

# Quantum Gravity, and the calculation of maximum SOL mass

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**Abstract:** Here Temporal Mechanics shall derive the mass of the electron using the same system of logic that derived the mass of the neutrino in paper 35 (Temporal mechanics (E): Time-Space Logistics) to then derive new equations for gravity via a process of equating time to space, and thus in theory, providing a theory for quantum gravity. There, an equation for gravity will be proposed that calculates the minimum and maximum limits of mass for a gravitational field, thence deriving the maximum mass of a sun from the mass of the neutrino, subsequently presenting a key insight to cosmology theory. From here, an equation proposing the maximum and minimum limits of space shall be derived in supporting the proposed time-equation and the temporal event of time not passing at the speed of light  $c$ , successfully deriving the Planck length, putting into question the current one-dimensional mathematical formalisms for time.

**Keywords:** temporal mechanics; temporal calculus; time-equation; SOL; quantum gravity; gravity; electron; positron; neutrino; neutrino flavor; particle pair production; CMBR; beauty quark; Planck length

## 1. Introduction

This paper, in following on from the series of papers on Temporal Mechanics [1-35], shall derive the mass of the electron from the Planck scale in using the same spatial factor,  $S_0$ , that derived the mass of the neutrino in paper 35 ([35]: p27-28), to then derive new equations for gravity in equating *time to space*, and thus in theory, providing a theory for quantum gravity. There, an equation for gravity will

be proposed that calculates the minimum and maximum limits of mass for a gravitational field, thence deriving the maximum mass of *SOL*, subsequently presenting a key insight to cosmology theory. Subsequently, an equation proposing the minimum and maximum limits of space as the Planck scale and Oort cloud region respectively shall be derived, supporting the proposed temporal wave function and associated temporal event of time not passing at the speed of light  $c$ , putting into question the current one-dimensional mathematical formalisms for time.

This paper will be divided into 11 key sections, as follows:

- (1.) Introduction
- (2.) The flaw in Physics
- (3.) What is required
- (4.) Time and Light
- (5.) The electron
- (6.) Deriving the mass of the electron
- (7.) Gravity
- (8.) Deriving the mass of *SOL*
- (9.) Establishing the limits of time and space
- (10.) The natural error at play
- (11.) Conclusion

Together with the work of Temporal Mechanics [1-35], it is assumed the reader is cognizant of the fundamental ideas and associated phenomena central to light and particles, thence the quantum nature of light with wave and particle features, together with Einstein's Special and General theories of relativity, and how from all of such have come two general models explaining the phenomena of the atom based on the model of light as the photon, namely the Quantum mechanical model and the Standard model of particles, each representing their own particle and field force code of descriptions and associated classification of data-driven measured phenomena. The presentation here thence focusses on how all of such can be fundamentally challenged with a new axiom for time and associated temporal wave function to better account for the nature of light in space regarding particle and field force behaviour while addressing all the accepted data reservoirs of both Quantum Mechanics and the Standard model.

## 2. The flaw in Physics

Relativity theory is primarily based on the investigation of non-zero mass bodies in motion, making mass a *primary* consideration, with time and space *secondary*. Furthermore, relativity theory examines how light,  $c$ , is related to mass, in fact how anything is related to mass, mass being the *a priori* of theoretic modelling, as per Einstein's often quoted statement:

*“Descartes argued somewhat on these lines: space is identical with extension, but extension is connected with bodies; thus there is no space without bodies and hence no empty space. It appears to me, therefore, that the formation of the concept of the material object must precede our concepts of time and space”.*

A. Einstein, “Relativity: The Special and the General Theory”, 1954 [36].

It is widely considered that Einstein *accomplished* his basis for relativity theory with  $E = mc^2$ . What he did not do is explain *why*  $c$  is a constant despite any relative motion of non-zero mass objects in space, and more importantly *why* at  $c$  time does not pass, conversely making  $c$  a presumption based on known observed data.

To therefore resolve relativity theory is to ask *why*  $c$  is a fundamental constant for **any** frames of mass motion reference in time and space. To do that is to present a fundamental basis for time and space that upholds the constancy of  $c$  despite mass and its motion, and how at  $c$  time does not pass. Yet such conflicts with what Einstein initially proposed, namely that *“The formation of the concept of the material object must precede our concepts of time and space”*.

In Einstein not fundamentally explaining why  $c$  is a constant, in not considering  $c$  as a constant *primarily* and that at  $c$  time does not pass, a serious oversight in using  $c$  began to occur in his equations, namely the mere plugging of  $c$  into his equations as though a simple time-linear value, as underwritten primarily by his idea of a *curvature* of *spacetime*, presupposing motion for mass and thus gravity, while overlooking  $c$  being a constant in all frames of reference and yet more importantly that at  $c$  time does not pass.

In short, as shall be demonstrated here, the core problem with physics practice is in merely plugging  $c$  into equations without considering  $c$  is still a constant despite the relative motion of objects, despite time-dilation, despite doppler effects, and that most importantly at  $c$  time does not pass.

### 3. What is required

To explain this in another way, let us ask the question, “what mathematical grid for space can properly plug in  $c$  regarding non-zero-mass objects in motion while knowing  $c$  is an exclusive vacuum paradigm that does not change with those relative non-zero mass objects in motion?”.

Technically, two levels of mathematics are needed regarding the spatial vacuum, the  $c$  reference and the particle reference being measured. The  $c$  reference, as Temporal Mechanics proposes, is primary, and the mass reference is secondary. With this proposal therefore, light *anomalies* such as doppler shifting (axial and transverse) measured as a radiance/absorption signature of bodies in relative motion are proposed not to be an issue of light as an *a priori*, yet the issue of how light is registered/observed by non-zero mass particles, namely how light is both radiated and

absorber/observed, projected and received, and the relative motions there of those projection and reception non-zero mass objects. Ultimately, to say light is the condition of how particles project and register light is an account through the non-zero mass particle lens, not a primary (*a priori*) account of light as a wave function in the vacuum with two features, namely  $c$  and that at  $c$  time does not pass.

Fundamentally, Temporal Mechanics proposes that simple axial time-line modelling (and associated mathematics) for light (as based on non-zero mass particle activity) is *insufficient* to explain not only the fundamental *a priori* nature of light, yet the fundamental *a priori* nature of particles thereof. Conversely, "layers" of modelling and associated mathematics in respect of these different functionalities (of  $c$ , of the relative motion of non-zero mass objects independent of  $c$  given  $c$  is a constant in all frames of reference, and with the allowance of time not passing *at  $c$* ) need to be applied. The only solution there, for a mathematics, is to find the axiom of  $c$  with time and space, and thence mass, despite how complicated that mathematics may be for the axioms of time and space and  $c$  (with the aim of harbouring mass in the way it is known to be harboured with data).

Ideally, a basic code for  $c$  with time and space is needed to then explain the separate relativistic behaviour of bodies in motion upon that basic time and space code for  $c$ . Otherwise, energy as per  $E = mc^2$  is a too simplistic link between mass and the idea of  $c$  if not for first deriving that equation in the proper contextual and conditional requirement of time for  $c$  and that at  $c$  time does not pass. Indeed, there is basic link there, between mass and  $c$  using energy, yet such, namely "energy", does not account for how mass exists with space and its relationship with  $c$  as a *speed*, as it is just a postcard in a moment of time that fails to account for time not passing at  $c$ .

In short, at  $c$ , although there are many moments, such can't be assumed in calculating the energies of masses moving in space while also trying to explain particle behaviour as motion in relation to  $c$  as a constant, when two energy paradigms exist in that inter-play, namely  $c$  and mass, technically exclusive to each other on many known data levels of analysis, especially if  $c$  is a constant and mass can move any way it wants despite  $c$  needing to be  $c$  in whatever tangent mass wants to move in.

As a result of this fundamental flaw, the real question for Einstein's photon particle/wave model and the general wave-particle Quantum Mechanics model is the pixilation those models offer, or rather, "can't offer" to the Standard Model 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 as found with Heisenberg's Uncertainty principle (as described by Bell's Theorem 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 quantum pixilation and how gravity, and thence presumably mass, can get involved with light, with  $EM$ , namely the photon, to better account for time-dilation effects of light in the presence of a strong gravitational field without corrupting  $c$ .

The only solution, as Temporal Mechanics proposes, is to find the axiom of  $c$  with time and space, and thence mass, as a basic code for  $c$  with time and space to then explain the separate

relativistic behaviour of bodies in motion upon that basic time and space code for  $c$ , and how that relates with the nature of  $c$  as both standard time and time at  $c$  which does not pass. Otherwise, to regard energy as per  $E = mc^2$  is a too simplistic link between mass and the idea of light speed, ignoring a fundamental disparity between light and non-zero mass particles in relative motion.

As this paper shall demonstrate, in Einstein failing to properly account for the dimension of time, he failed to fully address the idea of time not passing at  $c$ , and thence failed to fully understand the *primary atomic code*, and thence *gravity*.

Temporal Mechanics has found that to properly resolve Einstein's relativity theory, one needs to consider a new mathematical basis for time not passing *at  $c$* . Such does not suggest that  $c$  is *immediate*, yet that there is a *speed limit* in play as a fundamental condition for any communication between any nominated points in space, and time not passing *at  $c$*  is an associated fundamental feature that needs to be acknowledged with a mathematical formalism describing such, a mathematical formalism from which all other phenomena can be properly theorized. This is the one thing Einstein did not rise to. It was good he acknowledged that the closer something gets to the speed of light (and when light is influenced by a strong gravitational field) *time slows down*. Yet he never considered such a principle to be a fundamental basis for time and space, namely the primary consideration of time not passing at  $c$ . Instead he looked for gravity as a result of mass as the fundamental basis for time and space, as *spacetime*, which one can only consider is a result of the greatness of Newtonian mechanics of that time, a follow-on effect still burning bright in Einstein's prioritization of ideas, not a truly objective stance.

Simply, if light is more fundamental than mass, why did Einstein prioritize mass with gravity as *spacetime* while overlooking instituting a mathematical formalism for light with time where at  $c$  time does not pass? He made an error.

#### 4. Time and Light

The basis of Temporal Mechanics is simple: if one accepts that  $c$  is an absolute value for a vacuum despite the relative motion of non-zero mass particles, why not plot a field of hypothetical time-points that only allow communication between those hypothetical time-points at  $c$  exclusive from the motion of non-zero mass particles? Such would merely be a hypothetical grid, yet a hypothetical grid that would pre-empt a wave function and associated process of expression of  $c$  by using, as Temporal Mechanics proposes, *time-before* time-points relating to a *time-now* time paradigm and thence *time-after* where that *time-now* time paradigm is given a speed limit,  $c$ , for information transfer between *time-before* and *time-after* at which speed time does not pass (as summarised in the previous paper, paper 35 [35]): in doing that and coupling that field with an extended temporal expression of the time-points covering *time-before*, *time-now*, and *time-after*, although seemingly difficult at first, a **more exact** account of the phenomena of light is established for non-zero mass particles in relative motion.

To put it simply, any plotting of  $c$  as an absolute value despite relative motion requires a hypothetical time-point temporal grid in a pure vacuum. That might seem intuitive if not simple at first, yet the next question is asking how the time-points communicate with each other. Of course at  $c$ , yet how then does phenomena such as mass and energy enact upon that time-point field? To know that is to then construct a temporal wave function for the communication between time-points and how that temporal wave function acts as both a wave and a particle, and then how that temporal wave function is a precursor to mass formation, mass that is independent to the underlying temporal wave function realm and associated  $c$  constraints thereof.

Overall, Temporal Mechanics found that to know why  $c$  is a constant in a vacuum is to look at two fundamental concepts, namely *time* and *space*, and to *then* explain that interoperation in correctly deriving  $c$  as a constant, how that temporal wave function is constructed as an *EM* field force, to then derive the atomic reference using the Bohr radius from that temporal wave function (the fine structure constant and Planck scale), to then correctly derive the known atomic particles (subatomic, elementary, and their known field forces), then  $G$ , and then to correctly derive the vacuum energy, CMBR (resolving the cosmological constant problem), vacuum permittivity and permeability, only to then correctly derive the known large scale observable metrics of space and associated large scale phenomena (Oort cloud, Heliopause, Bow shock), noting the inter-relationship of all the fundamental constants, as they can only be inter-related, all in reaching a simple and verifiable code for atomic phenomena and the fundamental field forces.

Key to that atomic phenomena code would be the idea of energy and of *temperature*, which Temporal Mechanics finds is a basic process between the various phenomenal facets of the atom and how an atom relates with another atom via *EM* and  $G$  according to a basis of *atomic spatial compression* brought into effect by *EM* and  $G$ , a compression that relates directly to the concept of *temperature*, ultimately to the value of the CMBR pinned at *2.725 kelvin*. This process was explained initially in paper 2 [2], in accommodating for the fine structure constant with the known radius of the atom (Bohr radius), paper 2 [2] in following on from the basic time-equation presented in paper 1 [1]. The primary achievement though of paper 2 was in adapting the time-equation to space in deriving the temporal wave function as both a particle and a wave where at  $c$  time does not pass ([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 " $\pi$ " 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  $\pi$  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).*

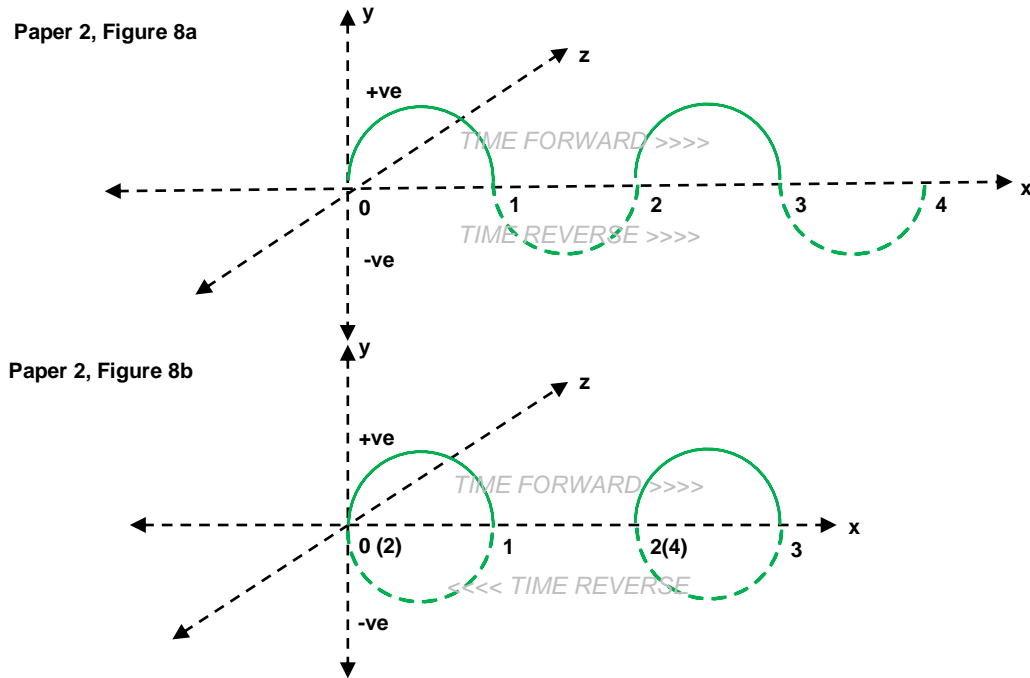
*On simple observation, we can suggest that we have developed a sinusoidal time-wave along a spatial axis given that time must move a value of  $\pi$  in each directional axis from the 0-scalar spatial reference point "0".*

*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:*



**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  $\pi$ , 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  $\pi$  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  $\pi$ , 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  $\pi$ ?".

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  $\varphi$  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  $\pi$** , the length in space time has moved along an axis (as per equation 2).

In all, there are 7 key concepts presented in paper 2 [2] regarding the temporal wave function that laid the foundations for the subsequent papers:

- The  $\varphi$  (golden ratio) nature of the phi-quantum wave function (*PQWF*) ([2]: p3-4)
- the “time-axes” of the *PQWF* ([2]: p4-9)
- the light “particle” nature of the *PQWF* ([2]: p9)
- the  $\pi$  nature of the *PQWF* deriving the atomic scale ([2]: p10-14)
- The energy compression scale of the *PQWF*-atom ([2]: p15)
- The internal electrodynamic features of the atom ([2]: p16-20)
- The uncertainty principle and quantum entanglement ([2]: p20-21)

The particle nature of light as the time-circle idea formed the foundational idea for non-zero mass *particle formation*, as per the *DIR* effect, as a *destructive interference resonance* producing particle formation at a region of optimal *destructive interference resonance*, namely at the reflection points of the temporal wave function forming complete wave function *time circles* (and not the standard abridged time circles found in the standard temporal wave function). Importantly in paper 2 [2] was presented the equation for the speed of light  $c$  and the charge of an electron  $e_c$  as measured with the proposed atomic temporal wave function spatial compression (temperature) scale, as per the following, page 16 ([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 “ $\pi$ ”, and thus a progression in the form of time. What type of progression of time? Electromagnetism (which shall be demonstrated). The following value results:*

$$\frac{19.8 \cdot \lambda}{e_c} = \frac{19.8 \cdot 2.426 \cdot 10^{-12}}{1.60218 \cdot 10^{-19}} = 2.998 \cdot 10^8 \text{ ms}^{-1} \quad (10)$$

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:

$$e_c = \frac{19.8 \cdot \lambda}{c} \quad (11)$$

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.

As a fundamental concept, the idea here is to now derive the mass of the electron  $m_e$ , and thence its charge  $e_c$ , to then confirm completely that the value of  $c$  can be derived.

## 5. The electron

To explain the electron is to explain most simply three things, the atomic shell it resides in, its charge, and its mass, yet perhaps even more simply, its *behaviour*, namely behaving as a cloud of non-zero mass particle points in the atomic shell structure.

The atomic shell confinement of the electron was initially presented in paper 1 [1] where from the time-equation the Rydberg formula was derived ([1]: p15-17). Following this, in paper 2 [2], the charge of the electron was accounted for with  $c$  ([2]: p16), as presented in the previous section here as per  $e_c = \frac{19.8 \cdot \lambda}{c}$ . Then the idea of an electromagnetic coupling force was presented for the atom ([2]: p18-20) where the idea of a type of electromagnetic coupling layered matrix would exist in the atom between the electron and proton. This idea was followed up on in paper 30 [30], where the actual nature of the electron shell as the *magnetic quantum shell (MQS)* was derived, associating what is considered to be the X17 particle to the value for the weight of the magnetic shell structure, and why ([30]: p19-20, eq1-2).

The behaviour of the electron as a cloud of points was addressed in paper 20 [20] where it was demonstrated that the time-equation itself and its nature with space underwrites the idea of why an electron exists in such a manner ([20]: p11-17). This then lead in paper 23 [23] to the proposal that the electron gets its charge from the idea of existing primarily as this cloud, as a particle nonetheless seeming to approach a speed of light in presuming to occupy whatever part of the atomic shell structure it is momentarily positioned in ([23]: p21-22).

*What is charge therefore, and why is there a duality of charge in the atom?*

*As presented in paper 21 ([21]: p16-22), energy is primarily related with time, and mass primarily related with space, with such a description being a part of the described association of mass with gravity.*

So, in regard to the universal constant “c” for the TSF, and in considering energy and mass, energy in regard to “c” would be directly in accordance with “time” per space (space as distance), as per equations 2 and 3 as initially presented in paper 22 ([22]: p18), here as equations 2 and 3:

$$m \cdot \frac{d}{t} = \text{fundamental property 1, } \underline{\text{<momentum>}} \quad (2)$$

$$e \cdot \frac{t}{d} = \text{fundamental property 2, } \underline{\text{<charge>}} \quad (3)$$

The proposal here is that fundamental property 1 as  $m \cdot \frac{d}{t}$  represents **momentum**, of course, and that fundamental property 2 as  $e \cdot \frac{t}{d}$  represents the concept of **charge**. The proposal therefore here is that momentum relates to charge if fundamental property 1 relates with fundamental property 2. Whys is this important? This is important in the fact that when  $\frac{d}{t} = c$ , when mass approaches the value of “c”, it becomes as  $\frac{e}{c}$ , and thus purely electric, as the charge of an electron,  $e_c$ . Therefore, when mass is light speed, its momentum designated by its mass becomes as charge designated by “ $e_c$ ”, and therefore the property of mass becoming faster has it develop charge.

In short, the proposal is that when mass is at light speed, it represents “charge”. How can mass be light speed? The TSU principle says it can be, as light speed essentially means it can be anywhere in the spherical time-point TST spherical zone, and it is this feature that creates the idea of charge, and in the case here, electric (negative) charge. Essentially, the time-point TSU principle cloud represents pure charge, mostly; there would be nonetheless a residual level of mass in association with the need for that time-point to have a location itself nonetheless.

Is this proposal an actual fact?

According to paper 2 ([2]: p13, eq11)],  $e_c = \frac{19.8 \cdot \lambda}{c} = 1.60218 \cdot 10^{-19} \text{ C}$ , an actual fact. Charge therefore would exist as the electron cloud associated to a magnetic time-point, while also needing to be balanced with a positive charge of equal value to the electron, as such a balance of charge would need to exist as the property of the TSF and associated TST representing a type of overall neutral footing basis.

In therefore considering the charge of the electron  $e_c$ , and in reaching a sufficient theoretic context for a description of particle formation based on the time-equation (the time-equation in underwriting the behaviour of the electron and thus charge), Temporal Mechanics proposed a derivation for the mass of the proton  $m_p$  from the charge of the electron, as follows from paper 23 ([23]: p22):

*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 **from which the electron as a charge came** (in using  $m = \frac{e}{c^2}$  ([2]: p16, eq15) and  $e_c = \frac{e}{c} = \text{fundamental property 2, eq3}$ ):
    - thus  $m$  equates to  $\cong 5.3 * 10^{-28} \text{ kg}$

- Factor this by  $\pi$  and the mass of a proton (or neutron) can be calculated.
  - Why a factor of  $\pi$ ? The mass of the electron would have been “per”  $\pi$ , 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  $\pi$  and thus the  $5.3 \cdot 10^{-28} \text{kg}$  value needs to be factored with  $\pi$ , giving:
    - $\cong \underline{1.67 \cdot 10^{-27} \text{kg}}$

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.

To note is the  $c$ -scaling process, namely that  $c$  is being used as a standard construct of measurement, a basic scaling factor of time with space as a *constant*, which of course it is, as derived in paper 2 ([2]: p 3-14).

Temporal Mechanics took a step ahead though with that  $c$ -scaling process and then derived the mass of the lightest neutrino (mass gap value,  $m_{MG}$ ) from the charge of the electron  $e_c$  via the following process, paper 25 p51 eq10, ([25]: p51, e10):

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:

$$m_{MG} = \frac{e_c}{c} \cdot \frac{1}{12} \cdot \frac{1}{c} = 1.5 \cdot 10^{-37} \text{kg} \quad (10)$$

Note, the “12” factorial is explained on pages 38-40 of that same paper ([25]: p40), there page 40:

The 12-factor is a calculation based on a feature of time-algorithm that needs to be accounted for as per page 5 figure 4 ([5]: p10, fig4), and the proposal is that this 12-factor is accounted for **on** the TSET level (elementary particle), yet not only this level, yet that it determines how energy propagates through space as a “maximum” factor of a quantum approaching an TSET level, as was presented in paper 13 [13], “Space, and the Redshift Effect”. It shall be demonstrated in a section ahead (3.5.2.5) that this 12-factor is able to properly account for the mass gap.

This elementary (neutrino) level was confirmed to be sub-light by this two-step  $c$ -scaling process, deriving the lightest neutrino as a single particle, a “single-particle” derivation from another “single-particle” (electron charge), **not** though a *particle pair production* derivation.

Nonetheless, it was considered thence that elementary particles are a feature subsidiary to subatomic particles, yet more precisely, *subquantum*.

In taking a step beyond this, Temporal Mechanics then sought to define how the elementary particles could form as a process of *particle pair production*, as a proposal, from the *DIR* process (*destructive interference resonance* of the temporal wave function).

The proposal for Temporal Mechanics in demonstrating *particle pair production* is to present a case for mass formation via the *destructive interference resonance (DIR)* process, and here basically such is to present the case of folding a basic quantum of light, destructively interfering the temporal wave function. Ultimately, such is to take the Planck length  $l_p$  of a wave function and to dive within it as the proposed *particle pair production DIR* effect, to then derive the value of the lightest neutrino and associated antineutrino, and thus establishing *a fundamental level itself for gravity*, as per paper 35 ([35]: p27-28):

*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 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:*

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

*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 3-d space analogue value, yet the issue here is creating a different concept as mass, with the derivation of mass, 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 ( $l_p : 1.616 \cdot 10^{-35}m$ ) 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 *a most basic value* of particle pair production mass.*

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

$$\frac{l_p}{S_0} = \sim 2.978 \cdot 10^{-37} kg \quad (2.)$$

*This value states that the lightest particle as mass and its anti-particle together represent a value  $\sim 2.978 \cdot 10^{-37} \text{kg}$ , and thus each represent value  $\sim 1.489 \cdot 10^{-37} \text{kg}$ , proposed as the lightest neutrino.*

*Is this value correct?*

*Yes, this value for the lightest neutrino was derived/calculated in paper 25 ([25]: p51), as this exact value, rounded off to  $\sim 1.5 \cdot 10^{-37} \text{kg}$  in that paper.*

*What does this mean?*

*It means two particles are formed of equal mass, a lightest neutrino and its antimatter counterpart, as particle pair production proposes.*

*This antimatter counterpart is proposed in paper 25 ([25]: p27-48, fig15), and its proposed proof of existence in representing a mass value carrying momentum (that quickly annihilates owing to its constitutional design) is presented in paper 33 ([32]: p32).*

*This concept here nonetheless is quite fundamental, as it means a number of things, 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 constant in time as a factor of the average of the cube of each of the first three primes in regard to a DIR Planck length.*

The issue of “why particle pair production?” was then presented, following the above ([35]: p28):

*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.*

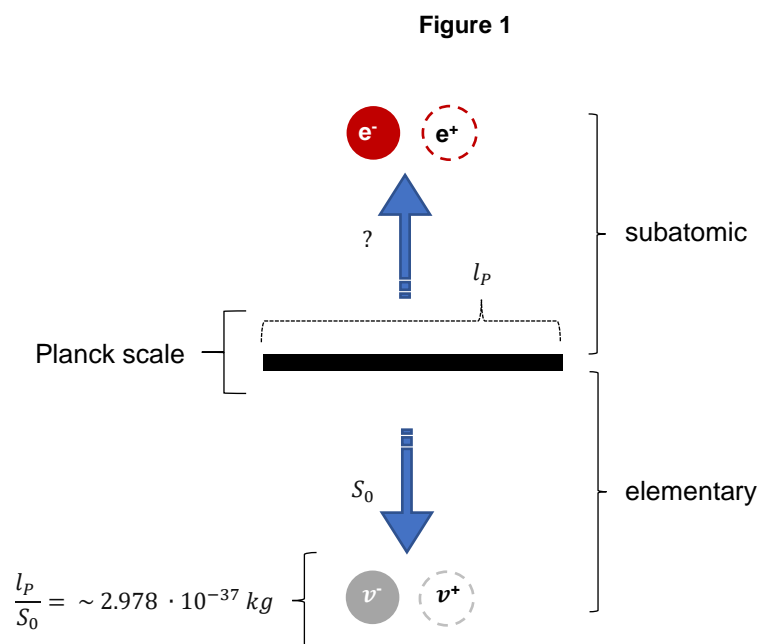
The fundamental question though is, “how is mass perceivable?”. Indeed, because of light, obviously, yet how, if indeed elementary particle non-zero mass is being defined as *subquantum*?

To answer this is to now derive the mass of the electron  $m_e$  as a process of *particle pair production*, and why such a process predominates particle formation, and how of course that process relates to the fundamental idea of gravity.

## 6. Deriving the mass of the electron

The proposal here is that mass can only be perceivable, quantum-related, as a derivable extension above the Planck scale, as per a process whereby the mass of an electron can and needs to be derived according to a temporal wave function requirement *for* the mass of an electron, as pre-empted in the final pages of the preceding paper, paper 35 ([35]: p30), namely that the mass of the electron must be derived from the Planck level as a *DIR* process (a Planck length *destructive interference resonance* process), namely via a *DIR* process of mathematical formalism, a process that must also encapsulate the idea itself of the “atom” and that general scale beyond the Planck length  $l_P$ , and yet ultimately why the atom and associated sub-atomic particles are the primary feature of observable mass in an observable reality.

In other words, from a Planck scale level, two things need to be derived via the *DIR* approach, namely the mass of the lightest neutrino  $m_{MG}$  as a sub-Planck scale (paper 35), and the mass of the electron  $m_e$  as upon a super-Planck scale, as per figure 1.



**Figure 1**, highlighting the factors involved on the sub-Planck (elementary) particle scale.

How therefore is the *super-Planck* scale (subatomic) derived, namely that basis of mass for the electron from a Planck length? This is where the “prime-number” analogue scale must come into play yet again, namely  $S_0$  as derived in paper 35 ([35]: p27) in the following manner:

*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 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:

$$S_0 = \frac{2^3+3^3+5^3}{3} = 53.3 \quad (1.)$$

*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 3-d space analogue value, yet the issue here is creating a different concept as mass, with the derivation of mass, 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 primary factor for  $S_0$  here when applied to the Planck length,  $l_p$ , is to consider a different dimensional entity to the elementary particle scale. The proposal here is that this different dimensional entity is a next level up dimensional step such that the  $S_0$  value as a spatial factor would represent the basic radius of the theoretic  $S_0$  dimensional sphere of influence for the mass of the electron  $m_e$  in the atom (as when factored with the Planck length via the DIR process).

A second key factor for this scaling-up process is that the electron would be associated to the key atomic scaling feature of  $\frac{1}{\pi}$ . This  $\frac{1}{\pi}$  scaling factor was already mentioned regarding the condition for the electron when it was used to derive the mass of the proton  $m_p$ , as per ([23]: p22):

- *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 **from which the electron as a charge came** (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  $\pi$  and the mass of a proton (or neutron) can be calculated.*
    - *Why a factor of  $\pi$ ? The mass of the electron would have been “per”  $\pi$ , 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  $\pi$  and thus the  $5.3 * 10^{-28}kg$  value needs to be factored with  $\pi$ , giving:*
      - $\cong 1.67 * 10^{-27}kg$

A third scaling-up factor would be noting what is being addressed in regard to the subatomic level, namely as per paper 2 [2] a primary “10” factorial for a standard phi-quantum wave function basic wavelength as the abridged electric-magnetic component of the temporal wave function (PQWF), presented in paper 2 as follows ([2]: p13):



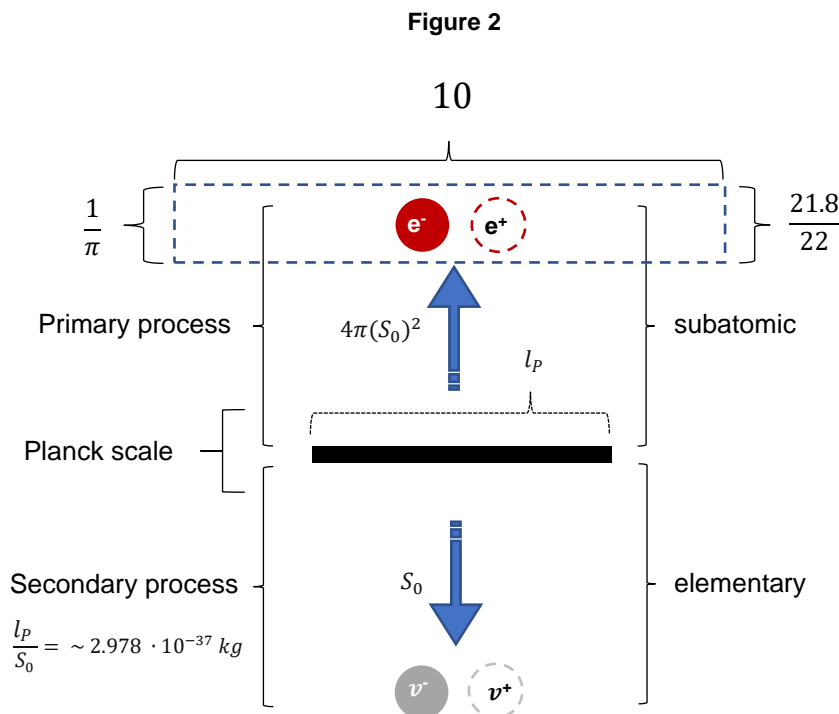
To be noted more importantly though is the squared value for  $\varphi$  (31.416253) for equation 6, namely a close value for  $10\pi$  in considering equation 3, the electric component step, closer than the initial equation 3 process for  $\pi'$ 's formulation.

We can propose therefore that the value for  $\varphi$  in the context of equation 6 offers a closer value for  $\pi$  as the idea of a *recalibrated* "10"  $\pi$  electric component step process of equation 3, and thus what would appear to be the almost exact value for  $\pi$ , as the more correct scale to be put in play, as a type of compromise given the electric and magnetic components are intricately linked as the golden ratio anyway.

Note, what must be now finally considered is the temporal wave function scaling factor of  $\frac{21.8}{22}$ , as that compression scale for the subatomic realm, and thus a required spatial compression consideration ([2]: p15).

Fundamentally therefore, in up-scaling  $S_0$ , four things are going on with the Planck length  $l_p$ , namely a basic 10-factorial implicit to the electric-magnetic temporal wave function component, an overall spatial scaling factor of  $\frac{21.8}{22}$ , how all of such is implicit to being based upon the idea of  $\pi$ , and thus a factor of  $\frac{1}{\pi}$ , and then how space itself would need to, as  $S_0$ , represent a surface area spherical zone of containment for the electron as  $4\pi(S_0)^2$ .

Consider therefore figure 2, an extension of figure 1:



**Figure 2**, highlighting the factors involved on a super-Planck (subatomic) scale.

And so, the following equation for the mass of a *particle pair production* process (mass of electron and positron combined),  $2m_e$ , is in order for a super-Planck scale:

$$l_p \cdot 4\pi(S_0)^2 \cdot \frac{1}{\pi} \cdot 10 \cdot \frac{21.8}{22} = 1.8219 \cdot 10^{-30} \text{ kg} \quad (1.)$$

This gives the value of the electron and positron each individually as  $9.109669 \cdot 10^{-31} \text{ kg}$ , which is almost the correct known value of  $9.109383 \cdot 10^{-31} \text{ kg}$ , an error of 0.003%, noting there would be a natural error in play ([2]: p4-5).

Temporal Mechanics has found this *electric* effect in its research with the *DIR* field as a natural electrical arcing in play, an arcing effect that has done very well in creating short-lived experimental results, as per experiments 1-6, EX-1>EX-6, as contained in papers 7 (EX-1, EX-2) ([7]: p6-16), paper 12 (EX-3) ([12]: p10-12), paper 17 (EX-4) ([17]: p18-22), paper 19 (EX-5) ([19]: p15-19), and paper 22 (EX-6) ([22]: p20-26).

The key proposal here by Temporal Mechanics is that although space is related to time via a particular geometric scale as presented in paper 2 ([2]: p3-14), space also appears to be associated to *time* via a particular *primary number scale*, both sub-Planck and super-Planck, as per the proposed  $S_0$  feature.

For instance, the spatial constant  $S_0$  represents a mixing of three values, as  $\frac{2^3+3^3+5^3}{3}$ , as an underlying condition, if not force, on the behaviour of particles on the elementary particle level. Such a phenomena of a *triple-mixing* has been confirmed by members of the *large international Daya Bay collaboration* [38] reporting how three types, or flavors, of neutrinos blend with one another, providing an explanation for the spooky morphing of the neutrino from one flavor to another, a phenomenon called *neutrino oscillation* [39].

Here, Temporal Mechanics is able to propose an explanation as to why neutrinos would have three interchangeable *flavors*, namely as per the  $S_0$  feature,  $\frac{2^3+3^3+5^3}{3}$ , feature of space for that level, while also explaining how (in using that same  $S_0$  feature) the electron would exist primarily in spherical atomic shells (as per the  $4\pi(S_0)^2$  and  $\frac{1}{\pi}$  factors). Temporal Mechanics is able to substantiate those theoretic models by deriving the mass of a neutrino-antineutrino and the electron-positron. Temporal Mechanics also proposed that despite matter and antimatter annihilation, antimatter has a lower chance of existence owing to one simple derived proposal, namely that antimatter represents an entropic process with time. This was proposed in paper 25, as per page 48 ([25]: p48):

*Note here why particles (matter) would dominate over anti-particles (antimatter), given the elementary particle level is fundamentally enthalpic (energy conservation) whereas the anti-particle realm would be entropic, purely, and therefore be exhausted almost instantaneously. This anti-particle potential realm would nonetheless represent an entirely theoretical confounding limit for mass in breaching the vacuum, and provide space with a type of repulsive effect against particle mass as it does with light as calculated in paper 23 ([23]: p24-31), together with giving space a type of “negative energy” feature in regard to mass, as proposed initially in paper 7 ([7]: p2-3).*

The next step here for Temporal Mechanics though is to now consider the idea of gravity, having derived the mass of the electron.

## 7. Gravity

Gravity, in being a fundamental field force, by the constraints of the temporal wave function definition, has been required to meet a description that is secondary *to* and yet just as fundamental as *EM*, and thus subsequently has required *not* an explanation central to *time*, yet central to *space*. Such has been the required case for the derivation of both the mass of the neutrino and mass of the electron, namely its *spatial* property with the idea of mass, as per the  $S_0$  description, still though adhering primarily to the temporal wave function code.

The idea of gravity has been presented in 7 key preliminary papers investigating how gravity would present as a phenomenon described in terms of the time-equation, and thus how it is related to the temporal wave function phenomena, specifically how gravity can be presented as an equation of force through the lens of the time-equation, and how that is related to the *EM* equation of force, matching known phenomenal and data requirements for gravity:

- Paper 1 [1] presented the idea of gravity as an equation of force according to a basic Newtonian process of logic, yet as an analogue of the time-equation, deriving a value for the gravitational constant  $G$  as  $M_c c^2$ , where  $M_c = \frac{2M_{c1+c2}}{3^2}$  ([1]: p8-10, eq10-12).
- Paper 7 [7] presented the case of negative energy, how the kinetic energy of mass increases under the influence of gravity using that temporal equation for gravity ([7]: p2-3).
- Paper 16 [16] then explained gravity and its relationship with light and the secondary associated time-dilation effects through the lens of the time-equation ([16]: p9-12).
- Paper 21 [21] then understood how *mass relates to mass* (as gravitational attraction) via this new time-equation application to the equation for gravity, and how that equation compares to the equation for charge ([21]: p15-20).
- Paper 22 [22] then re-integrated that idea of gravity into the idea of positive and negative energy, as in comparison to *charge*, to establish the idea of energy transfer regarding  $G$  and *EM*, specifically the scale of mass transition to energy as velocity for a non-zero mass increases to  $c$  ([22]: p13-20).
- Paper 23 [23] then presented how gravity would fit in with the idea of a temporal wave function as a *destructive interference resonance (DIR)* field ([23]: p21-28).
- It was not until paper 35 [35] though where a value for  $G$  was presented ([35]: p28, eq3) as per deriving the value of the lightest neutrino ([35]: p27, eq2), and thus establishing *a fundamental level itself for gravity as a description of space*:

The next question 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 @  $\sim 1.489 \cdot 10^{-37} \text{ kg}$ ), 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).
  - (b) The value of  $\pi$ , 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 dimension in play, and thus  $c^3$ .
  - (e) The overall atomic spatial compression factor of  $\frac{21.8}{22}$

Therefore, the following equation is proposed for the value of “G” as equation 3:

$$G = 12 \cdot \left(\frac{2}{3}\right)^2 \cdot \frac{21.8}{22} \cdot \pi \cdot c^3 \cdot m_{MG} = 6.67 \cdot 10^{-11} \text{ kg m}^3 \text{ s}^{-3} \quad (3.)$$

This value exactly matches the value of the known value for  $G$ .

The interesting feature to note here is that the standard value for  $G$  is measured in  $\text{kg}^{-1} \text{ m}^3 \text{ s}^{-2}$  (as per the basis of  $F = ma$ ) yet the time-space Temporal Mechanics method uses  $\text{kg m}^3 \text{ s}^{-3}$ , and yet if they essentially represent the same concept, then ultimately  $s = \text{kg}^2$ , 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.

Essentially, Temporal mechanics has provided for a theory for Gravity that is primarily quantum-based, and thus quantum gravity, namely based on the underlying logistics of the temporal wave function and associated *DIR* (mass generation) effect.

However there is an anomaly for the units of  $G = 12 \cdot \left(\frac{2}{3}\right)^2 \cdot \frac{21.8}{22} \cdot \pi \cdot c^3 \cdot m_{MG}$  ( $\text{kg m}^3 \text{ s}^{-3}$ ) as compared to its earlier derivation of  $G$  in paper 1 [1], namely  $G = M_C c^2$  (where  $M_C = \frac{2M_{C1+C2}}{3^2}$ ) ([1]: p8-9, eq10-12), the units there for  $G$  being  $\text{kg m}^2 \text{ s}^{-2}$ , and thus therefore a new issue now exists, namely two sets of units for  $G$  using the one *a priori* time-equation basis.

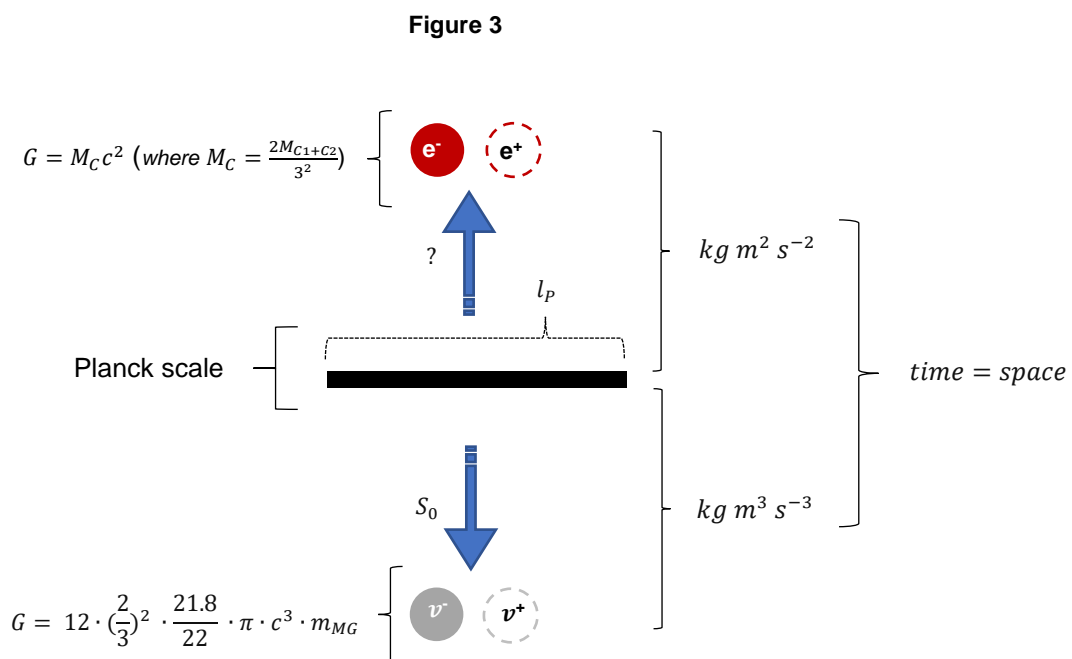
In other words, the time-equation mathematical formalism now requires one process of  $G$  as presented in paper 1 [1] to equate to another process of  $G$  as presented in paper 35 [35], as an equation relating the following constants, here as equation 2:

$$kg\ m^2\ s^{-2}(\text{paper1}) = kg\ m^3\ s^{-3}(\text{paper 35}) \tag{2.}$$

In equating these units out, the following eventuates, equation 3:

$$s\ (\text{seconds}) = m\ (\text{metres}) \tag{3.}$$

Quite simply, Temporal Mechanics, in presenting the case for two equations for the gravitational constant  $G$ , is able to consider that the relationship for those two equations for  $G$  would be central to *time* equating to *space*, seconds to metres, given the same underlying time-equation was being used to derive both values for  $G$ . Consider figure 3:



**Figure 3**, highlighting the  $s\ (\text{seconds}) = m\ (\text{metres}),\ \text{time} = \text{space}$ , feature of the equations for  $G$ .

The new proposal therefore is to formulate a third equation for  $G$  based on the premise of *time* equating to *space*, as *timespace* (and not Einstein’s *spacetime*) where *time* and *space* would equalize as *time = space*.

Is such possible? Such is possible, and it involves a third concept for gravity, not the sub-atomic particle level of  $G = M_C c^2$ , or the elementary particle level of  $G = 12 \cdot (\frac{2}{3})^2 \cdot \frac{21.8}{22} \cdot \pi \cdot c^3 \cdot m_{MG}$ , yet a fundamental *timespace* level for gravity in association with mass.

As it happens, the only way to reach that understanding is via approaching the very limits of the lightest mass (presumably elementary particle level) to the greatest mass (presumably made up of

subatomic particles), as a scale of gravity in space, yet more precisely, a scale featuring how an atom can hold itself together, namely the elementary particle realm as a “lightest mass” level being held by its parent subatomic particle realm as a “greatest mass” level, a scale beyond which gravity is proposed to be unable to function, nor therefore mass, and thus presumably, *anything*. Knowing that scale will allow us to propose the ultimate maximum mass, presumably that of a sun.

## 8. Deriving the mass of *SOL*

If, as according to the time-equation, the fundamental character of *time = space* must be upheld for the time-equation datum reference of  $t_N = 1$ , then there at that datum reference for space and thus the process of gravity, as the time-equation is proposed to uphold, *space must also equate to “1”*. How so though?

For *time = space* to exist on a fundamental level, Temporal Mechanics proposes:

- that there must be the smallest mass limit, say the combined mass of the neutrino given the elementary particle would exist as a lightest particle “set” of 3 in the context of a subatomic particle as proposed in paper 25 ([25]: p40-44), a proposal substantiated by the idea of  $S_0$  being the average of a triple prime-number set (as presented in section 7) and thus in theory a set of 3 neutrino descriptions, as  $m_{3\nu}$ ,
- and that this set of 3 neutrinos  $m_{3\nu}$  would exist within its parent subatomic particle *realm* which would form a maximum mass that could influence any subsidiary singular elementary neutrino particle sets, a maximum mass say  $M_X$ ,
- and that the condition for *time = space* would exist as a fundamental condition for when time is represented by  $t_N = 1$ ,
- and therefore to satisfy the condition of *time = space* while also recognizing  $t_N = 1$ , then the *scale* of distance between  $m_{3\nu}$  and  $M_X$  would feature this “1” factor for distance, as a factor of an absolute limit of temporal wave function *incursion*.

Essentially, it was stated/demonstrated that:

- electron-positron pair production is the primary feature of *particle pair production*,
- noting how electron charge  $e_c$  is intrinsic to the formation of proton and neutron mass ([23]: p22),

- and that the elementary particle scale comprises of 3 elementary particles for each parent subatomic particle as proposed in paper 25 ([25]: p40-44).

The issue being presented here is that in knowing the gravity equation primarily *is derived on the sub-Planck scale, the elementary scale*, as per paper 35 ([35]: p28, eq3), namely  $G = 12 \cdot \left(\frac{2}{3}\right)^2 \cdot \frac{21.8}{22} \cdot \pi \cdot c^3 \cdot m_{MG}$ , then at what point would there be a maximum field influence found between the elementary particle level and the subatomic particle level to the point of incurring maximum instability (and thus gravitational compression, and thus also heat) in the status of the temporal wave function otherwise keeping the atom together and functional?

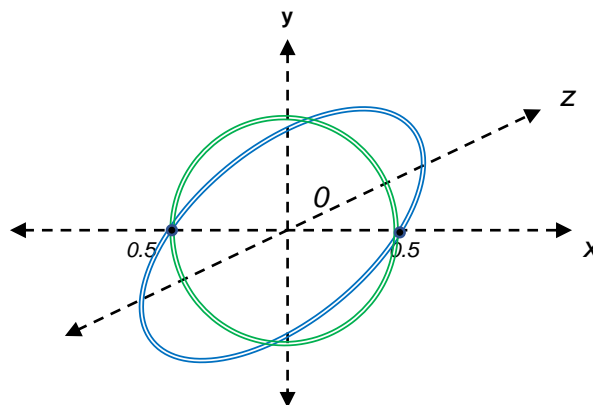
What would represent a maximum, an incursion level event, for the temporal wave function?

Let us suggest an incursion of the temporal wave function (phi-quantum wave function, PQWF) would represent an overall factor of “1”. How so?

Let us suggest that there would be in an incursion-event an added compression of 0.5 of a temporal wave function wavelength for the radius of an atom, and thus a factor of “1” for the general atomic *diameter* temporal wave function (*section 3 in this paper, and paper 2 ([2]: p11, fig6)*, both *adequately highlighting the process of calculating the dimensional length of the temporal wave function*). Such is proposed to be *calamitous* on the *time = space* level *if* time and distance equate to “1” as a compression, as here the “1” factor for space as distance along the x-axis is presumed lost, compressed, for the diameter of an atom, thus negating a standard temporal wave function for the atom.

This fundamental “1” level was presented in paper 2 ([2]: p11, fig6), as follows:

Consider therefore figure 10 in considering  $\varphi$  as the magnetic component of the wave function, and  $\frac{-1}{\varphi}$  as the electric component of the wave function (value for  $\pi$  tracing a circle) as analogous to figure 6:



**Figure 10:** The circle  $\left(\frac{-1}{\varphi}\right)$  as the electric component (green) is a circumferential value of  $\pi$ , the ellipse ( $\varphi$ ) as the magnetic component (blue) is a circumferential value of 4.6.

Simply, to lose that “1” amount for the temporal wave function in the process of gravitational temporal wave function compression is considered to be catastrophic.

Therefore, in considering the classical Newtonian equation of gravitational force as  $F_{3vX}$  for masses  $m_{3v}$  (lightest mass) and  $M_X$  (heaviest mass), as  $F_{3vX} = G \frac{m_{3v}M_X}{d^2}$ , the question now is, “what is the value of  $d$ , namely the distance between the heaviest mass ( $M_X$ ) and the lightest mass ( $m_{3v}$ ) despite  $time = space$  where distance would seemingly equate to “1”?

The value of  $d$  must consider the four following concepts:

- Firstly, that the metric of distance here is as the metric of time (as per  $time = space$ ), and thus if time must represent the value of  $t_N = 1$  for the temporal wave function, then distance must represent the value of 1 (namely, the scale of compression being proposed for this maximum level incursion for  $time = space$ ).
- Secondly, it must be considered that this proposed “1” incursion is for the atomic scale wave function, and therefore is for a factor of the temporal wave function steps ([2]: p15), steps which then needs to be factored with the value of  $\pi$  for each wave function step, as here distance is being calculated in equality with the wave function as the atomic *radius*, and thus  $21.8\pi$ .
- Thirdly, a doubling of the  $21.8\pi$  factor, as a measure of the overall *atomic diameter* of the proposed time-space template atomic limit being compressed by an overall scale of “1” (as the incursion).
- Thus fourthly, this atomic wave function using the compression scale of 21.8 must be brought in  $\frac{1}{2}$  a wave function step, 0.5 for each radius, as a value of “1” as a *maximum* allowable incursion of the atomic diameter, and thus as an atomic diameter on this level (a double radius) a complete *incursion/compression* value of  $d = 1$ , as the proposed maximum incursion here, thus revealing a scale compression of 21.3, namely  $21.8 - 0.5 = 21.3$ .

Therefore, the following equation applies for  $d$  as  $d_{3vX}$ , namely the proposed distance between  $m_{3v}$  and  $M_X$ , as an atomic radius where the condition of  $time = space$  exists for  $t_N = 1$ :

$$d_{3vX} = 2 \cdot 21.3 \cdot \pi = 133.8 \quad (4.)$$

Therefore, let us propose that the classical equation for gravity is such for the smallest mass as  $m_{3v}$  and greatest mass as  $M_X$ , as follows, equation 5:

$$F_{3vX} = G \frac{m_{3v}M_X}{(2 \cdot 21.3 \cdot \pi)^2} \quad (5.)$$



Once again, this is an equation for *time = space* in the context of  $t_N = 1$ , and so the value of  $d$  as  $d_{3vX}$  must follow suit. To visualize this is to consider the value of 133.8 represents a scale of measuring the condition of *time = space* for the time-equation as a theoretic *time = space* measure of distance between a neutrino and a supermassive subatomic particle structure and how such would represent a systematic breaking-point causing (presumably) systematic collapse of the temporal wave function and thus time and space.

The idea here though is to derive the value of  $M_X$ , namely maximum subatomic mass given the mass of the neutrino has been derived, so the next issue to address is the value of  $F_{3vX}$ . The approach here is to consider what the energy value here would be for *time = space*, namely by applying the equation *energy = force · distance*.

The value of  $F_{3vX}$  is easier to resolve in considering what the maximum distance  $m_{3v}$  and  $M_X$  are limited to in encountering one another, such as a value of allowable energy.

Quite simply, the distance  $m_{3v}$  and  $M_X$  could move would be  $\frac{d_{3vX}}{2}$ , namely  $\frac{1}{2}$  the distance of  $d_{3vX}$ , logically in their approaching one another at the same rate despite their difference in mass.

The energy limit here is proposed to be a measure of the gravitational constant  $G$  yet **per**  $c$ , as an absolute consideration for the energy for gravity, noting that here  $c$  is being used as a scaling process, a *constant*, needing to be factored in with  $G$  on this absolute level of consideration (namely, maximum and minimum mass). Thus the following equation would apply for energy, equation 6:

$$F_{3vX} \cdot \frac{d_{3vX}}{2} = \frac{G}{c} \quad (6.)$$

This then proposes the value of  $F_{3vX}$  to be as follows, equation 7:

$$F_{3vX} = \frac{2G}{c \cdot d_{3vX}} \quad (7.)$$

Therefore, in applying equation 5, the following results for  $M_X$ :

$$M_X = \frac{(2 \cdot 21.3 \cdot \pi)}{m_{3v}} \cdot \frac{2}{c} = 1.9986 \cdot 10^{30} \text{ kg} \quad (8.)$$

This value would represent the *maximum* value of mass on an accumulated subatomic scale that can exist in regard to the minimum elementary particle scale (triple neutrino,  $m_{3v}$ ).

This value would therefore represent the upper limit to any locale of subatomic mass, such as a sun, without having it collapse.

The calculated value of the mass of the sun,  $M_{\odot}$ , is a value of  $1.988 \cdot 10^{30}$  kg, a difference of being under by  $\sim 0.5\%$  to the theorised value here. More simply, this result presents the case of *SOL* currently being at the most massive value allowable for gravity to work, upon the very threshold of the

incursion level, and thus puts into question the scales used in measuring the stars, a case as presented in papers 32-34 [32-34], summarised in paper 35 in the following manner ([35]: p33):

*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.*

Given that the condition of  $time = space$  would present itself within its allowable confines, it would be logical to propose that the mass value of SOL,  $M_{\odot}$ , is always on the threshold of  $1.9986 \cdot 10^{30}$  kg, and that there is no larger scale of mass than such, and moreover no smaller scale of mass than the neutrino. It would be also logical to propose that SOL being on this precipice would represent in its region of compression a therefore extreme amount of temperature, an obvious feature of SOL.

One question to address is why does SOL always seem to exist on this maximum mass limit? As the following section shall highlight, it has everything to do with the units of the various physical phenomena (charge, mass, temperature) being contiguous upon the platform of  $time = space$  according to maximum and minimum *spatial* and *temporal* limits, not a deliberate or contrived fabrication, yet a holistic balance of mathematical values and associated physical phenomenal descriptors.

## 9. Establishing the limits of time and space

The answer to the question of why SOL operates at or on maximum mass is to consider what the absolute limits of time and space would be and how such would relate with a maximum SOL mass process.

Here Temporal Mechanics provides *two* limit-values for space, namely the *microscopic* as the Planck scale ([2]: p3-4, eq1), and the *macroscopic* as the Oort Cloud scale ([13]: p11).

The Planck length  $l_p$  was used in the process of deriving the lightest neutrino on the elementary scale (sub-Planck) in paper 35 ([35]: p27-28), in also being used to derive the mass of the electron on the subatomic scale (super-Planck) here in section 6.

The Planck scale as per the Planck constant (not the Planck length) was derived in paper 3 ([2]: p3-4), the temporal analogue for  $E = hf$ , as the most fundamental scale for the temporal wave function, and so it was considered as a standard axis of definition for physical phenomena, namely relative to that scale. There in that paper was also explained how there exists a natural error percentage at play, accommodated for by the “*logistic map equation*” ([2]: p4-5).

It is important to note that the Planck length  $l_p$  was used as an assumed value in paper 35 ([35]: p27-28) in calculating the mass of the neutrino-antineutrino, and also here in section 6 in deriving the mass of the electron-positron, both processes of derivation utilizing a Planck length *accomplice* in the form of a proposed spatial factor  $S_0$ . The Planck length thus has yet to be formally derived by Temporal Mechanics.

To derive the Planck length therefore is to consider how it is relevant to a *minimum* microscopic scale, and how that *minimum* microscopic scale can be used in a *time = space* equation relating to the derived *maximum* macroscopic scale.

How was the maximum scale established? The Oort cloud scale was derived in paper 13 as the temporal analogue for extra-atomic light governed by the proposed extra-atomic principle of  $E = f$  for light, thence deriving the maximum distance light would travel in space from an atomic  $E = hf$  level to an extra-atomic  $E = f$  level, the value of  $r_0$  as the distance of *SOL* to the Oort cloud ([13]: p11).

To test this process is to now apply the *time = space* condition in suggesting that the spatial minimum (say  $d_{min}$ ) and maximum (say  $D_{max}$ ) would together be directly equitable to the “energy” of that space as a feature of *time*, here as a value of vacuum permittivity  $\epsilon_0$  and vacuum permeability  $\mu_0$ , an *EM* and thus temporal wave function feature of space, here as per equation 9:

$$\epsilon_0 \cdot \mu_0 (\text{time}^2) = d_{min} \cdot D_{max} (\text{space}^2) \quad (9.)$$

The *EM* microscopic length for space  $d_{min}$  is proposed to rely on two key conditions:

- The Planck length  $l_p$  (and thus a factor of  $l_p$ ), a value to be calculated.
- A required upscaled *EM* factor of 10 for  $l_p$ , a factor as proposed in the derivation of the electron mass  $m_e$ , namely in accounting for the most basic temporal wave function scale (and thus a factor of  $10l_p$ ).

The *EM* macroscopic length for space  $D_{max}$  is proposed to rely on two key conditions:

- The value of  $r_0$ , derived by Temporal Mechanics to be  $1.09589 \cdot 10^{16} \text{ m}$  ([13]: p11).
- A factor of  $\pi$ , given the whole intent of the temporal wave function is to define  $\pi$ , and thus ultimately a circumference of a circle is sought on the largest possible

macroscopic scale, namely the Oort cloud circumference (and thus an overall factor of  $2\pi r_O$ ).

Equation 9 therefore becomes as equation 10:

$$\varepsilon_0 \cdot \mu_0 = 10 l_P \cdot 2\pi r_O \quad (10.)$$

Thus the value for the Planck length  $l_P$  is calculated as follows, equation 11:

$$l_P = \frac{\varepsilon_0 \cdot \mu_0}{10 \cdot 2\pi r_O} = 1.6159 \cdot 10^{-35} m \quad (11.)$$

This value holds a 0.02% error to the current calculated Planck length  $l_P$  of  $1.616 \cdot 10^{-35} m$  (to be discussed in the following section).

Another feature to note is that in knowing  $\varepsilon_0 \cdot \mu_0$  equates to  $\frac{1}{c^2}$  ([23]: p30, eq7), then according to equation 9 therefore  $\frac{1}{c^2}$  would be a concept of *time*<sup>2</sup>.

Therefore, as an amendment to equation 9 we get equation 12 as follows:

$$d_{min} \cdot D_{max} (space^2) = \frac{1}{c^2} (time^2) \quad (12.)$$

If though it were proposed that  $c$  can be used as a *measurement scale* for space with these maximum and minimum distance metrics, and merely a constant with no units, just a scale, the following equation becomes apparent, equation 13:

$$cd_{min} \cdot cD_{max} (space^2) = 1(time^2) \quad (13.)$$

Here in this appreciation of  $c$ , *time*<sup>2</sup> represents the value of 1, presumably as the datum reference of reality, namely time  $t_N = 1$  ( $t_N 1$ ) *squared* as  $(t_N 1)^2$ , of course in this condition for  $c$  having no units (like the fine structure constant), as a realm for  $cd_{min} \cdot cD_{max}$ .

All of such though is presented in this *time = space* limit paradigm. Why is such a limit?

*time*<sup>2</sup> for the time-equation is by definition  $t_A$  (*time-after*), in that  $t_A = t_B^2$ .

And so if  $t_B + 1 = t_A$ , and  $t_A = 1$ , then  $t_B = 0$ , a mathematical result which represents obviously the limit for the time-equation in giving a 0 value for  $t_B$ , noting that the time-equation is  $t_B$  dependent, noting also that it was proposed that the functional limit for the time-equation was the value of 0, namely that at  $c$  time would be 0, as per paper 2 ([2]: p4-11) and section 4 of this paper.

Therefore, it becomes apparent that in granting  $c$  no units and thus a pure constant, the time-equation thence proposes that time equates to 0 for that consideration of  $c$ , meaning that at the speed of light time does not pass for  $c$ , and thus there are no units there for time or space at  $c$ ; such confirms why  $c$  is a constant and why at  $c$  time does not pass.

Essentially therefore, for the region of space defined by the  $d_{min}$  scale and  $d_{max}$  scale is a standard fixed propagation value of  $c$  at the speed of which time does not pass, namely dimensionless concepts of time and space, a 0, or as the theory here proposed, an "incursion event", meaning mass would be prevented from reaching the  $c$  limit, yet of course as mass would approach  $c$ , time would slow to 0 at  $c$ . Further to this, as per section 7, it is understood that gravity would operate by the standard of the  $time = space$  context, and so here the effect of a massive body incurring a greater gravitational field and thus  $time = space$  would result in the idea of approaching a functional limit of the system and thus time not passing, or in other words, the effect of *time-dilation*, *time-slowness*, for light in a strong gravitational field, despite  $c$  still being a constant.

Therefore, to explain the limits of time and space, as presented here with the *SOL* mass limit and that of  $c$ , is to ask why these limits are upheld and executed by the system of time and space, as they appear to be, as *SOL* hovers on its incursion mass level. Here, it is considered that the system of time and space, *timespace*, is pushed to its absolute limits to be complete, unified, with all its facets, primarily as the temporal wave function accommodating for the condition of  $\pi$ , as presented section 4, a temporal wave function that must have in its construction a feature that allows it to have time being 0 at  $c$ , and thus not a standard time-linear wave function, yet a temporal wave function (section 4).

## 10. The natural error at play

The very nature of the *unified* units of physical phenomena with these equations highlights that *timespace* is designed upon maximums and minimums in play, while keeping everything unified, consistent, with number-relationships, with mathematics. To note here though is the theme of aligning the units related to physical phenomena in this process of number utility, namely that the constants of the phenomena being used, although representative of specific units, are able to be held in an overall mathematical unitary paradigm of  $time = space$ , together with  $c$  as a basic constant (like the fine structure constant).

In short, the proposal is that there is a basic number relationship in play that links the units of physical phenomena in being underwritten by a  $time = space$  formalism, and therefore if this unified mathematical association between the constants and units of physical phenomena is a necessary feature for reality, *SOL* therefore is by such a condition spurred to its maximum mass to create the necessary range of phenomena required by the unified mathematical association of the constants and their respective units, without though having everything collapse nonetheless, and thus having *SOL* on the *cusp* of an incursion event, never in a complete breach though.

It can therefore be considered that the  $time = space$  and  $c$  conditions represent both a complete potential process of construction and a complete potential process of destruction resulting in calculated percentage errors, generally on or below 0.2%, simply because the absolute limits, the absolute perfection, of the mathematical structure itself would in fact incur an oblivion-event, and yet such is what the system has to avoid, namely avoiding collapsing into nothingness. This will be further

addressed in a subsequent paper, introducing the idea of planets, while also deriving the known spatial scale of *SOL*.

The thinking here therefore is that the system as a pure theory is always very slightly out of balance with what is observed. Such a condition was presented in paper 3 ([2]: p4-5) as a type of natural anomaly, a chaos, in play regarding the derived temporal wave function value of  $\pi$  and the actual value of  $\pi$ , namely that the value of  $\pi$  being used in the temporal wave function is a close estimate to  $\pi$ , and that the *timespace* system seeks forever to perfect that value, leading to the acceptance of an ever so slight discrepancy between what is theorised and what is measured, as a constant error in play, an *initial condition* error in line with the proposed chaos equation of paper 3 ([2]: p5, eq2-3) which would echo through all the facets of the physical manifestation of the temporal wave function and thus leading to slight discrepancies between pure theory and observed data.

An example of this is the notion that *SOL* ideally can't be at solar maximum else fall into an incursion event, a system incursion event, yet as calculated here must hover at a value observed to be just under by 0.5% of its maximum theoretic value, as the data shows, setting it would seem a type of standard for a calculated error in the system according to a fundamental error "initial condition" ([3]: p3-4) for the system, simply because the entire system has intrinsic to it a feature of absolute oblivion, of systematic collapse in line with an ultimate *time = space* principle that the system chooses (prefers) to avoid in needing to uphold all its constituencies. Where this collapse happens is proposed to account for the phenomena of the stars (and phenomena of black holes), to be presented in a subsequent paper.

The question therefore of "*why do electrons-positrons predominate in the particle pair production process of a DIR event over neutrinos-anti-neutrinos?*" can perhaps in part be answered. Basically, the formation of an electron-positron pair production is favoured over the neutrino-antineutrino pair production owing to the neutrino being implicated as a *minimum mass* with the *maximum mass* of *SOL*, an event the *timespace* system keeps at bay. Here therefore the issue encountered at CERN regarding the *beauty quark* and why through its decay there is a predominance of electrons over muons [40] be approached. And so, the proposal if not derivation here by Temporal Mechanics is that the subatomic level is a standard, and when that breaks down (whether by collisions, etc) the elementary level ensues.

## 11. Conclusion

To explain light on face value as a linear time function is quite simply suboptimal. One must delve below and uncover the temporal circuitry of light in space to properly understand the phenomenal effects of light with non-zero mass particles. In doing such, all the various anomalies found with light and particles can be better uncovered and explained. Quite simply, using a classical wave model for light as a wave function, and a basic bullet-like photon model as a particle, both fail, simply because they are not considering that light is not a simple time-linear thing. Consequently therefore, it would not be possible to use the mathematics of infinitesimals to explain a wave function of light, as the

mathematics of infinitesimals implies a linear progression, which light in space as a temporal function, as Temporal Mechanics shows, is quite simply *not*. Fundamentally, Temporal Mechanics shows that a simple linear progression of time as a feature of a mathematical model to explain light can be proven to be insufficient.

The inconsistencies therefore found with Quantum Mechanics owe themselves to that theoretic formalism using a linear time function to describe light while trying to explain its wave and particle features as one. Indeed, light has a number of properties, a wave and a particle as topographic ideas for one, yet also the temporal ideas of the wave function of light travelling at  $c$  while also *at that speed of  $c$  time not passing*. The issue is finding how to construct a wave function that accommodates for those topographical and temporal features, to create a required *consistency*. Temporal Mechanics has constructed a temporal wave function that accommodates for the wave and particle topography of light, while also explaining, deriving, light travelling at  $c$ ,  $c$  at which speed time does not pass, as explained here in this paper in section 4, and initially proposed in paper 2 [2].

In view of calculating the mass of *SOL* as a maximum limit for a subatomic locale of non-zero mass particles, the key implication here is that cosmology has incorrectly labelled the metrics of stellar phenomena, a case presented in papers 32-34 [32-34]. Indeed, the effect of using the stars, if not *SOL* itself, as a basis for physics theory should not be underestimated. The issue though is getting the *scale* right, the sizes according to known metrics of this solar system and what is possible and what is *not*.

The practical task ahead nonetheless for Temporal Mechanics is in demonstration of these results, namely demonstrating the *particle pair production* effect, of electron-positron particle pair production, as derived here in this paper, specifically in demonstrating the antimatter (positron) repulsive effect with a positively charge plate in the context of generating a *DIR* field. What also must be derived is the spatial size of *SOL* in explaining such with its derived and calculated mass in the context of a maximum spatial *timespace* scale.

## Conflicts of Interest

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

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For ease of search functionality, the complete PDF of Temporal Mechanics containing all its current papers as listed here [1-35], is available from the following link (Non Open Access):

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