in the context of deriving all of such equations, certain principles central to the interoperation of time and space became evident, certain core themes, initially found to represent 8 key time-space principles, principles built on how it was understood time and space interoperate, as per paper 24 ([24]: p23, fig5):

- Time-space uncertainty ([20]: p11-13)
- Time-space context ([21]: p16-17)
- Time-space groove ([21]: p20-22)
- Time-space spin ([23]: p12-15)
- Time-space field ([23]: p15-17)
- Time-space template ([23]: p17-20)
- Time-space wave ([23]: p23-27)
- Time-space pulse ([23]: p27-28)

In deriving the elementary particle level, two further principles were derived in paper 25 [25]:

- TSEC: Time-space elementary context ([25]: p38)
- TSET: Time-space elementary template ([25]: p40)

It was realised that those 10 principles could be further compacted to then reflect back on the a priori for time and space, as stated in paper 30 as the “5 Principles of Simplicity” ([29], p12-13):

(A) *Space is an infinite void, a nothing, that when considered alone has no in-built ruler or measurement mechanism to measure its dimensional scope or size, other than time.*

(B) *Time, or Temporality, is the concept of a uniform “time-now” event in space that is preceded by a pre-now (time-before) event of time-points and followed by an unknown time-after realm; the time-before realm in being non-local as an infinite array of infinitesimal time-points in symmetry with one another, a non-locality of time-points (time-before) in a uniform field of time-after potential time-points via time-now, creating an arrow from time-before into time-after via a perceptible local datum reference time-now realm.*

(C) *A datum frame of reference in the time-now realm, namely a locality, is what our consciousness naturally assumes, within this entire structure, as how there becomes the idea of a measurement process in space by identifying a network of non-spatial (non-local) time-points to prescribe a locality in space (reference in space), as upheld by the perception-based time-equation (arrow) leading to a mandate for 3d space.*

(D) *Energy, the concept of transmission of a time-point datum-reference from one time-point datum-frame of reference to another at a “fixed”/constant speed, is how one datum reference acknowledges another via this transmission of energy, as the arrow of time, as non-local time-point energy transmission at a constant rate (commonly understood as light).*

(E) *Mass being the result of a time-point pairing, as one time-point joined to another as a new datum reference, as a destructive interference resonance (DIR) energy transmission (folding-over of data-transmission), as a time-point DIR interference producing the idea of a unique locality in space by this interference of time-points, a destruction of non-locality to produce locality, a locality which as mass associates with space to present with the need for itself to represent a uniform drive of spatial homogeneity as thus a general mass-force of attraction as the force of gravity (as shall be explained).*

Paper 30 [29] was integral in reaching a new level of understanding for the atom, a key link for the time-space (atomic) template, namely the idea of the $Magnetic\ Quantum\ Shell$ (MQS) with the derivation of the $X17$ particle ([29]: p18-19), which then lead to the proposal of the greater macroscopic manifolds of papers 32, 33, and 34 [32-34].

7. Charge-EM IPD

The first example of the electrodynamic IPD can be found in paper 1 ([1]]: p8-9):

So, let us now look at the basics of electrostatic charges and the respective force in between. Electrostatic force, the feature of space given "charge" by time (our proposal), would be proportional to the following:

- *the charge of one event, charge (A) Q_A,*
- *the charge of another event, charge (B) Q_B,*
- *a charge-event constant relevant to an overall space and time feature of the event, a context Q_c,*

Electrostatic force would also be indirectly proportional to the following:

- *the time difference from charge (A) Q_A to charge (B) Q_B, t_{AB}, a process of "symmetry-breaking" with t_{BA},*
- *the time difference from charge (B) Q_B to charge (A) Q_A, t_{BA}, a process of "symmetry-breaking" with t_{AB},*

Once again, note that t_{AB} and t_{BA} would be features of t_N. Thus, the following equation would apply as the electrostatic force between the two events of Q_A and Q_B as Q_{AB} (eq. 13.)

$$Q_{AB<NEWTONS>} = \frac{Q_C Q_A Q_B}{t_{AB} t_{BA}} (C^3 t^{-2}) \qquad \textit{([1], eq13)}$$

We can't though use "time" in this equation, because technically we are proposing time "is" the feature of electromagnetism. Thus, we must replace the variable of "time" with "distance", as follows (using "c") (eq. 14.):

$$Q_{AB<NEWTONS>} = \frac{Q_C c^2 Q_A Q_B}{d_{AB} d_{BA}} (C^3 t^{-2}) \qquad \textit{([1], eq14)}$$

Here "d" is the distance between the two charges. We know via experiment that $Q_C \cdot c^2 = k_e$, where k_e is Coulomb's constant. Yet what is Q_C? What is the fundamental "charge" context of electrostatic interactions?

Basically, all the known formalisms and variables of the standard electrodynamic equation (Coulomb's equation for force, here as Q_{AB}) had to be converted over to the new time-scaling, as an IPD process.

Paper 2 then sought to bring greater detail to the variables in play with electrodynamic modelling. To achieve this, the idea of the golden ratio algorithm derived in paper 1 ([1]: 1-6) was then put to task in deriving how it would form a "wave function" ([2]: p3-18), and then how that wave function had two components, electric and magnetic, and what the agenda/limitation of that wave function would be. This then led to the idea of the wave function seeking to prescribe the value of π, which found its optimal range in prescribing a time-space template (atomic locale) in paper 2 ([2]: p12).

Quite simply, putting all the features together not only warranted a time-space template focus as a model for the atom, yet also pointed to known constants including the Fine Structure constant. To

achieve this process, certain spatial compression factors came into play to make it possible to derive the value of c and electron charge e_c ([2]: p16):

Thus, what we are considering is that ~20 times (19.8, as adjusted from 20, as 21.8 is adjusted from 22) the wavelength of the electron "per" its charge (per its fundamental representation of energy and thus "time") is in fact its "speed", the speed of the wavelength, as the whole equation for the atom runs as a way time can find "π", and thus a progression in the form of time. What type of progression of time? Electromagnetism (which shall be demonstrated). The following value results:

$$\frac{19.8 \cdot \lambda}{e_c} = \frac{19.8 \cdot 2.426 \cdot 10^{-12}}{1.60218 \cdot 10^{-19}} = 2.998 \cdot 10^{8}\ ms^{-1} \qquad \textit{([2], eq10)}$$

The value is well within an accepted range for the speed of light/electromagnetism [21]. Yet this is an interesting equation, as the charge of an electron is 20 wavelengths (that it delivers, $19.8\ adjusted$*) in the atom "per" the speed of light:*

$$e_c = \frac{19.8 \cdot \lambda}{c} \qquad \textit{([2], eq11)}$$

Here therefore is delivered a derivation for the charge of an electron based on a calculated value for the speed of light c derived from the time-equation in applying the known value for the Bohr radius a^0 of a proposed limited temporal wave function in space and associated fine structure constant value of $\frac{1}{137}$. Once again note that the wave function still prescribes that at the speed of c time does not pass, owing to the temporal nature of the wave function through space.

Of course more introductory attention to detail is presented in paper 2 [2], most especially regarding the wave and particle nature of light, pages 4-11 ([2]: p4-11),

Note the following five key points:

- *The two possible wave function outcomes for the x-axis (nominated here as the spatial axis) in space represent the two directions the temporal wave function would move along each axis in space, one needing to be the opposite direction of the other in space, and thus inverse wave-sign value (y-axis -ve, and +ve) at the "0" point of the x-axis and y-axis in recognition of this basis.*

- *Therefore, along those two directions of space (along the x-axis) for this wave function would represent two temporal phase alignments, one positive (y-axis +ve), the other negative (y-axis -ve), suggesting a type of paradoxical condition of time-forward and time-reverse for the wave function moving along either direction of the x-axis from 0.*

- *Paradoxically therefore, this wave function, having both positive and negative temporal features, would appear to have time stand-still, not pass,*

as it travels along the x-axis in either direction from 0, despite it representing a speed of transmission along the x-axis from 0 as an overall time-equation in space.

- *Along each directional x-axis from 0 we must also nonetheless satisfy each wave function step to having traversed along each directional axis (here the x-axis) the value of "π" as a "unit" wave function length in space.*

- *The question to ask is how well this wave function is able to prescribe the value of π based on how it is mathematically defined from the temporal realm and associated time-equation in its application to space (here as the x-axis).*

On simple observation, we can suggest that we have developed a sinusoidal time-wave along a spatial axis given that time must move a value of π in each directional axis from the 0-scalar spatial reference point "0".

Yet is such a standard sinusoidal wave as mathematics/physics knows it? No it is not. The important features to note here are that:

- *this is **not** a simple linear wave in space,*

- *this is a time-wave in space with both positive and negative temporal features,*

- *the implication being that time forward is positive and time-reverse is negative (y-axis).*

*Although the direction in space may appear to be positive or negative in terms of a reference from "0" on a mathematical grid, space here is space, it is not considered positive or negative, and yet what to note here with this temporal wave function is that the temporal function itself of the time-wave, the vertical y-axis, is the temporal feature of the wave having both **positive** or **negative** values, as **time-forward** and **time-reverse** respectively.*

This feature will ultimately play a key role in explaining the particle nature of light and how at c time does not pass, to be presented in subsequent papers. Consider nonetheless an adaptation of figure 8, here as figures 8a and 8b:

Figure 8a

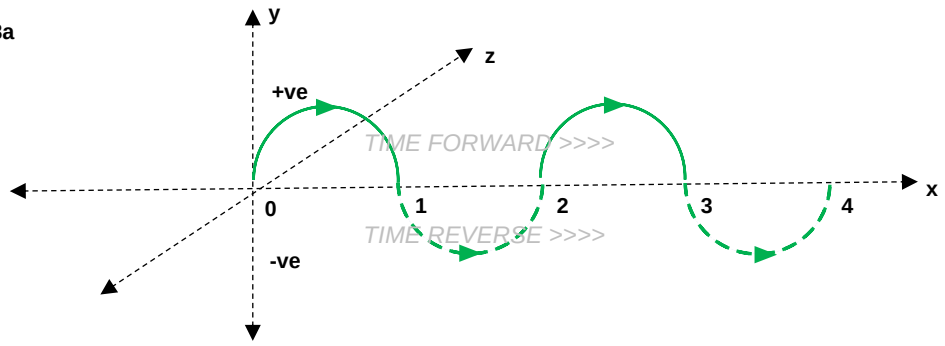
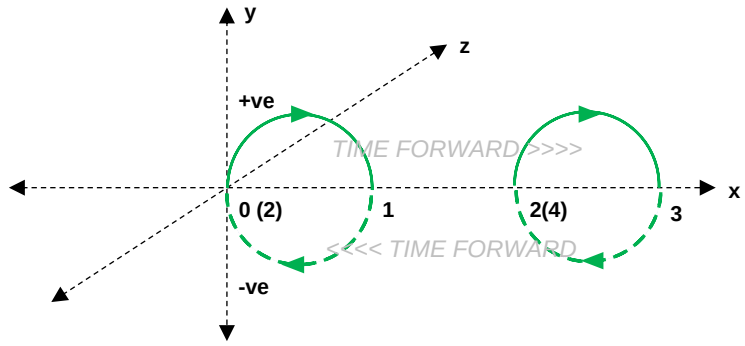


Figure 8b



Paper 2, Figures 8a-8b: note the primary temporal wave function as figure 8a, and the secondary time-circle "particle" effect of that wave function as figure 8b, both wave functions demonstrating the idea of time being an overall loop (not passing) as the progression of the temporal wave function, yet figure 8a being the primary focus for this paper and subsequent papers. Note also in figure 8b the time-reverse feature of values in brackets for the x-axis, as from figure 8a.

Note the time-circles in figure 8-b, how the negative region of the y-axis as time-reverse brings that part of the x-axis wave function back a step (in being time-reverse), twisted backwards, creating a time-circle as a type of time-now "virtual particle-ring", giving light an almost particle-hopping nature as it would progress along either direction of the x-axis from 0, almost like the light particle-ring is tunnelling as it trains along each direction of the x-axis from 0.

This particle feature though is a secondary effect of light and as such is not considered part of the primary focus of examining the temporal wave function, yet will be pursued as a discussion point in subsequent papers.

In short, the focus primarily here is how well this temporal wave operates primarily from first principles, and subsequently here how it must deliver π, and this will be a consistent theme through this paper and subsequent papers, namely focussing on the primary temporal wave function and not its secondary apparent particle effects, which without understanding the fundamental processes at play would be a misleading investigation.

Indeed therefore, the issue with π is the question of, "why assume that time as this wave would "move" through the axes of space continually as though beyond the length of π, extending outwards to infinity from 0, as opposed to just going back and forth along a "0.5" and "-0.5" x-axis grid presuming to trace π?".

Note therefore the following:

- *It is all about the time equation and how we have installed time into space.*
- *Yet installing time into space requires the time equation to be modified, adapted, given space is a different creature to time, as per equation 2.*
- *To note is that we cannot modify t_N, only how time as φ or a $\frac{-1}{\varphi}$ entity is applied to space as an "after" and "now" event.*

- *We do know though that t_A must aim (as a mechanism of a spherical wavefront in time, a future placement of the wave function, a t_A event) to ultimately most basically for one axis (here the x-axis) **equal the value of π**, the length in space time has moved along an axis (as per equation 2).*

The next key fundamental step for the electrodynamic modelling process was in paper 3 [3], for that IPD process, in deriving the fundamental quantum scale, the Planck scale ([3]: p3-4).

1. *Establishing the correct time and space granularity for a basic scale of temporal wave function energy*

The equation for the energy of a package of light on the atomic level here is proposed to follow the same rules as presented in the second paper [2], here though by focussing on the relationship between energy and the temporal wave function characteristics of frequency.

For instance, owing to the derived electric and magnetic features of the temporal wave function, "charge" can be considered as the electric feature of the temporal wave function, and can thus be considered as the primary focus of the π-condition for the temporal wave function; charge thus would be an essential ingredient to the temporal wave function, together with the idea of frequency and wavelength, and of course c. Simply, the most basic concept of charge would be considered here to be that of the electron, and thus e_c.

Let therefore the following be suggested if indeed the energy of the temporal wave function E should be proportional to the electrical feature of the wave function e_c and its associated frequency value f:

$$E \propto e_c \cdot f$$

There are though other features of the temporal wave function that need to be considered as presented in paper 2 [2].

For instance, here on the atomic scale for the temporal wave function, we need to consider the wave function of the electric component, a component which has five key features that need paying attention to in regard to its wavelength and thus frequency on the atomic scale:

- *The primary "10-step" feature of the temporal wave function along each direction of the x-axis, and thus 20 temporal wave function steps (therefore a factor of 20).*
- *The fact that this 10-step process is primarily the magnetic wave function feature, with the electric component out of phase with the magnetic component, producing a 0.5 step error (therefore a factor of 19.5).*
- *That there is a spatial compression factor in play [2]: p15-16), leading to an added ~0.2 compression factor on the temporal wave function (therefore an overall factor of 19.3).*
- *That there is an underlying c component to the temporal wave function (therefore an overall factor of $\frac{19.3}{c}$)*

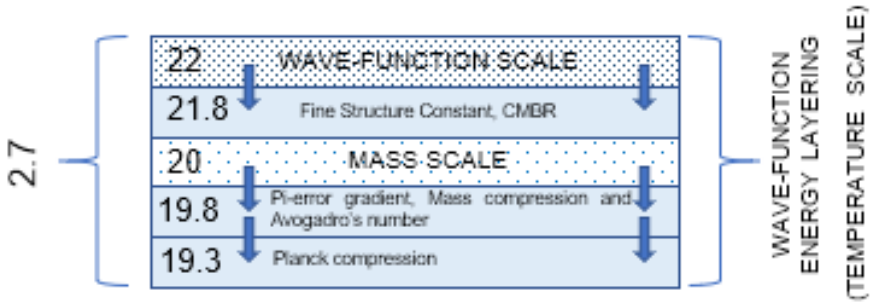
- *That the energy of this temporal wave function must be a feature of t_A, and thus t_B^2, a squared feature of the electrical component of the temporal wave function, simply because here the energy of the temporal wave function is categorised by the magnetic component of t_A as presented in equation 6, paper 2 ([2]: p12, eq6) (therefore an overall factor of $(\frac{19.3}{c})^2$ is required).*

Thus, the following equation would suit:

$$E = (\frac{19.3}{c})^2 \cdot e_c \cdot f \qquad \text{([3], eq1)}$$

$(\frac{19.3}{c})^2 \cdot e_c$ is by our knowledge of the Planck equation $E = hf$ [8] the value for h, as the value here of approximately $6.639 \cdot 10^{-34}\ Cm^{-2}s^2$, an error of 0.2% to the known value of $6.626 \cdot 10^{-34}\ Cm^{-2}s^2$. In subsequent papers, it will be shown that the maximum temporal wave function compression is a value of $22 - 2.725 = 19.275$ where the value of 2.725 is the derived value of the minimum compression-temperature of space (temperature of the CMBR), and thus a value of 19.275 would need to be used in equation 1, bringing this proposed value of h to $(\frac{19.275}{c})^2 \cdot e_c$, and thus $6.623 \cdot 10^{-34}\ Cm^{-2}s^2$, an error of 0.04% to the known value.

Once again, the compression factors come into play, as summarised in paper 14 ([14]: p23, fig6) requiring a lengthy analysis of how light ($PQWF$) would logically perform beyond the atom, beyond the time-space template (TST), in requiring the precise derivation of values for the Lamb Shift ([14]: p24, eq10), vacuum energy ([14]: p23, eq9), vacuum permittivity ([23]: p30, eq5), and vacuum permeability ([23]: p30, eq7) in alliance with this scaling system:



Paper 14, Figure 6

With those required values derived, as summarised in paper 25 ([25]: p20-22), a new summary was presented in paper 24 ([24]: p20, fig 3) showing the interlinking facets in play for a time-space template (TST), an atom, as presented in the previous chapter.

In short, what became obvious through this IPD process is that there is the basic temporal wave function that presents as an EM construct with a dipole and monopole portioned wavelength that seeks to define π and in doing so generates a time-space butter-zone, a time-space template (TST), the atom,

which then undergoes certain compressions owing to emergent factors with the wave function interacting with itself in forming mass and associated field effects with charge and gravity.

The question was, "*how far does this go, can it derive all the known phenomena of the atom, namely the elementary particles, and if so, can it reach to the level of the hypothetical "quantum gravity" realm?*". The answer is surprising.

It appeared that there was a limit for the $PQWF$ in the form of the Planck scale, as presented in paper 3 ([3]: p3).

Another limit was considered in the form of what would constitute the grossest particle, and this value was derived by means of using the derived charge of an electron to then use the logistics of $temporal\ calculus$ to derive the mass of the grossest particle from the charge (energy) of the electron, namely the mass of a proton (and thence the mass of a neutron), as presented in paper 23, page 22 ([23]: p22), in using the derived time-space template (atomic) scaling metrics:

> *It would be now possible to calculate the mass of the proton (and neutron) if it is considered that such a basic time-point particle as mass when taken up to near light speed produces the charge equivalent to that of an electron. For instance:*
>
> - *If particle speed and wavelength are known, distance and time:*
> - *the charge can be calculated as* $e_c = \frac{19.8 \cdot \lambda}{c}$ *([2]: p13, eq11)*
> - *and so too its mass* ***<u>from which the electron as a charge came</u>*** *(in using* $m = \frac{e}{c^2}$ *([2]: p16, eq15) and* $e_c = \frac{e}{c} = fundamental\ property\ 2$*, eq3):*
> - *thus* m *equates to* $\cong 5.3 * 10^{-28} kg$
> - *Factor this by* π *and the mass of a proton (or neutron) can be calculated.*
> - *Why a factor of* π*?*
> - *The mass of the electron would have been "per"* π*, the actual spherical reference it is upon as the time-point cloud (TSG), yet the mass of the central time-point would not be per* π *and thus the* $5.3 * 10^{-28} kg$ *value needs to be factored with* π*, giving:*
> - $\cong 1.67 * 10^{-27} kg$
>
> *Such would be the mass of a proton and neutron from this value of electron charge, a confirmed fact. Fundamentally here mass is related to charge and therefore gravity to EM.*

The important feature to note is that this formulation requires the basis itself of the $temporal\ calculus$ logistics, of requiring those time-space template scaling factors, derived scaling factors, of the time-space template (TST), and those basic principles involved there.

In short, the electrodynamic feature appeared to be anchored to the basic subatomic particles, to the electron and the proton, despite the fact that there existed a derived lower scale, the Planck scale IPD analogue of the same value to the Planck scale ([3]: p3). To know why, and why the force of gravity

is much smaller than that of electromagnetism, is to understand how mass, mass as a particle, and its associated gravitational field force, are derived.

8. Mass-Gravity IPD

The first example of the gravity IPD can be found in paper 1 ([1]: p9-10), as a basic description of a proposed relationship between non-zero mass object in using a temporal analogue of the known Newtonian equation for gravity as a *first attempt IPD* for gravity before the formulation of the phi-quantum wave function ($PQWF$) and associated time-space template (TST). Further refinement to this gravity IPD equation of paper 1 was made in paper 4 ([4]: p6-7). It was in paper 2 though ([2]: p19, fig16) where the notion of a *destructive interference resonance* (DIR) of a phi-quantum wave function ($PQWF$) was proposed as that process which was intrinsic to non-zero mass formation, a proposal that needed validating, yet a proposal that carried with it a required scaling system for the time-space template (TST), a proposal which would prove instrumental to proposing the MQS (electron shell structure) and associated accurate derivation of the $X17$ particle in paper 30 ([29]: p18-19):

> *According to paper 2 ([2]: p19, eq 16), there exists a scale in play for the magnetic template EM-coupling dynamic of* 32.7*, as an adjusted EM-coupling factor, as by definition of the* e *and* m *time-points, thus time-points which are linked via the phi-quantum wave function ([2]: p4-11), a condition that would fix not only the electron number per shell at a maximum value, yet define the concept of a shell itself as a spherical surface area; such is what is proposed for the uniform magnetic quantum shell surface area structure, namely this theoretic maximum value* ***factored*** *to the energy of a single electron, as though although the electrons can be of any number in the atom, the electron feature abides by a code of being uniformly* ***held*** *by the* 32.7 *EM-coupling factor of the* MQS*, almost like an axis the electron builds around as a value for atomic modelling of EM-coupling stability for each electron, of course in the constraints of the Hyperfine structure of the shells and associated inclusion of the Rydberg equation.*
>
> *Therefore, this primary* 32.7 *EM-coupling factor would be applied to each electron as a value of energy-mass, as a quantum representation of the shell, and thus surface area, as it can only represent, and therefore the proposal is that equation 1 and 2 apply for the energy value of the magnetic shell for each electron as a mass value for the magnetic component of the* 32.7 *EM-coupling factor:*

$$32.7 \cdot \ electron\ mass = MQS\ shell\ unit\ mass \qquad \textit{([30], eq1.)}$$

$$32.7 \cdot \ 0.511\ MeVc^{-2} \ = \ 16.7\ MeVc^{-2} \qquad \textit{([30], eq2.)}$$

> *Research by the "*$Institute\ of\ Nuclear\ Research\ (Atomki)$*" through work at* $CERN$ *has uncovered a value for such an energy in the atom of* $16.7\ MeV$*, ascribing this value to a particle named* $X17$ *[32][33][34].* $Atomki$ *has though not identified this as the magnetic shell confining an electron in the atom though, as that theory has not been formulated by contemporary modelling, and thus the energy value remains a mystery to the physics community.*

Throughout the papers therefore, in stride with developing the EM IPD, the gravity IPD was kept a close eye on, from basic accounts and descriptions, to more broad-ranging if not atomic and EM based phenomena, as was evident in papers 21 ([21]: p16-23) and 22 ([22]: p13-17), as a basic description of gravity in in regard to space and the temporal wave function (and associated *destructive interference resonance* effect). Following such, the mass of the proton was derived as a value from the electron charge, as described in the previous chapter, as per in paper 23 ([23]: p22).

The big issue though was describing the ***size*** of the particles in reference to a phi-quantum wave function ($PQWF$) wavelength, if not the Planck length (lP). To achieve this, the concept of a *particle itself*, and to what scale can it be derived, needed formulating.

9. Particle IPD

In terms of the *particle* IPD, namely how to derive the metrics/size of a non-zero mass particle on varying atomic scale (subatomic, elementary), it was in papers 25-27 [25-27] that all the general features of particle existence (matter and antimatter) were derived, and then how they would represent enclosed structures as though as spherical entities, as per paper 27, "*Temporal Calculus: resolving Elementary Particle formation and confinement*" [27]. Thence, the idea was then putting those particle formulations up against known issues in physics, paradoxes implicit in Einstein's SR and GR [28] including Bell's Theorem [29][35], and then the problem of light itself as a theoretic device [29], to then address the macroscopic scale as per papers 31-34 [31-34].

As an example of an IPD for the idea of particle <u>*spin*</u>, $temporal\ calculus$ presents the case that particle spin is principally a result of a fundamental interoperation of time and space, suggesting that particle existence is an entirely fundamental time-space phenomena, as follows:

- a time point is time that does not pass,
- so a spatial point in regard to a time point has no movement,
- yet with a time-point field central to consciousness there ultimately and most basically exists two time-points in regard to space, φ and $-\frac{1}{\varphi}$,
- and this then represents a *flow* as an arrow which as time for that spatial region represents ultimately a *spin*, as presented in paper 23 (23]: p12-15).

In other words, the particle IPD required keeping an eye on all the previous time-space principles being laid down, principles which themselves needed proper comparison to known particle-light anomalies such as Bell's Theorem [29][35] and the "Yang-Mills existence and mass gap" problem [25][26].

To properly accommodate for the idea of the "mass gap" and what was considered to be an associated principle of "non-local" particles, the idea of the lightest particle, the "lightest neutrino" required establishing, as presented in paper 25 ([25]: p51):

To address the TSET-e_1 mass value therefore, to note clearly here is that the idea of "e" is being considered as a "$fundamental\ property$", and that $e_c = \frac{e}{c} = fundamental\ property\ 2$. In therefore using that same line of logic in having successfully derived the proton (and neutron) mass from charge on the TST level, and now applying the same logic to the TSET level, two things need to be factored:

(i) *The "12" factor, as presented.*

(ii) *The fact that a new charge level is being encountered as a new electron analogue (as TSET-e_1), and this would therefore invoke a new "c" factorial according to $fundamental\ property\ 2$.*

(iii) $m = \frac{e}{c^2}$ *([2]: p16, eq15) still holds as* $m = \frac{e}{c} \cdot \frac{1}{c} = \frac{e_c}{c}$

Therefore, the equation for the mass of TSET-e_1, the value of the mass gap m_{MG}, would be as follows:

$$m_{MG} = \frac{e_c}{c} \cdot \frac{1}{12} \cdot \frac{1}{c} = 1.5 \cdot 10^{-37} kg \qquad \textit{([25], eq10)}$$

This would be the value for TSET-e_1 as confirmed by researchers from UCL, Universidade Federal do Rio de Janeiro, Institut d'Astrophysique de Paris and Universidade de Sao Paulo [26].

The exact calculation there holds m_{MG} to be $1.486 \cdot 10^{-37} kg$.

There, a particular time-space scaling process was put in play, namely the use of c as a scaling factor, together with the "12" factorial, given that the "12" factorial was derived in paper 5 ([5]: p7-9, fig2-3) relevant to the mass-gravity scaling process.

Overall, what occurred was the derivation of the lightest proposed particle on an elementary scale in the context of a derived suite of particles that exist on an elementary scale with proposed features, matter and antimatter, as presented in papers 27-30 [27-30], particles that still have yet to be linked to the ultimate EM scale, the Planck scale, to thence propose an ultimate link between gravity and EM, between mass and EM. How did Temporal Mechanics face this problem?

Although it was possible to derive the mass of the proton from the charge of the electron, what needed to be constructed was how EM could be associated to the fundamental appearance of the lightest particle and thence somehow to the idea of what is considered to be the force carrier of that lightest particle, gravity.

Therefore, the task now should be to link the Planck length, the smallest possible wavelength of a quantum wave function, with the smallest possible particle mass.

The first issue to note is that:

(i) the smallest possible particle (presumably as mass) would be a result of a process of *destructive inference resonance* (DIR) of the smallest possible quantum wavelength, and therefore its value as a Planck length (lP) would still in theory be upheld yet as a pure line.

Therefore, the second issue to note is that:

(ii) the normal phi-quantum wave function ($PQWF$) scaling system would no longer apply beyond the DIR process in becoming a *line* from being a temporal wave function.

The third issue to note is that:

(iii) "mass" is proposed to represent how the general system of time-space interoperation balances itself to achieve π, thus making π a factor in the relationship between mass as a process of gravity, as presented throughout paper 2 [2].

All these issues need resolving. The question is how.

In resolving issues (i)-(iii), the proposal is to consider a *new idea of space*, a purely *number-based concept of space*, not as spherical space as proposed by the temporal wave function feature, yet here a purely new mathematical feature, one that bases itself not on time yet on space. Here the thinking is to consider a volume of space, and thus the metric of a line *cubed* (different of course to the temporal *sphere* of space). Why? Owing to the fact the standard *temporal wave function* logistics no longer apply for this new process of examination, like an "*inside the temporal circle*" approach is now required.

10. Thinking "*Inside the Temporal Circle*"

Therefore, the consideration exists that with this $PQWF\ DIR$ effect on the Planck length scale, there are going to be two potential new analogues in play, namely an analogue for *time* and an analogue for *space*.

Logically it is the analogue for space here that would be considered as the primary contender for the concept of mass and thence gravity, so such shall be the current focus.

In continuing with this primary space analogue proposal, the next question is, "how is space determining itself from past to present to future", "how is the feature of the 3 times (time-before, time-now, time-after) in $temporal\ calculus$ going to be annexed by space as a new description, a new concept"?

The proposal here is to consider *prime number relationships*, pure aggregated *numbers of units* of 1 divisible only by 1 or their aggregated unit value. And so here, in taking the most basic level possible for space, the idea is to take the first three prime numbers (2,3,5) and to cube each of them as an analogue for 3d space also though in an analogue time period of time-before (2^3), time now (3^3), and time after (5^3), to add each of those values together and then to divided them by 3, 3 as the average time, taking the three separate times for 3d space into 1, as per equation 1:

$$S_0 = \frac{2^3+3^3+5^3}{3} = 53.\dot{3} \qquad (1.)$$

This value is proposed to represent the *spatial analogue* for a DIR Planck length.

Let this analogue be called a *zero-space factor*, as S_0.

What therefore are the units for this analogue?

Presumably, a length *cubed*, as a 3d space analogue value, yet the issue here is creating a *different concept* **as** mass, <u>*with the derivation of mass*</u>, from the DIR of a standard *time-space* ***metric***, so essentially this process is defined to represent the outcome of ***mass***, not length *cubed*.

The next proposed step is to take the DIR Planck length ($l\mathrm{P}: 1.616 \cdot 10^{-35} m$) and divide it by S_0, the thinking being that dividing the DIR Planck length by S_0 will demonstrate what becomes of the DIR Planck length in terms of this new S_0 spatial construct, namely <u>a most basic value</u> of what is proposed to be *particle pair production* ***<u>mass</u>***.

The value of this process is as follows as equation 2:

$$\frac{lP}{S_0} = 3.03048 \cdot 10^{-37}\ kg \tag{2.}$$

This value states that the lightest particle as mass and its anti-particle *each* represent a value $\sim 1.5152 \cdot 10^{-37} kg$, proposed as the mass of the neutrino and antineutrino. Is this value correct? The known/accepted value is closer to $1.5 \cdot 10^{-37} kg$, and so the value derived here could be an upper limit value.

To note is that the value for the lightest neutrino was derived/calculated in paper 25 ([25]: p51), precisely as $1.486 \cdot 10^{-37} kg$, and so the average of these three values (the double value here of $3.03 \cdot 10^{-37}\ kg$ and the single value of paper 25 [25] as $1.486 \cdot 10^{-37} kg$) is $1.5055 \cdot 10^{-37} kg$.

This concept of derivation here though nonetheless is quite fundamental, connoting a few key ideas, as follows:

- In using a cubic prime number relationship for space it is possible to calculate, as a direct relationship, the mass of the lightest particle to the Planck scale (EM).
- Thus, “moment” values of mass in space using the concept of “light” will always prove insufficient.
- The lightest mass is the average of the cube of each of the first three prime numbers in regard to a DIR Planck length.

The real question is, “why is there a process of *particle pair production* in play?”. Here, it is merely inferred that such a concept is in play, as based on a “double” value for the lightest neutrino. There is also the inference that the zero-space factor, S_0, represents a definitive link between matter and antimatter. The question is, “why?”.

The S_0 factor certainly, by design, is contradictory to everything that the $temporal\ calculus$ of the time-equation represents, and thus could be rightly termed an “*inside the temporal circle*” approach, as much as one would say, “*think outside the square*”.

The proposal by Temporal Mechanics for this *particle pair production* process is that S_0 needs to be examined as the idea of *gravity* in knowing that gravity would act *equally* for matter and antimatter, and that matter and antimatter would annihilate each other to pure space and energy.

11. Gravity as a spatial derivation of the Planck scale

The next question therefore is, "what is the most ***fundamental equation for gravity on this scale***"?

Given that each of the facets of the cube of the each of the first three primes are *connected* in having them averaged together, such represents a proxy for a **force of attraction** itself, namely the force of gravity, here as the gravitational constant (given gravity would naturally represent a proportionality between mass, and inversely proportional to distance squared), requiring the following key factors:

- How a basic particle is held together, namely as the value of M_{MG} (mass gap value, mass of the lightest neutrino @ $\sim 1.5055 \cdot 10^{-37} kg$), as a force of *attraction*.
- How a particle exists in the context of the *temporal* (time-point aether) nature of space:

  (a) The $(\frac{2}{3})^2$ factor, per paper 4 ([4]: p6-7), namely 2 results per 3 dimensions *squared*.

  (b) The value of π, given such is what mass is proposed to achieve, namely the general *balance* for the folding of a phi-quantum wave function ($PQWF$), as presented in paper 2([2]: p5-12).

  (c) The 12-factor, as the mass-gravity factor for the phi-quantum wave function ($PQWF$), as proposed in paper 5 ([5]: p7-9, fig2-3).

  (d) A c-scaling for each spatial dimension in play (intrinsic to S_0) and thus a value of c^3.

  (e) The overall atomic spatial compression factor of $\frac{21.8}{22}$ which also must be squared, as according to (a), and thus $(\frac{21.8}{22})^2$.

Therefore, the following equation is proposed as a value for G, here as equation 3:

$$G = 12 \cdot (\frac{2}{3})^2 \cdot (\frac{21.8}{22})^2 \cdot \pi \cdot c^3 \cdot M_{MG} = 6.67355 \cdot 10^{-11}\ kg\ m^3\ s^{-3} \qquad (3.)$$

This value closely matches the known value for G $6.6743 \cdot 10^{-11}$, an error of 0.01%, the issue here using an averaged value for M_{MG}. The correct value here for M_{MG} would be $1.50566 \cdot 10^{-37} kg$ and not the average value of $1.5055 \cdot 10^{-37} kg$.

As a subsequent paper shall present, G can be exactly derived in the proper context of a temporal wave function collapse-incursion event.

The interesting feature to note here nonetheless is that the standard value for G is measured in $kg^{-1}\ m^3\ s^{-2}$ (as per the basis of $F = ma$) yet the time-space Temporal Mechanics methods uses $kg\ m^3\ s^{-3}$, and yet if they essentially represent the same concept, then ultimately $s = kg^2$, or that time is mass-squared, namely that the fundamental relationship between two mass objects in the context of gravity is still "time", which of course is the fundamental basis of the time-point aether and the associated relativity between time-points using space and thence mass.

Of course this now suggests that Gravity at its core is a type of subquantum cubic spatial matrix, and given the scale it operates on, that gravity would represent a largely smaller force than EM, yet the fundamental question beckons, "*how does gravity propagate in space as this subquantum spatial cubic matrix, namely how does this subquantum gravity operate*"?

The following issues are still in play care of the time-point aether and how it derives 3d space:

- Space as 3d exists by virtue of the time-point aether,
- and so the propagation of gravity through space would be through 3d space and thus the time-point aether,
- and thus gravity would propagate as per this new determination of the average of the first three prime numbers with space as cubed values,
- and that gravity has a propagation rate limited by virtue of the time-point aether and its relationship with space, namely c.

And so the force of gravity between masses would be by virtue of the masses being in a time-point aether where the masses (as the time-points) are seeking relativity with one another via 3d space as a process of c, as presented in chapter 6 as per the "5 principles of simplicity" of time-space, and thus:

- the idea of *inertia* is simply the concept of a mass in this time-point aether that will resist any force applied to it other than abiding by its underlying mass-based gravitational "time-point aether" associated field effect,
- this idea of inertia must nonetheless account ultimately on an elementary particle level the idea of $s = kg^2$, of a particular temporal relativity between two mass objects.

Therefore, to consider mass-inertia equivalence as a primary way to theorise particles in space and thence considering gravity as a curvature of *spacetime* is an entirely flawed approach, namely in using inertia as a primary quality of measurement, and thus in not regarding inertia-mass for what it should be (namely as a secondary consideration) as presented in paper 21 ([21]: p14, p16-17) then an entire underlying science (temporal) is being missed.

The next question is if there is any alteration to this prime number sequence field of gravity through the time-point aether, and does the proposed subquantum description of gravity relate to why the atom manifests the way it does with the standard subatomic particles (electron, proton, neutron)?

The answer is complicated and reserved for a subsequent paper, which will require the derivation of the electron mass and positron mass as a process of *particle pair production* in using the same S_0

concept for gravity as space. There in that paper will be explained why mass formation is executed in favour of *electron-positron pair production*, and thence why electron formation in the atom outweighs other decay processes, hence helping explain the issue encountered at CERN regarding the *beauty quark* and why through its decay there is a predominance of electrons over muons [41]. Hence, a subsequent paper shall derive the mass of the electron from this new Planck length scale process.

As presented in chapter 5, "*Fundamentally, Temporal Mechanics does not consider a geometry for space as a type of Planck scale, yet considers space as a pure void defined by the golden ratio nature of time-points according to human temporal perception ability, yet more primarily, defined by the only logistics available for the proposition of a universal time-point aether having time-points seeking relativity with each other via space in using* c *as a measure of that relativity, and not as a basic standard of axiomatic definition per se, as presented in paper 1 [1].*". As Temporal Mechanics shows*, the geometry of mass and gravity* is associated to space by virtue of a DIR Planck length (lP). As highlighted, as this is a new and potentially complicated field, three key points need to be highlighted:

- Mass as a particle is proposed to be the way the dimensions of time and space employ a *destructive interference resonance* (DIR) wave function ($PQWF$) to create a more uniform time-space field, which then results in matter and thence gravity by that process of *destructive interference resonance* (DIR) of the wave function ($PQWF$), in order to create a greater harmony between time and space.

- Mass and gravity therefore are proposed to be the manifestation of *time* finding resolution with *space* on an entirely new paradigm basis, namely mass and gravity.

- The idea of *discretised space* as a *transformation code* **cannot** be a *quantum topological structure* simply because a quantum is fundamentally based on the *time code*, on the golden ratio of two values anyway, and yet space is something else, requiring a step beyond (below) the Planck length itself.

In short, Temporal Mechanics and associated $temporal\ calculus$ proposes that a particle is a result of *destructive interference resonance* (DIR), a manifestation of the *destructive interference resonance* of an EM wave function ($PQWF$) from the interoperation of time and space delivering the *phi*-algorithm for time as a standard EM wave function, a particle as mass which represents how that interoperation of time and space can be perfectly balanced, delivering particle mass despite that particle mass being activated as a process of *symmetry breaking* in the process of *particle pair production*, warranting the idea of mass needing to balance its parent offspring process of symmetry breaking.

To prove this, it was necessary to demonstrate mathematically and precisely that the smallest ***linear*** spatial dimension of a phi-quantum wave function ($PQWF$) *destructive interference resonance* metric (DIR) as a Planck length ***is exactly measurable*** via a particular scale of primary number relationships *per time* (a factor of 3) to the ***mass*** of the lightest particle, the lightest neutrino, thus warranting a basic conceptual and ***primary*** use of numbers as a theoretic device for measuring time and

space ***in primarily linking the spatial dimension with the concept of mass***, while then demonstrating that this value is integral to a phi-quantum wave function ($PQWF$) scale as per deriving the value of "G".

One important thing to note is that all of such thus has nothing to do with the description of light as a *photon,* the description of light as a particle. TM though *does* propose light to have a particle effect, yet this is a *secondary* feature to the primary temporal wave function, as initially presented in paper 2 ([2]: p7-10).

12. Cosmological IPD

Perhaps the most challenging IPD for Temporal Mechanics was the Cosmological IPD, for the cosmological IPD requested sizeable problems to be solved, as the following problems per paper 25 ([25]: p8-10) highlight:

(a) Horizon Problem
(b) Flatness Problem
(c) Monopole problem
(d) Hubble Constant problem
(e) Cosmological Constant problem

There is also the often overlooked "Axis of Evil" problem, as presented in paper 34 ([33]: p31-32):

(f) "Axis of Evil" problem

To note is that the current *assumptions* in cosmology, namely the "big bang" start date (and the concept of a metric expansion of space to explain the redshift effect), dark matter, and dark energy, things that have yet to be *directly* proven (dark energy and dark matter) and that which is impossible to prove other than by indirect calculation of the proposed metric expansion of space and associated redshift effect (the big bang), were ***not*** considered in the IDP of Temporal Mechanics. What was considered though were the ***known*** measured values for:

(g) The age of universe
(h) The age of Earth
(i) The distance of closest star to the sun
(j) The number of stars in our galaxy
(k) The number of galaxies in universe

Temporal Mechanics, with the freedom to exercise its IPD principle, approached cosmology with the aim of solving *all those issues*, (a)-(k), and found only one key solution to achieve all of such, namely to consider the idea of light extra-atomically to be dictated by a process of $E = f$, no longer bound by an

atomic $E = hf$ reference, yet a process of $E = hf > E = f$, as initially presented in paper 13, "*Space, and the Redshift Effect*" [13], then followed up in papers 32-34 [32-34]. In doing such, Temporal Mechanics was able to present a new case for the redshift of light.

Such a process was not easy or simple either, for (as stated) it required creating a time-space template (TST) ([23]: p17-20) for the atom that required certain compression/temperature scales ([14]: p23, fig6) for space to be put into effect to balance all such phenomena and associated metrics, as presented in paper 24 ([24]: p20, fig3), yet compression scales that confirmed known fine structure features of the atom, namely the fine structure constant ($\frac{1}{137}$), the value of c, Planck's equation ($E = hf$), all based on the Compton wavelength (λ) and Bohr radius (a^0), as presented as a summary of equations in the previous paper ([33]: p13-16).

All of such also are figuratively summarised in parts 2 and 3 of figure 3, paper 34 ([33]: p17, fig3).

So, with such equations established for the microscopic scale, the task was to present how this integrated $E = f$ effect for light extra-atomically would work on what could only be considered (in not being related to the atom in being an extra-atomic phenomena), the macroscopic and thus cosmological scale, in accommodating for points (a)-(k), in resolving them as an IPD requirement.

The approach that was taken was to determine what the $E = f$ level represents, calculated to be the known Oort cloud distance, and then in using the idea of c as a measurement factor (as was used successfully on the microscopic scale ([25]: p51) to wind this back inwards in that greater spatial sphere. In doing such, the Heliopause level was correctly calculated ([31]: p14-15). Then the Heliopause was taken out towards to the $E = f$ level by a required temporal energy (entropy-enthalpy) factor of 12, correctly calculating the Bow shock level ([31]: p15-16), the mathematics of which are outlined throughout papers 32-33 [32-33].

In short, there was no intention to design anything in particular in regard to cosmology theory, yet to thoroughly allow *temporal calculus* to be applied to the $E = f$ manifold the same way it applied itself to the $E = hf$ atomic time-space template (TST) manifold, while seeking to accommodate for issues (a)-(k). And such was so in papers 32-34 [32-34].

The general result was surprising in that it proposed the universe of stars actually represents a 2d hologram projected by the time-space circuitry involved in the three key manifolds, namely the Oort Cloud (O-manifold), Heliopause (H-manifold), and Bow Shock (B-manifold) manifolds, which then worked in with an $E = hf$ based (optimal atomic quantum focus) holographic 2d manifold at a distance of 1 light year from the sun (E-manifold) which then put the idea of Earth (central to the idea of a "year", as per a solar revolution) as the centre of the universe, thus solving the "Axis of Evil" problem ([33]: p31-32).

The SOL based holographic manifold, the E-manifold, lead to interesting results using a formulated and very intuitive SOL-Earth time-space circuit system, as presented in paper 34 [34]; there, the distance to the apparent closest star (name) was calculated ([33]: p23-25), together with the apparent distance of the most distant apparent star (as a value for the apparent age of the stars in a metric expansion model) ([33]: p27-28). There also was derived the number of holographic stars in the perceived local galaxy, the Milky Way, calculated to be ~ 414 billion ([33]: p28-29), and thence the number of galaxies in the holographic universe calculated ([33]: p28-29), all of which proved to be fascinating results,

especially given our technological performance as a species with all things *screen-based*, suggesting that an anthropological principle could perhaps be at play upon our social development, as based on the stars.

Therefore, Temporal Mechanics has failed in one key thing, namely making stellar phenomena *real*.

Some could ask, "what good are the stars then if they are merely holograms, apparitions"?

Fundamentally, Temporal Mechanics finds that the stars would most logically *represent a placement* to create a certain effect of conscious life for Earth, a perception reference ability, simply by the fact that Earth is calculated to be the ultimate reference in this scheme of temporal perception, as perhaps it should be, also warranting our primary location of residence and development as a species.

The stars also could have a much higher significance beyond the realm of science itself though, perhaps central to a higher consciousness ability of humans, a more virtual and holographic perception ability, something more cerebral if not "*spiritual*", something perception-related beyond what physics would perhaps consider as relevant or provable.

13. Perception IPD

Fundamentally, the logistics implicit to Temporal Mechanics do not *assume* perception, yet tag a known and fundamental trait of perception to a specific operation, a specific fundamental definition, namely to the flow of time, while through that theoretic process is able to demonstrate how such a perception model actually represents a time-point based caricature to known philosophical models of consciousness, as presented in paper 10, "*The Conception of Time*" [10].

Conversely, the logistics of Einstein's *spacetime* has perception assumed to be tagged to light and clocks, ultimately to the Planck scale, yet not the idea of time, and that is the key difference between the logistics of Einstein's Relativity theory and Temporal Mechanics. In fact, the IPD of Temporal Mechanics is to confirm known norms of perception, as presented in papers 1 [1] and 10 [10], and not how Einstein merely assumed the idea of perception.

To therefore more broadly look at the idea of perception, and not just the idea of perception alone, yet the perception ability of being theoretic, of constructing a theory of time and space in the first instance, it could be considered that a model of reality, as a theory, *is itself* ***pure imagination***, as what a pure theory could only be, namely entirely theoretical. Yet, although that may be true in some sense, in another sense consciousness could have, if not ***has***, *intangible properties* such as *pure time* and *pure space* that themselves represent a type of proxy for *pure imagination,* and it is that proxy that Temporal Mechanics focuses on, namely the intangible nature of pure time and pure space to warrant the credibility of a pure theory to have credence of being real in being true to being a pure theory *as a theory*, provided it can be presented via that pure theory how the interoperation of time and space can ***thence*** allow for the coagulation of matter and its associated properties and field forces.

Therefore, the problem for Temporal Mechanics was in deriving the real (particle and field phenomena) from the *intangible,* the key problem being knowing how to *first* define the *intangible* time and space to then allow particle-field phenomena to take shape.

In the case of getting the entirely theoretic entities of time and space right, the IPD condition in this case exists that if the $a\ priori$ is right, that which is derived from that $a\ priori$ must be a formality and completely interconnected by that $a\ priori$ and thus must depend entirely on that intangible $a\ priori$, yet must as *a derivation* explain physical phenomena, namely the data of physical phenomena secondary to the time-space $a\ priori$, for the theory to hold true as a *pure theory*.

For instance, clocks and momentum *as a theory* are used in *spacetime* theory as *a primary* $a\ priori$ leading to $E = hf$ pixilation and resolution; yet such as a pure theory can only fail in presuming to be *intangible* (as any theory ultimately can only be) while at the same time presuming to be tangible (clocks and momentum). The further complication for Einstein's relativity theory is that the actual reality of where objects ultimately exist are framed by the perception ability central to mass and line of sight with clocks and momentum as the perceived location; to measure anything primarily as a physical object (in that case of Einsteinian physics) is discounting the actual primary theoretic mechanism behind what is being observed.

In short, to theorize reality is a paradox in itself, namely making the purely theoretical as something that is meant to be real, yet if our human perception has a natural theoretic ability to accommodate for something as insubstantial as theory, yet also as real as reality, as much as theory itself seeks to be, it ***is possible***; here, Temporal Mechanics suggests that "*time*" is that natural *theoretic key* that can successfully derive the general time-space constants, circuits, and manifolds of reality, *if "time" is utilized as an* $a\ priori$.

14. Conclusion

The approach of Einsteinian physics is the mass-gravity and space approach, given the cosmological dogma there of the metric expansion of space to explain the redshift effect of light, and how much of cosmology theory depends on such a thing, on that ΛCDM model, the key problems there though being the cosmological constant problem (the required amount of energy to account for the metric expansion of space, warranting the need for dark energy and dark matter), the "Axis of Evil" problem ([33]: p31-32), and the Horizon and Flatness problems, all of course interlinked problems as presented in paper 25 ([25]: p8-9), all features of the a fundamental fallacy incurred it would only seem by Einstein's relativity physics.

The proposal with Temporal Mechanics is to define *time* more fundamentally, more mathematically, more specifically, to give greater mathematical primacy of definition to "time", and to *then* link time with space mathematically, as data-based and data-driven definitions, and to then theorise how that can relate with the ideas of light and mass, *mathematically*, all data-based and data-driven mathematical resolutions, without the requirements of unproven concepts (Dark Energy and Dark Matter), to by such a process better involve data central to QM and the SM of particles.

The limitation of any work is the measuring ruler it uses, and the case with Einstein is his use of light as the measuring standard, suggesting that as a primary construct nothing else could dive deeper than the quantum of light. There it found itself to be proven insufficient, and not necessarily outright wrong,

as highlighted by the Standard Model of particles (as per the "Yang-Mills existence and mass gap" problem), highlighting the existence of sub-quantum matter (a case presented here in chapter 9), and the insufficiency of detail in the process between light and a particle location in space (as per Bell's Theorem [29][35]).

The idea of proving Einstein wrong, as presented in this article by Brian Koberlein in "Universe Today" [42], entails the following, as quoted,:

> *To begin with, Einstein's gravity will never be proven wrong by a theory. It will be proven wrong by experimental evidence showing that the predictions of general relativity don't work. Einstein's theory didn't supplant Newton's until we had experimental evidence that agreed with Einstein and didn't agree with Newton. So unless you have experimental evidence that clearly contradicts general relativity, claims of "disproving Einstein" will fall on deaf ears.*
>
> *The other way to trump Einstein would be to develop a theory that clearly shows how Einstein's theory is an approximation of your new theory, or how the experimental tests general relativity has passed are also passed by your theory. Ideally, your new theory will also make new predictions that can be tested in a reasonable way. If you can do that, and can present your ideas clearly, you will be listened to. String theory and entropic gravity are examples of models that try to do just that.*
>
> *But even if someone succeeds in creating a theory better than Einstein's (and someone almost certainly will), Einstein's theory will still be as valid as it ever was. Einstein won't have been proven wrong, we'll simply understand the limits of his theory.*
>
> *Brian Koberline, Universe Today, January 13, 2014*

Temporal Mechanics has achieved all of such in detail in showing due respect of SR and GR and the data it has amassed, while nonetheless proposing "new proof" in presenting an experiment for the *EM$^{D/R}$ particle pair production* effect ([32]: p20-22).

On a cosmological scale though, beyond what we are capable of directly presenting as proof in person, Temporal Mechanics has presented the case that a sound cosmological model of the stars should be based on a physics witnessed in this solar system which is to be then, should be, extended out to a cosmological scale, minus all the false presumptions, false presumptions such as an initial start date of time and space as a big bang model prescribes, and thus minus an associated metric expansion of space, and thus minus also the more recent inclusions of dark matter and dark energy. In all, Temporal Mechanics proposes a theoretic structure as based on the human temporal perception ability, delivering a more thorough, broad-spectrum, and above-all *interlinked* account of physical phenomena and associated data.

To now answer the initial question, "*why do we do measure things, what is the logical if not philosophical drive to measure*?". Temporal mechanics finds that there is a basic underlying system of

numbers and associated mathematics inter-relating time and space, yet a basic underlying system within the constraints of our perceptive abilities for time and for space.

Conflicts of Interest

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

References

For ease of search functionality, the complete PDF of Temporal Mechanics containing all its current papers as listed here [1-34], as all the papers available in the one search facility, is available from the following link (Non Open Access):
https://transactions.sendowl.com/products/78257031/AE5EA60A/view

1. Jarvis S. H. (2017), Gravity's Emergence from Electrodynamics, DOI: 10.13140/RG.2.2.35132.28804/1, https://vixra.org/abs/1704.0169
2. Jarvis S. H. (2017), Golden Ratio Axioms of Time and Space, DOI: 10.13140/RG.2.2.30099.12327/3 http://vixra.org/abs/1706.0488
3. Jarvis S. H. (2017), The Emergence of Consciousness from Chaos, DOI: 10.13140/RG.2.2.23388.23683/1, http://vixra.org/abs/1707.0044
4. Jarvis S. H. (2017), Phi-Quantum Wave function Crystal Dynamics, DOI: 10.13140/RG.2.2.10045.10726/3, http://vixra.org/abs/1707.0352
5. Jarvis S. H. (2017), Time as Energy, DOI: 10.13140/RG.2.2.23466.88009/3, http://vixra.org/abs/1711.0419
6. Jarvis S. H. (2018), The Relativity of Time, DOI: 10.13140/RG.2.2.13400.55044/3, http://vixra.org/abs/1801.0083
7. Jarvis S. H. (2019), Golden Ratio Entropic Gravity: Gravitational Singularity Field Testing, DOI: 10.13140/RG.2.2.35399.14246/1, http://vixra.org/abs/1904.0485
8. Jarvis S. H. (2019), The Golden Ratio Time Algorithm, DOI: 10.13140/RG.2.2.35399.14246/2, http://vixra.org/abs/1905.0081
9. Jarvis S. H. (2019), The Physics Chimera, **DOI:** 10.13140/RG.2.2.28499.02084/1, http://vixra.org/abs/1906.0127
10. Jarvis S. H. (2019), The Conception of Time, DOI: 10.13140/RG.2.2.10258.71363/1, http://vixra.org/abs/1906.0441
11. Jarvis S. H. (2019), Space, and the propagation of Light, DOI: 10.13140/RG.2.2.15833.67689/1, http://vixra.org/abs/1908.0388
12. Jarvis S. H. (2019), Space, and the Nature of Gravity, DOI: 10.13140/RG.2.2.17320.93443, http://vixra.org/abs/1909.0656
13. Jarvis S. H. (2019), Space, and the Redshift Effect, DOI: 10.13140/RG.2.2.14287.43683/2, http://vixra.org/abs/1911.0064
14. Jarvis S. H. (2019), Solving The Cosmological Constant Problem, DOI: 10.13140/RG.2.2.25730.63686/4, http://vixra.org/abs/1912.0451

15. Jarvis S. H. (2020), Hybrid Time Theory: “Euler’s Formula” and the “Phi-Algorithm”, DOI: 10.13140/RG.2.2.13078.91205/2, http://vixra.org/abs/2001.0233
16. Jarvis S. H. (2020), The Hybrid Time Clock as a Function of Gravity, DOI: 10.13140/RG.2.2.27053.64487/1, http://vixra.org/abs/2001.0401
17. Jarvis S. H. (2020), Hybrid Time Theory: Cosmology and Quantum Gravity (I), DOI: 10.13140/RG.2.2.20045.79847/1, http://vixra.org/abs/2003.0659
18. Jarvis S. H. (2020), Scientific Principles of Space, Time, and Perception, DOI: 10.13140/RG.2.2.16207.84648/1, http://vixra.org/abs/2004.0260
19. Jarvis S. H. (2020), Hybrid Time Theory: Cosmology and Quantum Gravity (II), DOI: 10.13140/RG.2.2.23972.22405, http://vixra.org/abs/2005.0053
20. Jarvis S. H. (2020), Mathematical Principles of Time and Energy, DOI: 10.13140/RG.2.2.34441.67683/4, http://vixra.org/abs/2005.0179
21. Jarvis S. H. (2020), Dimensional Mechanics of Time and Space, DOI: 10.13140/RG.2.2.21001.88169/1, http://vixra.org/abs/2005.0286
22. Jarvis S. H. (2020), Dimensional Thermodynamics, DOI 10.13140/RG.2.2.29715.71202/3, http://vixra.org/abs/2006.0194
23. Jarvis S. H. (2020), Time-Space Wave-Mechanics, DOI 10.13140/RG.2.2.10565.68320/3, http://vixra.org/abs/2007.0223
24. Jarvis S. H. (2020), Temporal Calculus (The Calculus of Time-points in Space), DOI: 10.13140/RG.2.2.15362.09929/3, http://vixra.org/abs/2008.0111
25. Jarvis S. H. (2020), Temporal Calculus: solving the “Yang-Mills Existence and Mass Gap” problem., DOI: 10.13140/RG.2.2.33774.43843/3, https://vixra.org/abs/2008.0226
26. Jarvis S. H. (2020), Temporal Calculus: Time Scaling Space, DOI: 10.13140/RG.2.2.28539.75043/2, https://vixra.org/abs/2009.0091
27. Jarvis S. H. (2020), Temporal Calculus: Resolving Elementary Particle Formation and Confinement, DOI: 10.13140/RG.2.2.20191.07844, https://vixra.org/abs/2009.0177
28. Jarvis S. H. (2020), Temporal Calculus: Resolving Einstein’s Theory of Relativity (Special and General), DOI: 10.13140/RG.2.2.12474.21447/2, https://vixra.org/abs/2010.0017
29. Jarvis S. H. (2020), Time and Non-Locality: Resolving Bell’s Theorem, DOI: 10.13140/RG.2.2.12651.98086/1, https://vixra.org/abs/2011.0002
30. Jarvis S. H. (2020), Non-Local Time-Point Theory: Magnetic Quantum Shell (MQS) Modelling, DOI: 10.13140/RG.2.2.11032.83206/3, https://vixra.org/abs/2012.0040
31. Jarvis S. H. (2021), Temporal Mechanics (A): Time-Space Circuits, DOI: 10.13140/RG.2.2.28879.10407/1, https://vixra.org/abs/2101.0022
32. Jarvis S. H. (2021), Temporal Mechanics (B): Time-Space Constants, DOI: 10.13140/RG.2.2.31751.21925/4, https://vixra.org/abs/2101.0148
33. Jarvis S. H. (2021), Temporal Mechanics (C): Time-Space Manifolds, DOI: 10.13140/RG.2.2.30214.70720/4, https://vixra.org/abs/2102.0047
34. Jarvis S. H. (2021), Temporal Mechanics (D): Time-Space Metrics, DOI: 10.13140/RG.2.2.17868.54403/4, https://vixra.org/abs/2101.0022
35. Aspect, A.; et al. (1981). "Experimental Tests of Realistic Local Theories via Bell's Theorem". Phys. Rev. Lett. **47** (7): 460–463. Bibcode:1981PhRvL..47..460A. doi:10.1103/physrevlett.47.460.

36. Heisenberg, W. (1927), "Über den anschaulichen Inhalt der quantentheoretischen Kinematik und Mechanik", Zeitschrift für Physik (in German), **43** (3–4): 172–198.
37. Adams, John Frank (1969), Lectures on Lie Groups, Chicago Lectures in Mathematics, Chicago: Univ. of Chicago Press, ISBN 978-0-226-00527-0
38. https://quantumgravityresearch.org/portfolio/all-papers/, webpage accessed 26th March 2021.
39. https://quantumgravityresearch.org/videos/movies/, webpage accessed 26th March 2021.
40. https://quantumgravityresearch.org/portfolio/what-is-reality-movie/, webpage accessed 26th March 2021.
41. https://scitechdaily.com/new-result-from-large-hadron-collider-challenges-leading-theory-in-physics-cannot-be-explained-by-our-current-laws-of-nature/, webpage accessed 29th March 2021.
42. https://www.universetoday.com/108044/why-einstein-will-never-be-wrong/#:~:text=To%20begin%20with%2C%20Einstein%E2%80%99s%20gravity%20will%20never%20be,agreed%20with%20Einstein%20and%20didn%E2%80%99t%20agree%20with%20Newton, webpage accessed 26th March 2021.