Non-Local Time-Point Theory:
Magnetic Quantum Shell (MQS) Modelling

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Abstract: In this paper Temporal Mechanics moves beyond known issues of Bell's Theorem, as per presenting the case of non-local time-points being responsible for the phenomenon of quantum entanglement and associated disparity between the location of a particle and its actual quantum mechanical status. To properly introduce and qualify the time-points, here is presented 5 "Principles of Simplicity" of time and space, principles that then shall explain the construction of the elementary and subatomic particles, and yet more fundamentally describing the relationship between a particle and a quantum of light and thence describe the natural propulsion and illumination of a particle and how that is observed in nature (and as what). The data backing Temporal Mechanics and proposed modelling ranges throughout all the confirmed and well-established data in physics and chemistry, to recently discovered data yet to be formally allocated theoretic understanding, uncovering embedded encryption in high energy particle collision data not previously recognised and theoretically placed, here with electron shell modelling as the newly proposed magnetic quantum shell (MQS) system.

Keywords: temporal mechanics; temporal calculus; Bell's Theorem; non-local; time-point; symmetry; symmetry-breaking; electron shell; magnetic quantum shell; time-space circuit

1. Introduction

From the outset of Temporal Mechanics [1]-[29], the proposal has been to investigate the worth of making "time" (as time-points in space) the primary focus of mathematical congress for the calculation of observed phenomena. This quest was pursued in accepting that physics had hit a wall in using light as a primary mathematical utility to describe mass-particle based physical phenomena, namely the wall that

exists between Quantum Mechanics (QM) and the Standard Model (SM) of particles, more specifically the disparity between light and the exact location of a particle in space.

Quite simply, light as a *massless* particle, the photon, has been contradicted by the discovery of particles that exist *sub-light*, implying that light in space should warrant such sub-photonic mass-qualities which is a theoretic impossibility if light is massless in using light.

Although through the millennia it may have seemed natural for those in science to do such, namely to use light to measure mass as per momentum/inertia, this problem warrants a re-examination of that process given the findings of Quantum Mechanics and associated Copenhagen Interpretation, and thence Bell's Theorem.

It has taken 29 papers [1]-[29] thus far of what has been termed *temporal calculus* (time-equations with space) to reach the required theoretic tooling to properly predict and explain the findings of Quantum Mechanics, the Standard Model, and Bell's Theorem, as to be presented here in this paper. Papers 1 through to 29 [1]-[29] are required reading therefore, yet all relevant navigation prompts will be used in this paper when required so as not to seem repetitious, a requirement in the context of this unique account of physical phenomena, as per using a *temporal calculus* and not standard momentum-inertia mathematical formalisms (for light in measuring mass).

The presentation therefore of the contents of this paper as with its predecessor papers in this Temporal Mechanics journaling process requires the appropriate referencing of the subject material indigenous and endemic to its *charter* of instituting "time" as the primary theoretic tool of development and measurement for space. The context of this paper is therefore still held in the general journal of the Temporal Mechanics papers, a charter not of standard physics or chemistry doctrine (physics unanimously itself being a charter of mass and momentum mathematical formalism), yet one of "time-points" in space.

All data relevant to physical phenomena nonetheless, from physics through to chemistry, is thoroughly presented throughout the papers [1]-[29], as much as the physical phenomena of reality is not being contested, merely how that data is linked together with all the relevant streams of science in view, the key discipline here being physics. Temporal Mechanics is not therefore a way to debunk physics or chemistry theory, yet to present evidence that there is in fact a more precise scaling system to measuring physical phenomena than using light and mass alone, and here that scaling system is presented as "time" via this process of Temporal Mechanics, in employing *temporal calculus* as the new mathematics.

Subsequently, in the process of these papers, a key issue that has been uncovered regarding contemporary physics theory is that its idea of "time" in not being the primary fundamental theoretic construct in physics theory, as presented by Einstein, is a misleading notion, as the papers demonstrate, given what the *temporal calculus* can derive in using "time" as a *primary* theoretic device, and thus with those models consistent with Einstein's special relativity (SR) and general relativity (GR) are questions, especially in the context of cosmology theory.

In this paper, paper 30 of Temporal Mechanics, in moving forward with the proposal of *non-local time-points*, the construction of the elementary and subatomic particles, in terms of their time-points in regard to space, shall be explained using the *temporal calculus* time-equation theoretic tool, accounting for the ideas of particle inertia, particle propulsion, and particle turbulence, ultimately relaying the

relationship between a particle and a quantum of light in describing the natural illumination of a particle and how such is observed in nature bearing particular reference to a new electron shell model as the *magnetic quantum shell* (MQS) which has been uncovered as allowing for a *general description* of particle-light interactivity.

The structure of the chapters shall be as follows:

(1) Introduction
(2) The "Particle Location" Problem
(3) The Problem of Light
(4) *Temporal Calculus*: resolving symmetry and symmetry-breaking
(5) "Principles of Simplicity" and the Time-Space Circuit *(TSφ)*
(6) The Time-Space *Atomic* Template (TST)
(7) The Magnetic Quantum Shell (MQS)
(8) Particle Dynamics
(9) Particle Radiance
(10) General Cosmology Modelling
(11) Temporal Mechanics: An Overview
(12) Conclusion

As this paper shall highlight, the problem with using mass and momentum in association with a quantum of light as a measurement tool is what that quantum tool is trying to measure, namely that huge disparity of size of the elementary particle mass compared to the size of the quantum that is measuring the mass, and the problem of the quantum being massless. Ultimately, to measure the size of something most basically is to take two points in space and measure that line as distance, which Quantum Mechanics (QM) tries to do with mass, yet the problem that is encountered is not just the elementary particles sub-quantum sizes, yet the idea itself of Quantum Entanglement (QE) and the reference of the observer measuring two particles presumably at the same time and the effect that process of observation has on the objects being measured by light.

2.   The "Particle Location" Problem

In physics, a particle is most commonly and instinctively measured by its mass using line of sight. Such has been the case all the way to the ancient sciences, as a particle in nature is most commonly associated to the concept of mass and how that is perceived with light, measured on a principle of inertia (resistance to any change its status). So it has become entrusted to physics to measure particles using mathematics via a basic description of their mass, and to associate other values such as time and energy to the idea of its mass, such as momentum $(p = mv)$, force $(F = ma)$, and so on, using light.

With the advent of Einsteinian relativity following the abandonment of the "particle" aether (per the results of the Michelson Morley experiment), "light" was described as a massless particle while also

given qualities known to a particle such as momentum as per its energy, its energy as based on its velocity and wave function properties (frequency). Light then as a particle with momentum/energy qualities was fit into the basic equations of mass/momentum/inertia and so on. Light, as per QM, became the measurement rod for physics, most especially so with Einstein's Special Relativity (SR), using the standard of light as c, known at the time, where at the velocity of c time does not pass, only time being a possible variable in relativistic conditions.

Everything was working well for light being explained as a particle via equations designed for mass except when approaching a few features of light, as all the data suggested, that seemed paradoxical if not impossible. Key of these problems that surfaces is Bell's Theorem, demonstrating that QM is incompatible with Einstein's proposed local "hidden variables" to account for a known feature of light namely quantum entanglement (QE). Basically, light as it had been explained ran into descriptive problems as per its association, most fundamentally, with the concept of a fundamental particle. This was outlined in paper 29, "*Time and Non-Locality: Resolving Bell's Theorem*" [29].

Another problem became apparent with the Standard Model (SM) of particles. There, owing to the problem of light attempting to measure the size of those particles, it was necessary to measure such sub-quantum particles by their registered energy values, not their mass directly, and to **then** derive their mass from their energies, the elementary particles there being determined as registered energy values from subatomic particle collisions. Such needs to be done as no EM based and dependent microscope has the magnification gauge to measure something that is much smaller than a quantum of light itself as per what these particles from subatomic collisions are suggesting of themselves via such research and findings. In other words, if mass can exist sub-light, and Einstein's Special Relativity makes the idea of mass a primary thing as related to light, yet the SM presents the case of a particle with mass being far more fundamental than light, then there is a problem with the design of the theoretic tools physics uses to explain physical phenomena. As it would therefore seem, there is nothing wrong with reality, only a problem with how physical reality is being measured, and per what hierarchy of measurement devices. This was outlined paper 25, "*Temporal Calculus: Solving the "Yang-Mills Existence and Mass Gap" Problem*" [25].

Using mass as a primary mathematical structure-formalism requires that such a mathematics to explain itself as space and time in all space and all time while addressing light (c) and of course gravity. SR and GR try to achieve such in an *all time and all space* "big bang" model (ΛCDM model) that then aims to relate to our local mass-based research findings and associated theories to confirm that model and associated cosmology description, a model whose primary data is the CMBR and redshift effect, yet a model that cannot resolve EM and G together in the one mathematical formalism. Yet physics knows this and still continues on that mathematical path of mass-formalism primacy, simply because thus far it has no other choice, as such is how physics is defined per its formal mathematical approach to data. However, with SR trying to find relevance with the SM, and not finding it, physics has found its limit by virtue of its very definition as a science, as a scientific discipline, that requires itself to primarily measure "mass", the key problem being using "light".

Temporal Mechanics proposed that to get through such, a new *primary* mathematical formalism is required, namely "*time*".

3.   The Problem of Light

The interesting thing to note with current attempts to explain any theory of gravity in association with electrodynamics is that to use mass and inertia to explain gravity requires *light*, given how SR is constructed, which is paradoxical, as it creates the measurement problem for itself by that process of using mass/inertia to measure gravity *using* light on the most fundamental particle level.

It is readily accepted in physics that light takes its origin from an electron jump in an electron shell framework of an atom. It is also readily accepted that electrons form in a cloud around the nucleus of the atom, as that electron shell, and that although the electron shells may be certain, the exact location of the electron in the shell is not. It can be quite simply deduced therefore that the uncertain position of an electron in any nominated shell as it makes a jump producing light would lend its uncertain signature to a photon, in that the structure of the photon itself would have a type of uncertain signature to itself by virtue of its genesis from the electron shell and the electron's unknown location in the shell in jumping through the shells. Thus:

- To use light as the photon model, to measure the exact location of a particle using use light that has associated to it a type of uncertain signature, would naturally not be considered to lend exact results owing to its intrinsic uncertain signature, suggesting a type of natural uncertainty of measurement regarding light and particles, simply owing to the genesis of light itself from the electron jumping in between shells. Let such be problem number 1, namely the process in which light is formed and that inherent intrinsic uncertainty of signature that it carries by its genesis from the electron shell.

- Problem number 2 is quantum entanglement, how when measuring an object using light, the light that is measuring an object can be in entanglement with another object, light relevant to another object in another location, much like how an electron itself in occupying the electron shell could be paradoxically anywhere in any nominated electron shell, and that this feature would extend beyond the atom as a signature of light which would, as a quantum-signature, alter what it would be viewing of its intended target object it is seeking to measure in that same quantum-sphere of influence, suggesting a type of "missing field link" is at play.

- Problem number 3 is that light is being used as a measurement tool to investigate presumably the nature of the elementary particles, which works well if the particle being measured is the size of an atom, yet to measure the elementary particles, vastly smaller than the size of the wavelength of a quantum, then using a quantum of light is an absurdity, like using a standard school ruler to measure the size of an atom, namely the pixilation of measurement just isn't there.

Therefore, the three key issues as these three problems are, more simply:

(i) The nature of a quantum comes from the nature of an electron, and so as the location of an electron is indeterminant in its cloud, thus so too is the nature of the quantum born from electron jumps, and therefore using light to measure particles will logically always be met with natural uncertainty.

(ii) The nature of light itself is entangled with particles in its sphere of propagation as though connected with particles via an immediate network of particle information transfer effecting the state of a particle, a concept physics has yet to solve (Copenhagen Interpretation and Bell's Theorem.

(iii) Measuring mass sub-quantum requires a different set of measurement theoretic tools in play, something sub-quantum (as per the "Yang-Mill's existence and mass-gap" problem).

To solve those three key issues, namely the *uncertain* behaviour of light (***unpredictable***), the "*missing-field*" issue (***mysterious***), and the *low pixilation* issue (***murky***) on the elementary particle level requires accepting what is ultimately being sought, namely the measurement of the most fundamental particles, the elementary particles, and therefore the need to move away from using light as a measurement tool, yet something else far more fundamental than light in regard to space.

4. *Temporal Calculus*: resolving symmetry and symmetry-breaking

Resolving these issues is answering the question of "*what is more fundamental than light in measuring an object in space?*". Here the proposal is that "time" is the only thing more fundamental than light, as *that something* that can be used to measure the size of an elementary particle in space. The emphasis in doing this, in using "time-points" as a new measuring scale with space, is to acknowledge the need to measure the most fundamental particles, the elementary particles, and therefore the need to move away from using light as a measurement tool, yet something else far more fundamental than light in space, namely "time", to primarily address the ***unpredictable***, ***mysterious***, and ***murky*** issues that become evident in using light as a particle to measure mass.

The proposal here therefore is that "time" is the only thing more fundamental than light, *time* as something that can be used to measure the size of an elementary object in space, and thence account for mass and thus gravity.

The questions now are:

- *How does time measure space, by what mathematics?*
- *What known data-driven and associated physical data-based norms need to be observed for any mathematics in order to be properly employed to the concept of time and then have that mathematics applied to space and all its phenomena?*

With the benefit of hindsight and associated trial and error as provided by the discipline of physics, and thus ultimately in using all known theoretic data-based advancements in physics, despite the current model of physics hitting the "Bell's Inequality" wall, the benefit of what is known and how that works is a required inclusion into any new mathematical algorithm of measurement for time.

A number of fundamental notions are clear in approaching the "Bell's Inequality" wall in accessing the data of physics:

- o Time is considered in its most basic sense as an arrow from the past to the future in line with a generally perceived entropic event of energy.
- o Physics has symmetries as laws, in abiding by the principle of relativity.
- o When those symmetries are broken a new event has occurred, such as the creation of mass, known as "symmetry-breaking".
- o Mass is understood to be a "local" event in a time-now paradigm.
- o Light is a universal constant at c acting in a time-now paradigm.
- o There is proposed to exist "non-local" hidden variables responsible for light accounting for the location of a non-zero mass particle in the time-now paradigm.

The proposal therefore is that installed in an overall algorithm of "time" would be a type of "non-local" hidden variable time-point system of time-points in space coordinated in a fashion to event an overall arrow of time that involves symmetries and symmetry-breaking.

The question is how the idea of *time* as non-local time-points relates with space and thence particle-mass formation, describing all the required energies and field forces without breaking known physical laws.

After much trial and error and theoretic modelling and testing in Temporal Mechanics [1]-[29], the proposed algorithm for time represents an equation best modelled *on the human perception ability* of time, naturally, which is then applied to an infinite empty space, and then that algorithm for time is pushed to derive what it does via that process that is relevant to the basics of that perception ability and associated perception-based time-space constraints. More specifically:

- o The **temporal-algorithm (*arrow*)** itself as an equation is to be granted the **symmetry-breaking** trait requirement.
- o What that arrow-algorithm *is applied to* is granted **symmetry** status as the **symmetry of time-points in space**.

Simply, the overall idea of symmetry, of the principle of relativity, is considered as the feature of non-local time-points in space, and the way those time-points interact beyond their basic time-point status as a field of time-points is a process of symmetry-breaking. On top of this though, the arrow-algorithm is proposed to conform to known restrictions of human temporal perception, namely that the future is an unknown realm, and reality exists in time-now, and yet the key operator of the time-equation is the

continued potentiality (as a time-after feature) and yet also certainty of a time-before time-point, as presented initially in paper 1 ([1]: p3-10).

Such is the mechanism of $temporal\ calculus$.

Effectively, $temporal\ calculus$ is a *key* applied to an infinite realm of space, a key which generates concepts in space and time relevant to the human perception ability, concepts that are then checked with commonly understood concepts of physics; the specifics of that $temporal\ calculus$ abide primarily by what is humanly possible in terms of the human conscious ability of time, namely the arrow of time, and secondly how that time-algorithm needs to accommodate for the idea of symmetries and symmetry-breaking.

Thus, given what needs to be achieved, what precise algorithm needs to be employed?

As a standard for time, as a mathematics, clearly a minimum of two variables are required to form an equation, as sets. Paper 27, *Time Scaling Space* ([27]: p2-8), presents a summary of the context of mathematics in physics when used to measure objects in space. However, it is paper 8, *Golden Ratio Axioms of Time and Space* ([8]: p3), that gives a clear example of refining the time-equation down to its most basic features, as follows:

> *In mathematics, an equation is a statement that asserts the equality of two expressions. To present an "absolute" equation for time requires a type of equality to be established between two expressions/properties of time. What can we say about "time" that has two properties using both "1" (as t_N) and t_B, as an expression of equality?*
>
> *If time is a singularity, we can relate time-before to time-after along a basic linear mathematical construct as via t_N. This has been the Achilles heel it seems of our logic of time, so let us break it down further. For instance, we know that placing t_B next to t_N requires a negative sign for t_B (equation 1) given t_B is a "backward/negative" step compared to t_N.*

$$(-t_B) + 1 = \quad \underline{fundamental\ property\ A} \qquad\qquad equation\ 1.$$

> *Yet, if time is a singularity, we can present the case that t_N can also be "per" $(-t_B)$ as another equation as technically t_B would already be contained within the t_N construct, as it would have already happened (equation 2).*

$$\frac{1}{(-t_B)} = \quad \underline{fundamental\ property\ B} \qquad\qquad equation\ 2.$$

> *Thus, if these two features represent fundamental properties of time, and time itself is a singularity, then <u>fundamental property A</u> must equate to <u>fundamental property B</u> (equation 3.)*

$$(-t_B) + 1 = \frac{1}{(-t_B)} \qquad\qquad equation\ 3.$$

> *From equation 3, we arrive at the following (equations 4-5).*

$$t_B^2 - t_B = 1 \qquad\qquad equation\ 4.$$
$$t_B + 1 = t_B^2 \qquad\qquad equation\ 5.$$

Equation 5 is interesting, as essentially it suggests that if we consider an "arrow of time" equation that is absolute, and we add the past as a "positive value" (as it would be in considering an arrow of time equation) to t_N, as past + present, only logically we would arrive at the future, let us call t_A (equation 6.)

$$t_B + 1 = t_A \qquad\qquad \text{equation 6.}$$

Yet as we know, $t_B^2 = t_A$ (equation 7.)

$$t_B^2 = t_A \qquad\qquad \text{equation 7.}$$

This time-equation explains the golden ratio being integral to the arrow of time.

This equation process was presented in paper 1 ([1]: p4) via a different mechanism, the "perceptive" model mechanism as follows:

If light is "energy" and reality as we know it operates according to a process of entropy [6], namely increasing randomness, then "time" has an interesting feature that requires more investigating as it flows from t_B to t_A; if indeed the future is unknown, then we can suggest the following:

$$t_A = ? \qquad\qquad (2)$$

Let's propose that the idea of increasing entropy obeys the following process of time: time divides from a singularity in the "past" t_B to a duality in the "future" t_A, where t_A is two possibilities of t_B (fig. 8.):

Figure 8.

INCREASING ENTROPY/RANDOMNESS/DECAY
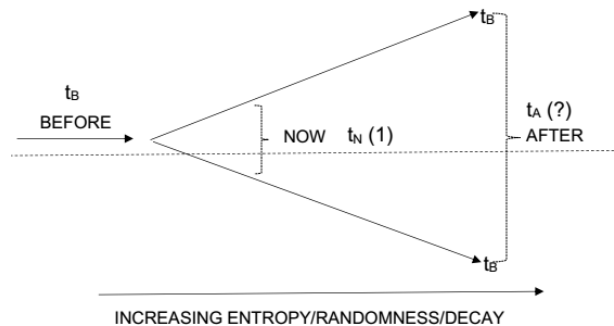
Here t_N represents that process of time-dividing, becoming dual time as t_A, as two possible outcomes for t_B, as a process of symmetry-breaking for a vector of 0-scalar space (as it involves a process of an uncertain outcome), yet here we are assigning this feature of symmetry-breaking to time. Let us suggest the following:

$$t_A = t_B^2 \qquad\qquad (3)$$

Now consider the following as a standard for time's flow:

$$t_N = 1 \tag{4}$$

Here time "now" has a constancy (in its application to space), a uniformity (eq. 1.) that has the potential for entropy, of division, of diversity, of symmetry-breaking for S_2 (compared to S_1). Let us also consider a standard:

$$t_N = t_A - t_B \tag{5}$$

Simply, t_B when applied to space (as 1, t_N) leads to t_A, as a proposed equation for "time". Thus:

$$t_B + 1 = t_B^2$$
$$\frac{t_B + 1}{t_B} = t_B$$
$$\frac{t_B^2 + t_B}{t_B^2} = \frac{t_B^2}{t_B}$$
$$\frac{t_A + t_B}{t_A} = \frac{t_A}{t_B} \tag{6}$$

Both processes result in the same golden ratio equation.

This primary equation was then applied to standard Euclidean geometry in paper 2 [2] to land the idea of a 3-d spatial grid and associated wave function of time (EM).

To note of interest regarding this time-equation forming the basis of $temporal\ calculus$ are the following key points:

- t_N as time-now is the ***locality*** factor.
- t_B as time-before, as the primary time-point, is the ***non-locality*** factor.
- t_A (as t_B^2) is the idea of ***symmetry-breaking***
- ***Symmetry*** is the idea of a field of t_B time-points in space, as the certainty, as the past would be.
- Thus, the whole algorithm itself as a process of ***symmetry*** and of ***symmetry-breaking***.
- The concept of light, "c", is the run of the equation, as a locality via t_N, as a flow of time in "time-now", t_N.

What $this\ temporal\ calculus$ represents therefore is a type of abstract algebra, yet perhaps more accurately, a bespoke algebra with conditions specific to the task it is employed to execute. Here the temporal algorithm is employed to capture the idea of symmetry and symmetry breaking using non-local time-points that manifest the idea of mass in a paradigm beyond the non-local time-point realm. It is also aimed to capture the full ability of human temporal perception awareness; if there is a liberty granted to human perception to devise mathematical systems, then there would be a liberty granted to a mathematical formalism based on the human perception ability.

When we consider symmetries, we consider how laws are consistent (as symmetries), yet when mass is *formed* through *Boson "pair production"* as the current proposal in physics presents, then

symmetry is considered to *be broken* to allow for mass to be formed *from more absolute symmetries* of those more fundamental processes. In other words, mass *formation* is a step that requires a conservation law to be *skewed* to *make mass happen.* That process is being captured by $temporal\ calculus$. The question though is, "how exactly does that algorithm work with space".

As a time-equation, clearly there are going to be steps when associated with space resulting in specific geometries, as per paper 2 ([2]: p3-12). The equation on its own though will present loops in time, presented in paper as a wave function ([2]: p9, fig8a-8b). These loops were then mathematically described in paper 6, "*The Relativity of Time*", presenting a series of time-equation steps ([6]: p2-4). Combining those two features produces more complex equations and geometries, as per paper 15, "*Hybrid Time Theory: Euler's Formula" and the "Phi-Algorithm*" ([15]: p2-8). Further to this there are even more complicated associations between the potential geometry of space and the time-equation, as presented in the following paper, paper 16, "*The Hybrid Time Clock as a Function of Gravity*" ([16]: p4-9). How can all of such be simplified?

5. "Principles of Simplicity" and the Time-Space Circuit ($TS\varphi$)

In review of the Temporal Mechanics papers [1]-[29] one thing becomes apparent, most fundamentally, namely that *space* is being considered as a *vast nothing*, and *time* is what accounts for and thus measures that vast nothing.

Presented throughout the papers is that the concept of time-points in space (if space as the void is indeterminant, and time is being used as the primary mechanism of measurement) is proposed to be the best way to negotiate the *size* of an object in space, as per measuring one hypothetical time-point in space to another, to accommodate for the idea of the space of that object as its size, whatever that size may be, however small or however large, and thus by-pass the concept of using an assumed scale of space itself to measure something smaller than the measuring scale presumably *of* that space labelled with a mass object, to by-pass using a quantum of light to measure an object smaller than the scale of that quantum of light for instance, hence the use of an infinitesimally small time-point, and not spatial point, as paradoxical as it seems.

It has to be this way because that is what known data suggests per QM and the Copenhagen Interpretation and associated resultant Bell's Inequality Theorem, together with the proposed solution presented in the previous paper "*Time and Non-Locality: Resolving Bell's Theorem*" [29], namely, non-local hidden variables, and here as "time-points". In short, it is proposed that the only solution available to the Bell's Theorem measurement crisis is finding something more fundamental than a scaling system of light, and if <u>metric space</u> is not possible as a scaling system with light, something more fundamental if not theoretic is required, namely "time".

The idea of using time-points to measure the size of space requires adopting what has been determined to be five "Principles of Simplicity" as 5 key points for time and space and their interoperation.

The five key "Principles of Simplicity" are proposed to represent a type of universal condition that exists for the most fundamental of concepts of reality, cornerstone principles for the ideas, as proposed,

of time and space. They, the five points, need to be as simple as possible because that is how they are being defined, as the most fundamental of fundamental of concepts with no further inherent or embedded complexity other than how they would interact with each other, an interaction with each other that would emerge the idea of the complexity of reality as it is perceived, as it presents itself to us and as us (as our perception would understandably be a complex mechanism in a complex reality).

The proposed idea of the *Principles of Simplicity* for time and space, is the idea that ultimately *everything* in reality can only be described *by* the most basic of terms, and here the fundamental *everything* is the idea of time as a non-local field of time-before time-points everywhere in space, and space being as "nothing", no scale, unfathomable, only given scaling by "time", as the following 5 principles aim to demonstrate (A)-(E).

All of such was presented as the time-equation in paper 20 as a *temporal calculus* with space ([20]: p11-18), proposed here as a **time-space circuitry** (**TSφ**) of time-before time-points that become a time-now field of points in space:

(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 3-d 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).

Although paper 1 [1] laid down the fundamental descriptors for time and space along these lines, as the time-equation and how that develops the wave function in space, deriving the axes of space, those dimensions ([2]: p3-12), presented here with the 5 principles as the $TS\varphi$ is another angle of considering the same process, yet here as a type of executive summary of papers 20-29 [20]-[29] in directly solving all the known theoretic issues in physics.

With these five fundamental concepts, each unique from the other yet associated with each other, the following points thence need to be observed:

- The mechanics of this entire operation need to focus on how the time-points <u>as non-local references of transmission</u> communicate with each other as a circuitry of time-space, namely points (A)-(C).

- The fundamental concept of all these time-before time-points being "non-local" is that such is how they are defined, in not being as a distinct point in space yet time, yet according to this definition as an overall potentiality of time-points in regard to space in the form of time-after via time-now, as a separate entity in general, only made a specific point in regard to space when that "non-locality" is destroyed through a DIR (folding) with other time-points, as the $TS\varphi$ prescribes.

- Essentially, the symmetry of the time-points is broken as a type of wave function of non-local time-points (EM), in the formation of mass (EM^{DIR}).

The process of mass-formation perhaps needs closer attention.

According to contemporary physics, *mass* forms/condensates via a proposed process of *Boson "pair production"* [38], the Higgs mechanism. Temporal Mechanics proposes exactly the same concept, yet not using Bosons as particle force carriers, as this process is already accomplished by the instalment of "time-points" making up a time-space field (TSF, [23]: p15-16), and thus a wave-model description of the same process of pair-production for the coagulation of mass, explained here as "*destructive interference resonance*" (DIR), as it only can if two concepts of EM come together to cancel each other out in forming the elementary particles of the electron and associated positron.

In other words, proof for Temporal Mechanics exists for this proposed effect, only made more available in the context of QM and the SM of particles having a theoretic link established between them as per *temporal calculus*; what Temporal Mechanics proposes for the formation of mass as per its *temporal calculus* is already a widely accepted particle-model process as per its Higg's Mechanism, a mechanism with associated values derived by Temporal Mechanics as a wave function process ([25]: p45, eq9).

Note also that the *temporal calculus* has symmetry-breaking already built into its equations, as presented from paper 1 ([1]: p2-6); symmetry-breaking, quite simply, is an enforcement in the time-

equation of two independent processes "pairing up", destroying the otherwise natural status of the symmetry of the time-points as the time-algorithm, triggering mass formation, which then creates a new mechanism of spatial-involvement (not temporally, obviously, yet spatial, as can only be), creating a "locality" event as mass, together with the space-based force of gravity, gravity as the uniform space effecting a uniform attraction between the mass-objects.

The most important thing to highlight is how a time-point is requested to quantify the unfathomable space it is being associated to. This was presented papers 1-4 [1]-[4], how time could represent an algorithm that then derives the 3-dimensions of space (as our perception appreciates it to be).

For instance, to measure a distance in space requires (if space is nothing, no scale, other than our own 3-d perceptive constraints) "two" time-points while then having a line in time drawn between two time-points.

How can a time-point measure distance in space? How can a line be drawn between those two time points as a value of measuring space?

In short, for a time-point to bear reference to another time-point reference is to entertain a new concept of time as a *duration* of time in assuming the idea of "speed", namely spatial distance per however many units of time are being determined as time-points, timestamps, to be crossed through. This was presented simply in paper 20 in figure 6 ([20]: p13, fig6). There, it was proposed that time-points quantifying space as a speed of information transfer is set at a certain rate of time (as a type of spatial time-stamp grid) through a certain distance of space, as c. Although the time-points are in an immediate entanglement with each other, as paradoxical as it seems, the time for one time-point to measure another would take c, which thence gives the idea of distance to space. This was point (D) here in this paper. A fuller description for the time-points and how motion can be accorded in space is given in paper 20 ([20]: p11-18).

In now bearing reference to how this time-equation is relevant to the human temporal perception ability, namely how we most simply observe time and space, such an explanation and model for the time-equation was presented in paper 1 ([1]): p2-5). This was followed up in paper 8 "*The Golden Ratio Time Algorithm*" ([8]: p2-5) as another way of constructing the same time-algorithm. This was then furthered in paper 20 ([20]: p14-15) in presenting the basic scheme of time-points in space, thence echoed again in paper 21 ([21]: p16-23) as the time-space context (TSC) idea.

Through all of such the 3-d basics of space were derived, the dimensions of light and space, mass and energy, charge and spin, the associated field forces, the wave function of information transfer, and so on, all pointing to a new pan-theory and associated model of cosmology in correctly calculating the redshift effect and deriving the fundamental atomic traits of starlight.

Thus, from the Principles of Simplicity as 5 points for time and space, as combined with the basic features of human perception performance in time and space, there exists a manner of perceiving reality as a time-space circuitry ($TS\varphi$).

In short, time-points are proposed to be a way to quantify/measure space, in not being as space, yet a way to measure space, and this is quite different to Einstein's *spacetime* theory.

Thus, the idea of *spacetime* theory has had to be withheld from the papers of Temporal Mechanics, yet of course not entirely ignored given the data they have resourced through their own

theoretic tools of choice, theoretic tools that although explain real data, cannot bridge necessary gaps, as presented in paper 28, "*Temporal Calculus: Resolving Einstein's Theory of Relativity (Special and General)*" [28].

6.   The Time-Space *Atomic* Template (TST)

It would seem almost natural to consider that the atom represents a template of sorts, a context, a reference, that would act as a key feature to all the phenomena of reality. Temporal Mechanics has presented the case for a particular structure for the atom as a type of <u>datum reference</u>, an atomic template, as the <u>time-space template (TST)</u>, as presented in paper 23 ([23]: p17-23).

Although Temporal Mechanics has derived all the general key features known to physics central to the atom, from the subatomic particles to the elementary particles, their characteristics and associated field forces (force carriers), what has *yet* to be explained is the *magnetic* feature of the time-space template (TST), a feature which (as shall be now demonstrated) represents the missing link from all thus far presented by Temporal Mechanics, here as a process of simplifying the description of light and mass as the *magnetic* shell phenomena, as the more efficient and thorough way to explain the uncertainty of a particle with light.

6.1   The *Magnetic* Electron Shell

The electron, as proposed by the time-point theory, occupies an "uncertain" location in the form of a cloud around the atomic nucleus (yet a cloud that is quantified), which prescribes c with its associated charge and spin, together with via that process setting the value of the weights of the other atomic particles. This was presented in paper 23 ([23]: p20-30) with the vacuum energy value derivation, and as per paper 23 ([23]: p20-23) with the derivation of the proton (p) and neutron (n) from the electron (e), and how then also the elementary particles are derived from the electron as presented in paper 25 ([25]: p40-52).

The question for the electron shell structure is, "*what makes this electron cloud the way it is, what sets its "shell" constitution in place, and how is this related to the vacuum energy, its outside world?*". Although the shell structure and associated Rydberg Formula and Constant were presented in paper 1 ([1]: p12-15) as a measure of the time-equation effecting itself as a spherical front according to the golden ratio equation, now it is necessary to give greater furnishment to that idea.

According to the time-point theory and associated $temporal\ calculus$, the *magnetic* (m) time-point construct is ***not*** key to the process of the phi-quantum wave function ([2]: p6-17) in that the feature of the wave function given primacy was the function of "π" (as per the *electric* (e) time-point mechanism), thus making the magnetic time-point facility <u>a background device</u> (owing to those golden ratio wave function equation dynamics and π-requirements as presented in paper 2 [2], also as presented as the explanation of the basic time-equation wave function for energy in space (as EM) and associated template formalisms ([14]: p22-23)).

So, if the electron has primacy as a particle, the thinking now must be that magnetism must be _a part of the background structure to the electron_, and here the proposal is that magnetism forms a type of shell around the electron cloud of particles (TSU: ([20]: p12-13)), which seems natural if indeed the electric component is proposed to be at a 90-degree variation and out of phase to the magnetic component, as presented for the wave function of EM in paper 2 ([2]: p5-12).

As suggested, what is of particular interest from paper 1 ([1]: p12-15) is the Rydberg equation derived from the time-equation in relating a temporal passage, from a t_B (time-before) spherical time-front to a t_A (time-after) spherical time-front, while adjusting that progression to the Compton wavelength ([1]; p12-15).

What was not presented there was the actual structure of the electron shells themselves.

Here, the proposal is that the shell would be presided by the "m" time-point feature, as presented in paper 23 figure 10 ([23]: p24, fig10), yet there the m-point without a definitive role or location. Note also though the statement on page 30 of same paper ([23]: p30) as per:

> Here μ_0 is the magnetic constant (Vacuum Permeability), which according to the theory presented here in considering $\varepsilon_0 = \frac{1}{4\pi \cdot Q_C \cdot c^2}$, then $\mu_0 = 4\pi \cdot Q_C$, which presents the case of _magnetic permeability related to charge, charge factored to a surface area of space…_

To discuss this backing of the shells by magnetism, and what values of magnetic energy (and mass?) would be incurred, the behaviour of the electron in these shells according to Temporal Mechanics first needs highlighting.

## 6.2   Electron Cloud Geometry

As presented in paper 4 ([4]: p10), the pattern of the electrons in the electron shell structure would represent a seemingly random set of points prescribing a certain shape outlined by its path in time, as a cloud, also developed upon in paper 20 with the time-equation ([20]: p12-13). There the electron could occupy certain points of locality most logically in a geometric fashion, and there most fundamentally in a helical pattern on the surface area of a theoretic shell performing a singular electron jump, _helical_ in that the jump of the electron would prescribe the transit between two locations in the electron shell maximally diametrically opposed as a π-based motion in time through the shell structure, as what would need to be the case for the run of the time-equation, the time-space circuit ($\boldsymbol{TS\varphi}$), also explained as a time-space pulse (TSP) pattern ([23]: p27-28).

What also needs to be considered is the condition of the "15" _destructive interference_ sub-levels of the atom, as presented as the elementary _destructive interference_ sublayers of the atomic template from the electron to the proton/neutron. This was presented in paper 2, figures 14 and 16 ([2]: p18 fig14, p19 fig16):

30c Subatomic/elementary functionalities
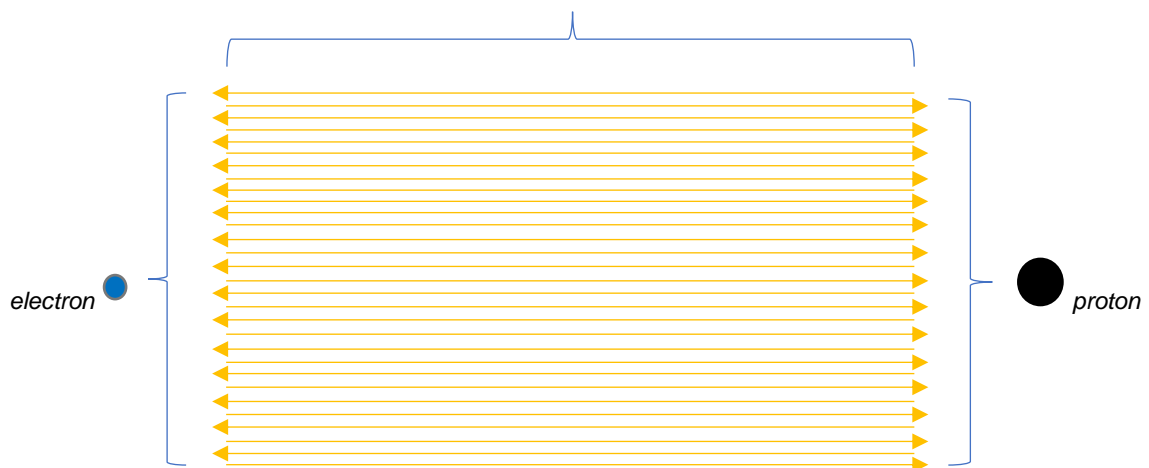
Paper 2 [2] Figure 14; 15 c directions from the electron to the proton, and 15 c directions from the electron to the proton, and 15 c directions from the proton to the electron, each loop meriting a new unique status/orientation of the electron and proton
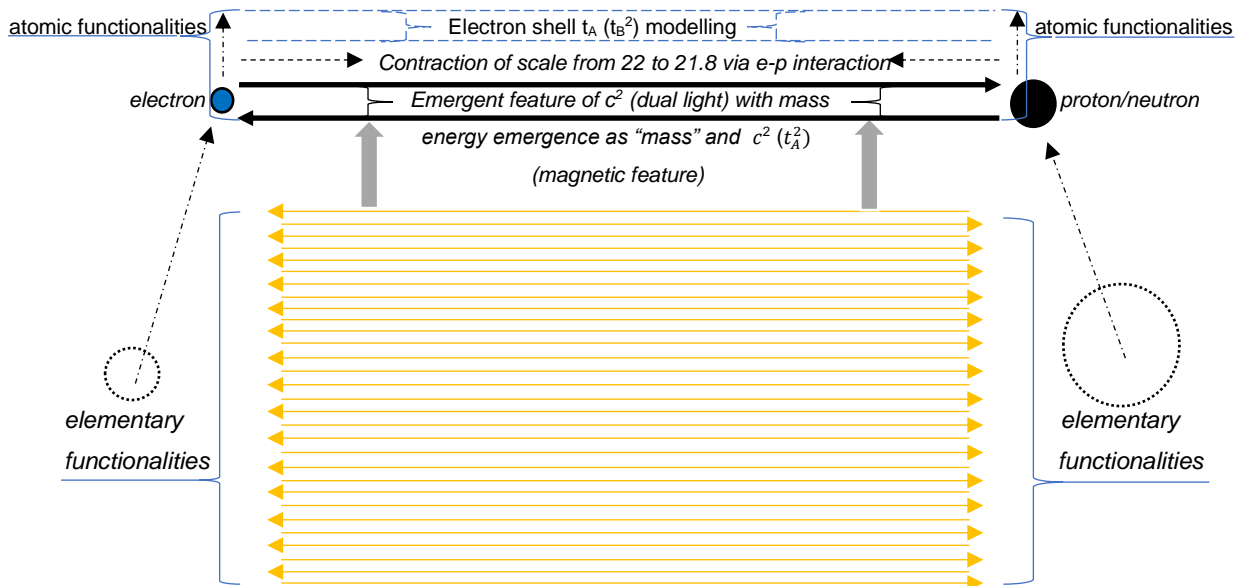
Paper 2 [2] Figure 16; "beyond" the 30c manifold is a c factor that can only be "squared" as a "future" ($t_B{}^2$) event beyond the primary 30c "now" event. Note also the contraction of the atomic scale from 22 to 21.8 owing to the emergent force between the electron and the proton, and subsequent electron shell modelling.

In coupling these 15 resonance layers ($30c$) to the Rydberg equation, as derived from the time-equation in paper 1 ([1]: p12-15), then the structure becomes (as the physics analogy of this concept) as the *Hyperfine structure* of the atom, namely as the electron shell system structure [30].

With these $temporal\ calculus$ factors in play, it is proposed that the electrons are confined in a shell, and how an electron jumps as a signature between shells would represent a type of geometrical helical transmission of energy as a wave, as based most simply on 2 points maximally equidistance (namely per that construct geometry) from each other in a sphere as a single π-constrained electron jump, not perfectly, obviously, as its motion would be uncertain by its uncertain location, yet directed by the π-constrained time-equation ($\boldsymbol{TS\varphi}$) nonetheless, and thus always distorted to accommodate for the electron's uncertain location, such as a wavefront in the time-point field (TSF), as described by the time-equation and the TSU ([20]: p12-14), then more complicated geometrical shapes as multiple jumps, as specific resonances.

As presented in paper 25 ([25]: p40-52), this general construction of the electron itself would be similar to the path it creates, central to the elementary particle confinement structure requirement and that sub-structure of the subatomic particles themselves representing a template of elementary particles with their own crystal dynamics as time-point activities in space, as also initially presented in paper 4 ([4]: p10-11).

As per paper 23 ([23]: p20-23) where upon the proton (p) and neutron (n) **_masses_** are derived from the electron (e) **_charge_**, and how then the elementary particle masses were derived from the electron charge in paper 25 ([25]: p40-52), primacy is given to the electron as the atomic _shape-maker_, which is understandable if the shape of an atom is based on the electron shell structure itself, as presented in paper 27, "_Temporal Calculus: resolving Elementary Particle formation and confinement_" [27]. This also alludes to the possibility that _the shell structure of the atom would have an underlying energy and mass_, which shall be derived shortly.

The proposal for the overall shape of the atom being central to what $temporal\ calculus$ proposes as a **_magnetic quantum shell_ ($\boldsymbol{MQS}$)** is granted basic structure through the idea of μ_0, the permeability of space, presented in paper 23 ([23]: p29-30) as a spherical feature of the atom, as also presented here in chapter 5.1. There, in paper 23 ([23]: p24, fig10), magnetism is presented most basically as a _spherical_ construct in regard to charge, and that is no different here; _permeability_ is thus simply the degree of magnetization that a material acquires in response to an applied magnetic field, and in the case here if an atom is naturally magnetically based, it is such a thing as what it has acquired as magnetism in regard to _space_.

Another key thing to note here is that **the outer (#15) shell of an atom**, the **5G shell**, is the shell that would allow the slip-streamed passage of electrons across atoms, as the MQS would allow, as the MQS template makes available.

6.3   Nuclear Shell Geometry

According to Temporal Mechanics, the electron is proposed to be created as a basic time-now time-point per the time-space circuitry ($\boldsymbol{TS\varphi}$) holding an uncertain location as a cloud of points in space (TSU, ([20]: p12-13)), in energy shells as prescribed by the time-algorithm in paper 1 ([1]: p12-15), yet owing to the EM wave function and spatial constraints of that electron existing as a cloud then it, the electron, becomes associated to a central inner DIR resonance nucleus, the "p" and "n" particles ([23]:

p19-23), which themselves would be structured in their own shell-system, protons in their own shell system, and neutrons independently also in their own shell system. This is understood as the Nuclear Shell model in physics as based on the Pauli exclusion principle [31].

Temporal Mechanics understands the Pauli exclusion principle as a natural condition that would exist for the atomic nucleus particles (p and n) needing to occupy independent quantum states *as dictated by their association to the electron and magnetic time-points of the time-equation and such a basic unique reference requirement for the time-equation's functionality*, as much as the basic time-equation requires the setting of the 4 t_N points, as highlighted in paper 23 ([23]: p13, fig3).

7. The Magnetic Quantum Shell (MQS)

The issue now to consider is whether or not magnetism would convey a type of "mass" effect, overall, in the atom, and how this would most basically manifest.

7.1 *MQS* Structure

As per paper 5 ([5]: p4), magnetism was proposed to represent a *mass-analogue* affiliated with the neutron and not the electron, thus being *neutrophilic*.

And so, what would be the value of this energy of the MQS, what value of mass would this hypothetical surface area 2-d manifold "shell" system structure be?

According to paper 2 ([2]: p20, eq16), there exists a scale in play for the magnetic template EM-coupling dynamic of 32.7, <u>as an adjusted EM-coupling factor</u>, 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 <u>as a spherical surface area</u>*; 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 that the electron builds around itself 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:

$$32.7 \cdot electron\ mass = MQS\ shell\ unit\ mass \qquad (1.)$$

$$32.7 \cdot 0.511\ MeVc^{-2} = 16.7\ MeVc^{-2} \qquad (2.)$$

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.

7.2 MQS Dynamics

This magnetic quantum shell (MQS) concept therefore would undoubtedly need to set the basis for *particle to particle* energy transmission, integral to the calculated $CMBR$, namely that the error gradient inclusive to the $32.7\ EM$ coupling factor as per paper 2 ([2]: p19) must properly account for the CMBR, as it does, as it is accounted for in paper 4 ([4]: p16-17), thence in paper 14 ([14]: p23-27), thence paper 25 ([25]: p31-32).

In short, to understand this magnetic quantum shell (MQS) is to understand all the required spatial compressions of the atomic template (TST) enforced by the electrical feature of the phi-quantum wave function (e and p attraction) and associated time-equation π-constraints, initially presented throughout paper 2 [2] then presented in paper 24 ([24]: p19, fig2) and how that then relates with the magnetic component and why, how the magnetic component also adjusts for this, and thence creates a new condition for the atom manifesting as what is to be proposed as the "weak" nuclear force, as a need for the atom to offload a part of its energy structure in setting a limit for the electron energy shell system, as presented in paper 25 ([25]: p43).

Likewise, the time-equation incorporates the strong nuclear force as the natural association of the central p and n t$_N$1-t$_N$1 time points, a natural force; associated to this is the disparity between the e and m time-points (each as an *arrow* and *tail*, as per figures 7-9 paper 23) as a natural "weak" force, as per paper 23 ([23]: p18-19, fig7-9) and paper 25 ([25]: p43).

Explaining this another way, the weak force is a basic mismatch between e and m time-points and represents most basically particle decay through EM release primarily effected by the electron. This electroweak force would naturally contribute to the CMBR (vacuum energy) of the entire time-space system as a standard value, only cycling in varying amounts due to any specific local events effecting the state of the particles, noting that the compression factors (as the process of this electroweak force coupled with the internal e-p association) are proposed to bring into effect the vacuum energy manifestation from the MQS, from the electron shells. Conversely the strong force is accommodated for by the central process of the p and n t$_N$1-t$_N$1 relationship of the $\boldsymbol{TS\varphi}$ time-equation, another feature that as a time-equation representing energy and thus points represents a primary force in time-space. This was described in paper 25 ([25]: p43).

7.3 MQS Light Polarization

The proposal for the magnetic time-points as the electron shell confinement structures now appears to be a strong case.

This MQS would be a feature of the time-space template (TST) working also in conjunction with the ABE, the *Atomic Barrier Enhancement* factor, as presented in paper 27 ([27]: p12-14), namely an EM^{DIR} field and thus *mass* associated to this MQS.

Therefore, in noting the repulsion between an EM and EM^{DIR} field, there would be a natural polarisation of light as EM emitted from the atom, which physics has known from 2002 [35], and puts down to natural scattering from electrons in the early universe, here though as a natural scattering from the electron shells.

To also note is that this polarisation features the notion of parity symmetry breaking down, as this is quite simply an electron occupying an uncertain location in an electron shell, thence being responsible for the CMBR, executing a type of helical motion, as described, as derived in paper 14 ([14]: p23-25). Simply, parity symmetry is broken with the Temporal Mechanics MQS electron shell model because that's where the weak interaction happens, and that's where the compression happens along with that weak interaction, that release from the compression, a natural decay, as presented in paper 4 ([4]: p8-10) and paper 25 ([25]: p43, fig 12), also a feature of the natural repulsion between an EM field and an EM^{DIR} field, as presented in paper 23 ([23]: p24-27). In all, this would manifest as a slight twist in the already polarised CMBR.

This twist in the polarisation of the CMBR has been recently discovered as per the work of *Yuto Minami and Eiichiro Komatsu, Phys. Rev. Lett.* **125,** 221301 [36], a description there seeking to place the phenomena into a ΛCDM model context.

8.   Particle Dynamics

With the two basic features of particle field interaction derived, namely EM and G ([22]: p14-16), and the confinement of the atom also derived as Atomic Barrier Enhancement (ABE) ([27]: p12-14), the relationship between individual particles and atoms then becomes a formality of EM and G interplay, of course with all the required conditions in play, as presented as the 10 time-space conditions in paper 26 ([26]: p9), noting of course that there would exist a natural distortion between EM and G, a natural repulsive effect, as derived in paper 23 ([23]: p24-28).

In short, this natural repulsive effect between EM^{DIR} (mass) and EM (energy) would manifest as a type of turbulence of particles in space in the context of the vacuum energy ($10^{-9}J$).

Essentially, the idea of a "field force" is carried by the sea of non-local *time-before* time-points bearing into the vacuum of space associated to each time-now elementary particle prescribing a required relativity between the non-local time-points in their (the time-points) being associated to the one entirely theoretic and *a priori* local elementary realm in space *as space*, limited of course by c as points of relativity in that overall *now* temporal event, as a temporal energy flow as the arrow of time. This was described as the time-space field (TSF) in paper 23 ([23]: p15-17).

Particles would therefore have their own propulsion by virtue of the time-equation *as an arrow effecting their underlying time-point features of being particles with an intrinsic mechanism of spin* ([23]: p12-15, fig 1-6), effecting itself through the MQS and TST (time-space template). This propulsion would

then result in random motion between particles, resulting in what physics understands as _Brownian motion_.

As presented in paper 22 ([22]: p16-23), mass (EM-A^{DIR}) would attract mass in a uniform gravity field (EM-B^{DIR}), disrupted naturally by the idea of EM energy as "heat" ([23]: p24-28), creating therefore the concept of a natural type of turbulence. Yet associated to this process would be an extra kinetic energy kick by virtue of the antimatter effect of entropy in space (and the effect there with gravity), as presented in paper 7 ([7]: p2-3), also proposed in paper 25 in presenting the theoretic basis for antimatter ([25]: p47-49).

Particle inertia would therefore be central to a general uniform spatial field (EM-B^{DIR}), that idea of inertia, of a particle having relative stability with other particles, yet having something such as _heat_ interrupting this stability warranting a natural resistance of mass (EM-A^{DIR}) to any change in its status with gravity (EM-B^{DIR}), a natural chaos. Such would be key to a process of particle-particle turbulence.

According to fluid dynamics, turbulence is defined as a fluid motion undergoing chaotic changes in pressure and flow velocity, a disruption to a laminar flow, namely when a fluid flows in parallel layers. It is considered that turbulence is caused by excessive kinetic energy in parts of a fluid flow, excessive kinetic energy which is thought to overcome the damping effect of the fluid's viscosity, and such is precisely the case here regarding the natural repulsion between EM (heat) and EM^{DIR} (mass).

Quite simply, particle turbulence would be a completely free state of particles with their own independent propulsion mechanisms as mass in space under the influence of not just their own random time-point general motions, yet of the background heat context (EM) of space interfering with their inertial (EM-B^{DIR}) states.

9.   Particle Radiance

To note here is how light is being regarded, namely as a spherical propagation of energy in space via the signal generated by the MQS and associated electron jumping. Also to note is that owing to the EM-EM^{DIR} repulsive effect, light is naturally inclined at an angle to gravity, and so EM would be inclined to curse ever so slightly in regard to mass, to EM^{DIR}, a feature physics understands as gravitational lensing [37]. This has two effects, namely, as presented earlier, a natural polarisation of light emitted from a particle with a helical twist (which studies have shown with the CMBR [36]), and how light is affected by massive objects, such as the sun, as per the idea of gravitational lensing.

9.1   Light reflection (secondary radiance)

One basic feature of the idea of radiance would be EM-EM^{DIR} opposition-reflection. Essentially the EM-EM^{DIR} repulsive effect is a type of natural reflection process, as opposing forces behave; most basically, an EM field facing off directly with an EM^{DIR} field, as with an atomic barrier (ABE, EM^{DIR}) for instance, would produce a mass-type reflection, as presented in paper 23 ([23]: p26-32); a pure reflection of EM against a MQS or ABE (EM^{DIR}) barrier would logically produce a certain momentary EM^{DIR} effect

itself at the moment of reflection (as a process of EM destructive interference resonance), and such would itself as mass represent a type of inertia, logically.

Such supports the concept of how light would appear to carry momentum when reflected from a surface, such as the solar sail proposal [38], and how light is proposed to carry momentum through Einstein's equation of $p = \frac{E}{c}$ where p is the momentum and E is the energy of the photon.

The interactivity of a MQS with light would be central to the energy dynamics of the time-equation and those associated energy protocols, and of course the general context of the TSF, as shall now be highlighted.

9.2   Light projection (primary radiance)

The nature of particle radiance becomes elementary in understanding how the intrinsic dynamics of a particle are responsible for EM radiance.

Radiance in its most basic sense would be a process of an EM^{DIR} structure (ABE) with fluxing MQS EM features (heat) as a time-space field (TSF) interacting with the surrounding space. Anything that would cause that EM flux/release would represent a process of radiance, whether perceptive or not, most basically measured as energy, as a transference of energy to the surrounding time-space field (TSF).

The proposal by $temporal\ calculus$ is that most fundamentally with mass this is a measure of the vacuum energy, which has been correctly derived with the Lamb shift effect ([14]: p24, eq10), as a process primarily of the electroweak force, as the value for the CMBR, which would be registered as having a slight level of polarisation owing to the EM-EM^{DIR} effect, and associated twist owing to the helical movement of the electron upon the MQS structure as energy is released.

Therefore, a scale of heat/radiation would exist between the vacuum energy of space and a basic electron jump, whichever way it is, absorption (electron jump up) or release (electron jump down), it can only be considered.

9.3   Static Charge Radiance

Static Charge Radiance is a multi-faceted phenomenon that requires some explaining.

Electron-Proton charge, or more basically still, the nature of the electron itself in association with a proton, represents the key structure of the atom. Yet an imbalance of the charges would create an overall EM signature (of an atom) which itself would only naturally represent a concept of energy radiation, which requires further attention to theoretic detail.

The radiation of electrical charge would be dictated by the confines of how such a process works on a subatomic scale, as e attracts p, yet "static" charge itself perhaps requires particular mention:

- Extra-atomically, it is the MQS (as a part of the time-space template) that would radiate the EM signature of the atom; free particles would do that themselves if free particles, and so too with an

atom, yet with an atom the MQS would perform this task *as though* acting like a charged or non-charged free particle.

- In a specified independent frame of reference, a non-mobile time-space context (TSC, [21]: p16-17) in a time-space field (TSF, [23]: p15-16), a MQS would act as though it is static, stable, and thus would radiate as an electric field perpendicular to its surface area (if it has an imbalance of charge associated to it, a net charge, whether positive or negative), and yet the following conditions apply according to the design of a TSF with two TSCs' in relative motion:

    o Two $MQSs$, one positive the other negative, would incur an attraction between the positive and negative in the form of seeking parity via electron flow, as would be natural for an $MQS's$ internal structure in a TSF context 23 ([23]: p18-25).

    o The motion of a charged MQS is always relative to whatever other $MQSs$ are around it, in that if a charge exists in a MQS and it is in motion, then the *inference* is of an *electron* motion representing itself, as is natural for an $MQS's$ internal structure in a TST context.

    o Fundamentally, the issue to note is how the time-space field (TSF) is being activated by any two objects, namely a TSF that by its construction as symmetry-based time-points in the context of space is wired holistically by theoretic design (symmetry) to know if there is relative motion with charge and how that incurs a magnetic field effect based on a TST, a time-space (atomic) template.

Quite simply, the magnetic feature would only become apparent when the MQS would be in relative motion to another charged construct, whether a free particle with or without charge, or another MQS (TST) with or without charge; provided there is relative motion in that set of MQS templates as charge in a TSF, it will produce a virtual TSF magnetic field according to how the TSF is designed, namely primarily from the $PQWF$ ([2]: p4-12) and that primary process in play in time.

10.   General Cosmology Modelling

According to Temporal Mechanics, unbound energy as a propagation of light in space is unbound, not bound by the confines of the atom, incurring a pure $E = f$ state (not an $E = hf$ requirement), as presented in paper 13, "*Space, and the Redshift Effect*" [13].

Fundamentally therefore, there would exist a diameter of a TSF field based on a standardly defined TST (MQS) condition approaching the equation of $E = f$, namely $h\,(Planck) \gg 1$.

The radius therefore of a *universal* TSF can be measured from a central point of EM radiance in a TSF.

This was calculated as the Oort cloud distance from the sun (SOL) ([13]: p11).

The new proposal here is that there would be a type of cosmological scaled MQS in play on the level of this Oort cloud, as an overall spherical magnetic field of influence harbouring a plasma field of particles, the reasoning being that <u>in the process of reaching</u> this ultimate level, of $E = f$, there would occur a new feature synonymous with a subquantum level, which as proposed in paper 25 ([25]: p50-51) incurs a "12" factorial (directly related to a $z11$ redshift), namely when light travels to a $E = f$ realm through space from a $E = hf$ realm, as light from the SOL for instance heading out to the calculated Oort cloud. Thus, the following would become observable for that realm of $E = f$ space as a gradient to a sub-quantum particle (plasma) level:

- The pure realm itself of $E = f$ would represent an unbound entirely massless state, <u>the process of reaching which</u> incurring an elementary particle state from a subatomic particle state, and thus in theory *a plasma state*, to finally a purely temporo-spatial state.

- The elementary particles in this proposed plasma state process of $(E = hf) > (E = f)$ would be visible, as EM phenomena, in approaching this pure $E = f$ realm, as though effecting themselves through a golden-ratio fractal process of resonances from the scale of $z = 1$ to $z = 11$ ([13]: p9-11) maximally before reaching this proposed ultimate Oort cloud $E = f \ MQS$ level.

Note also that included in this theoretic design the *Horizon Problem* is resolved, as $temporal \ calculus$ theorises a uniform CMBR and vacuum energy, also resolving the *Flatness Problem*, namely that there exists a uniform gravity density (uniform G-B, as it only can). Also note that the *Hubble Constant Problem* and *Cosmological Constant* problems are also resolved by $temporal \ calculus$ in explaining the redshift effect without requiring a metric expansion of space and associated dark energy and dark matter.

The problem with viewing the stars therefore is that **if** they are assumed to be suns similar to SOL, and then measured accordingly, as per the energy of radiance comparable to SOL as a standard, to then measure the projected distance from SOL those other presumed suns would be, and then measured in their relationship to one another as radiances and associated models, a completely differently cosmology results, one that doesn't account for the $E = f$ plasma-principle of elementary particles in a universal TSF field, one that cannot account for the $z = 11$ maximum redshift effect requirement, and how those energies would create points of light themselves as subquantum resonances requiring descriptors such as a metric expansion of space, dark energy, and dark matter.

One of the features that could become apparent in a generally uniform CMBR is the rotations of the planets and what would appear to be associated doppler shifting of the CMBR related to the known generally uniform CMBR field in regard to a view of the stars. This would come about as a particular anisotropy, a doppler shifting, blue-shifting and red-shifting, of course, which would make one consider such an anisotropy be a feature of an either expanding or contracting (cyclic) universe, if not steady state, findings confirmed by the "*Lawrence Berkley Laboratory and Space Sciences Laboratory*" [40]. Such is as Temporal Mechanics proposes as an effect of a planetary rotation in a general TSF field in view of the stars.

Given therefore all the data-derivation accuracies *temporal calculus* has delivered compared to standard cosmology theory, it can only be fairly proposed (in the absence of anything else mysterious to human perception) that the stars would more than likely represent a general plasma field of dust and debris displaying subquantum natural variances of wavelength to a factor of $z = 11$.

Indeed, the same $E = f$ scheme would apply for light from the stars reaching SOL, apparent as they could only be as high energy bursts, seemingly massive in scale, simply because of the $E = f$ effect of light in space reaching SOL from the stars, incurring a central plasma structure in the centre of that spherical stellar field of particle energy activity, SOL, a plasma centrality that would be relatively centred (obviously, in being centred in an overall outer plasma sphere). Also of note, according to *temporal calculus*, is that the heat volatility of SOL would peak on its surface where the MQS and the associated ABE-EM^{DIR} interacts primarily with free-released light (EM), namely its corona.

To note here is that *temporal calculus* uses all the same data as contemporary cosmology, and derives all the same key findings, including all the key findings of Einstein, with the findings of Einstein already discussed in paper 28 [28]. The uniformity of the CMBR is accounted for, its associated anisotropies, its redshift effect, together with the basic features of the stars as presented in papers 22-23 [22]-[23] as per the description of particle plasma states. The only exception is the scale that has changed, namely the size of this stellar phenomena and its distance from SOL, together with introducing a general cycle in time for generally recurring/cyclic events, and how time can be used as the primary mechanism of measurement, not just for particles, yet the space the particles inhabit.

What shall be discussed in a subsequent paper is what process fuels this overall time-space system, before which the key issue to now address is "causality", namely what is the drive for this pair production (DIR), this Higgs mechanism, to occur, for mass to *happen* in the context of a time-space circuit system $TS\varphi$, a general <u>time-space circuitry</u>.

11.   Temporal Mechanics: An Overview

Temporal Mechanics proposes as per its 5 *Principles of Simplicity* that the drive, the determinism, of physical phenomena is *a process of space becoming relevant to light in the only way it can, namely as mass and thence gravity, by condensing mass from light per EM folding, as EM^{DIR} field formation (Boson pair production).*

The challenge for Temporal Mechanics was to understand how a field of time-points, a field that grants space its dimensional effects, bears effect upon the concept of a localised mass-construct, or quite simply how a mass as EM^{DIR}-A with its associated gravitational EM^{DIR}-B field effect ([23]: p24-28) operates in an EM field, namely how EM links with gravity.

This explanation came through with papers 20-29 [20]-[29], as the general description of particle construction from the initial time-algorithm. There, the idea of the electron is key, generally located/forming in a 3-d shell while generating a temporal spherical EM field echo (DIR) within its cloud locality and also around its cloud locality, within its cloud locality as the DIR mass-effect leading to proton and neutron

formation, and around its cloud locality as the manifestation of the electron shells (MQS), described as *atomic barrier enhancement* (ABE) and associated MQS related Lamb shift and vacuum energy ([14]: p23, eq9).

The collage of the stars is also interesting, as a general $E = f$ backdrop of debris in a state of atomic disintegration showing all the features of particles in their free states (plasma), of the BEC and $accretions\ discs$, and $black\ holes$, and so on and so forth, all bound in the form of $globular\ clusters$ and discs, discs around discs at various angles, and so on and so forth, all derived from the a priori of $temporal\ calculus$.

Given the structure of how mathematics is applied to physics, namely with the current ΛCDM model using a mass/momentum based approach to mathematics, mathematics and physics are really branches of an over-arching entity known **as** the ΛCDM model, *a description itself that prescribes when time and space began*, yet a model refuted by Temporal Mechanics; if one thing is therefore being contested by Temporal Mechanics as a discipline, it is cosmology theory, given the need to move away from a mass-based approach of mathematical formalism to a temporal-based approach of time-points.

Papers 17-19 [17]-[19] presented many sides of the problem of physics using inertia to explain physical phenomena and the reliance on momentum to explain the redshift effect as the *metric expansion of space* holding stars as their own SOL. It was established there though that there exists a particular determinism in the time-algorithm, as presented in paper 19 ([19]: p12), that presented an interesting insight, already derived in the paper, an interesting insight nonetheless of the ultimate process of determinism in play, as follows:

*Note that $t_B = \frac{time}{distance}$ would be a fundamental **DETERMINISM** for space and time, manifesting on this primordial temporal level of time in the overall time equation as a type of **CAUSATIVE** element, as t_B. Note also that the overall equation of time as equation 3 presents ($t_B + 1 = t_A$) is an overall equation **for** "time"; installing the concept of space into t_B, and mass-energy into t_A, and the relationship of t_B and t_A central to "1" as the overall equation for time presents a particular case of cause and effect, of time seeking to be time by it seems shrugging off space, or in other words, creating a type of space-time indeterminism for t_A, as though making t_A as "nothing", pure space as an uncertainty of "time". Quite simply, t_B would represent the **CAUSE** to the **EFFECT** of t_A by time-space of t_B making t_A indeterministic, a case already proposed in paper 1 [1] with the carried suggestion of "$t_A = ?$" ([1]: p3, eq2).*

Thus, the time-equation is interesting in that it creates a cycle of determinism in itself as a key that when put on a truly grand scale, as per through the filters of papers 20 to 29 [20]-[29], this paper inclusive, the following becomes simply viewed:

- There exists a determinism of time and space, that interoperation, that when used with the concept of a "number", namely "1", gives rise to mass and energy, constantly, as an arrow of time.

- The constant calculation of reality as an equation requires the ideas of time and space added to a "number", a seemingly artificial concept, or rather, a datum reference of "1", which then provides for the existence of mass and energy

- As mass and energy are in opposition, as the EM-EM^{DIR} effect, then this causes a result that is forever divided, and thus an equation seemingly without end, without resolution.

- The idea of time and space therefore, being added to "1", creates a constant never-ending equation.

The practical viewpoint here therefore is a mathematical one, as the concept of a never-ending equation central to "1". In other words, mathematics alone cannot equate time and space with mass and energy, unless making the equation a time-equation itself symbolic of the never-ending feature of the result of the equation, the only beginning of which equation being relating time with space as an a priori according to that nominated time-equation. Indeed, it seems, paradoxes almost enforce logic, as much as the time equation as that golden ratio paradox enforces a need to explain an outcome.

Stephen Wolfram presented a paper on an algorithm that he proposes derives certain physical phenomena descriptions [41], a paper as a candidate for a basis of theoretical/mathematical physics, as based on descriptions consistent with some features of physical phenomena. Presented here with Temporal Mechanics is the case of the time-algorithm that (unlike Wolfram's algorithm) is **_not_** applied as a computer algorithm to a computer per se, yet to a principle of time relating with space in a _certain_ way, namely a way related to the human perception ability of temporal perception, not defined by the capability of a computer system, yet defined by the capability itself of human perception. By such a process, all the equations known for the fundamental field forces, together with standard measurement values and associated constants of particles and their field force carriers, have been defined with this _temporal calculus_ ([25]: p20-22).

The obvious question now to ask is how and when does this scheme begin and how and when would it end.

The only answer can be that it would begin with our datum reference and end there, because technically that datum reference, principle (C) as presented in the 5 Principles of Simplicity, is key, the key link between time and space. So, essentially, our datum reference logically needs to explain how this entire cycle of time with space works, and therefore as an answer to the question of a beginning and an end must include how we began as a species and how we may end as a species, and if there is no answer there to be found, the only logical thing to consider is something super-natural, something beyond our own datum reference code of consciousness with time.

In terms of the 5 Principles of Simplicity therefore, as a description of this _temporal calculus_, "_as a beginning of time there is a void, and that void was then measured with time using the reference of consciousness, which then resulted and continues to result in the ideas of energy as light and mass_".

12.   Conclusion

One thing that the process of studying physical phenomena can teach us is what can be assumed and what cannot be assumed. As Temporal Mechanics has shown, *assuming* "space" as a 3-d grid (a mathematical presumption itself) almost asks mathematics to come in and use the ideas of light and mass *as references of study* to measure the size of that *assumed* 3-d grid, a size itself which may be irrelevant to the more important task of understanding what is being assumed, namely the idea itself of a dimension, whether time or space.

Indeed, as per the results of the ΛCDM model, consequent to assuming the dimensions, that process is all about measuring the size of what is assumed, namely space, as a process of measuring something that can only naturally be done with the data used in that process, consequently having space extend to infinity as a vast abyss while contradicting known principles of time, given time also has been assumed in the context of assuming 3-d space.

Cannot though space be presented as an infinite dimensionless vast abyss to start with, and then have developed a mathematical formalism for time points in that space to measure space with *c*, using datum references, and then let subsequent mathematical formalisms develop from those datum references? Temporal Mechanics has presented the case it can and that such a process is possible in capturing known physical phenomenal data.

Two questions come to mind therefore:

(a)   Is physics trying to explain physical phenomena *based on* what we perceive *as model of what we think we are perceiving (such as the ΛCDM model)*?

(b)   Is physics trying to explain physical phenomena as a process of using our perception ability per se and how our perception ability relates as a time and space construct with what we are in fact perceiving in an impartial and unbiased way, as what science requires?

As has become evident, (a) is all sorts of paradoxes and unresolved problems, beckoning a new approach to understanding primarily the dimensions of time and space, one Temporal Mechanics proposes to deliver (b).

For ease of search functionality, the complete PDF of Temporal Mechanics containing all its current papers as listed here [1-29], all the papers available in the one search facility, is available from the following link:
https://transactions.sendowl.com/products/78257031/AE5EA60A/view

Conflicts of Interest

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

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