Gravity's Emergence from Electrodynamics

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Abstract: A new approach to understanding the fundamental particles and associated forces via a new a priori definition for space and time is forwarded, and is then linked to contemporary equations for Gravity and Electromagnetism; space as an infinitesimal universal "0"-scalar manifold, and "time" as the "feature" that divides and "qualifies" each 0-scalar spatial reference is discussed. Further, the idea of gravity as an emergent quality of electromagnetism (which here is given the spectra of "time" itself) is proposed by assuming 3-dimensional space as the "fine-structure 0-scalar manifold" while considering "time" as the "symmetry-breaking" principle of entropy "effecting" space, opening to a new mathematical method of applying the concept of time as the "Golden Ratio" equation to spatial transformations. By this process a link between gravity and electromagnetism is established, together with a proposal for the genesis of the four field forces via explaining atomic particle congress in the context of this time-equation, all of such granting electron shell modelling precisely according to the Rydberg description, setting a platform for further theoretic proposals and modelling.

Keywords: time-equation; gravity; electromagnetism; fine structure constant; golden ratio; electrodynamics; fractal; symmetry-breaking; entropy; imaginary-particles; imaginary-time; Higgs particle; Rydberg constant; Rydberg formula; electron shell

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1. First Principles: Space, Time, and the Golden Ratio φ

Here we shall rewind the ideas of Einstein [1], while being more fundamental with time and space as new a priori definitions, as a proposal for a "time-equation" in space.

Einstein's focus was primarily on "space" in employing Gaussian grids (method of "least squares") [2] while considering a universal reference for time [3]. Our approach to the definition primarily of "time" shall differ; such

shall not be a process of discounting the work done with spatial scalar/vector physics, not at all; here those results are considered from a new temporal basis of definition, looking at those results through a new lens, as what could appear to be a more “fundamental” lens of “time” itself, a more “first-principle” basis.

First, we will consider “empty three-dimensional space”, “0” space, stated here as 0-scalar. Consider the following for a 3-d spatial vector “0”-scalar reference extending outwards to infinity (fig. 1.). Now consider multiple 0-scalar references from Figure 1. extending out to infinity (fig. 2.):

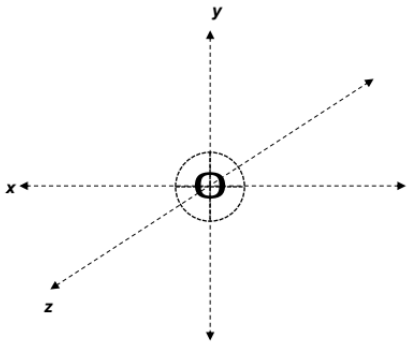

Figure 1.

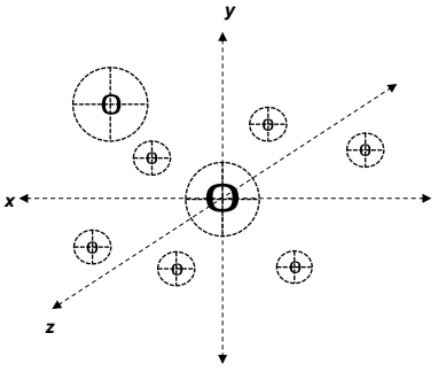

Figure 2.

A “location” in space as illustrated here is defined as a “zero” reference in an overall universal 0-scalar space 3-d manifold. What we’re proposing here is that which gives space it’s feature, of “cradling” everything, is “time”; as one space cannot be elsewhere, the effect of time is proposed here to “change” a reference of space, time giving each 0-scalar point of space it’s “uniqueness”.

With such licence of development open to us, let us consider the following for the flow of time per classical and contemporary physics (fig. 3.); consider space S_1 at time t_B (time-before), a 3-d space 1-d time (4-d) construct, as $S_1t_B\uparrow$ (arrow to represent a type of state) (fig. 4.):

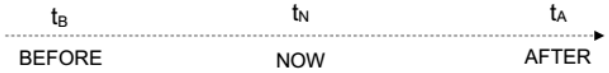

Figure 3.

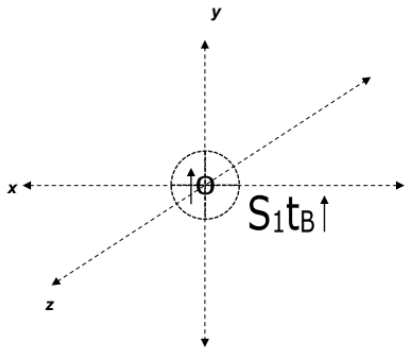

Figure 4.

Now consider space S_2 at time t_A (time-after), a 3-d space 1-d time (4-d) construct, as $S_2t_A\downarrow$ (arrow to represent a different state to S_1) (fig. 5.). Now consider this reference of space S_1S_2 for time-now t_N as $S_1t_BS_2t_A$ (t_N) (fig. 6.):

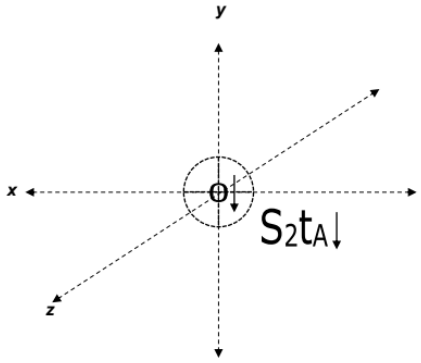

Figure 5.

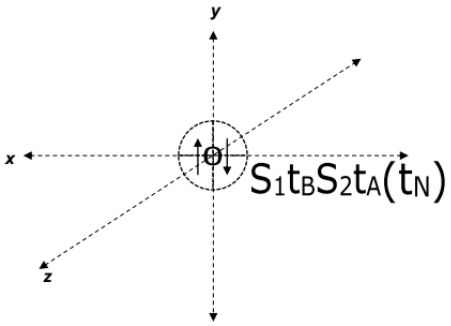

Figure 6.

One of the features of time which we can intuitively propose is that the state of S_1t_B to S_2t_A could represent a change in position of S_1 and not just a change in orientation/state. So, let us suggest S_1 has moved a distance "d" from t_B to t_A (fig. 7.):

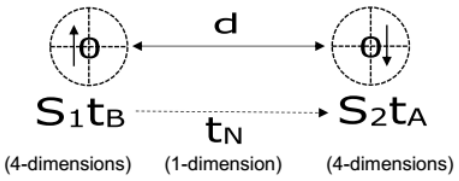

Figure 7.

Thus, we have a basic package of time that effects space from S_1 to S_2. As space is being defined as 0-scalar uniform, then it must have a uniform flow of time as this package of time, velocity being:

$$v = \frac{d}{t_A - t_B} = \text{c } (as\ we\ shall\ highlight) \tag{1}$$

This value would be a "constant" for a set value of "d" through a set time of t_B to t_A given the universal nature of the space it effects itself upon. This streaming package of time could "vibrate" from one state S_1 to the next S_2, and back again (a most basic consideration), as per an "up" position to a "down" position and back again, etc., as a feature of its presence "in" space. Furthermore, if space is as 0-scalar, then time is not; time would be "constant" in comparison to space. Time would also be "different" to space's emptiness, as let's say a thing called energy, that which gives space any required field "flux". Let's also say that time is a feature not just of energy, but "light", as space is not. By contemporary accounts a package of time could well be a "quantum" of light.

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:

$$t_A = ? \tag{2}$$

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.):

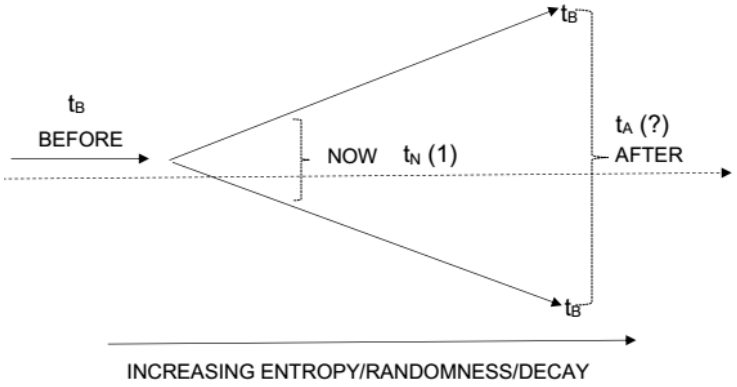

Figure 8.

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:

$$t_A = t_B^2 \tag{3}$$

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:

$$\begin{aligned} t_B + 1 &= t_B^2 \\ \frac{t_B + 1}{t_B} &= t_B \\ \frac{t_B^2 + t_B}{t_B^2} &= \frac{t_B^2}{t_B} \\ \frac{t_A + t_B}{t_A} &= \frac{t_A}{t_B} \end{aligned} \tag{6}$$

This equation is significant, for it represents the "golden ratio" [7], φ, which is solved as a quadratic equation for t_B as -0.61803... or 1.61803...; for each scalar/vector event in space, each past event is divided as a "now" event into the future as a change in state/reference in time, hence "randomness", "entropy", etc. Note each result for t_B can be 1.61803... or its negative inverse (-1/1.61803) as - 0.61803... (the quadratic solutions for t_B). In

using both quadratic results together for t_A (which technically breaks equation 6., yet is nonetheless how time is proposed to operate as symmetry-breaking):

$$t_B^2 = \varphi \cdot -\frac{1}{\varphi} = -1 \tag{7}$$

Thus, t_N as "1" is the opposite of a future event "-1", hence t_N sending itself to t_A as a negative inverse flip (in much the same way as t_B regarding t_A), thus a type of continual process of this equation as a "now" event. Yet according to the result here, the following is effected:

$$t_B = i \tag{8}$$

This would be the limit of the progression at "imaginary time" [8] (as developing equation 6. is ineffective using "*i*" for t_B), thus keeping time in its regular t_N beat (fig. 9.):

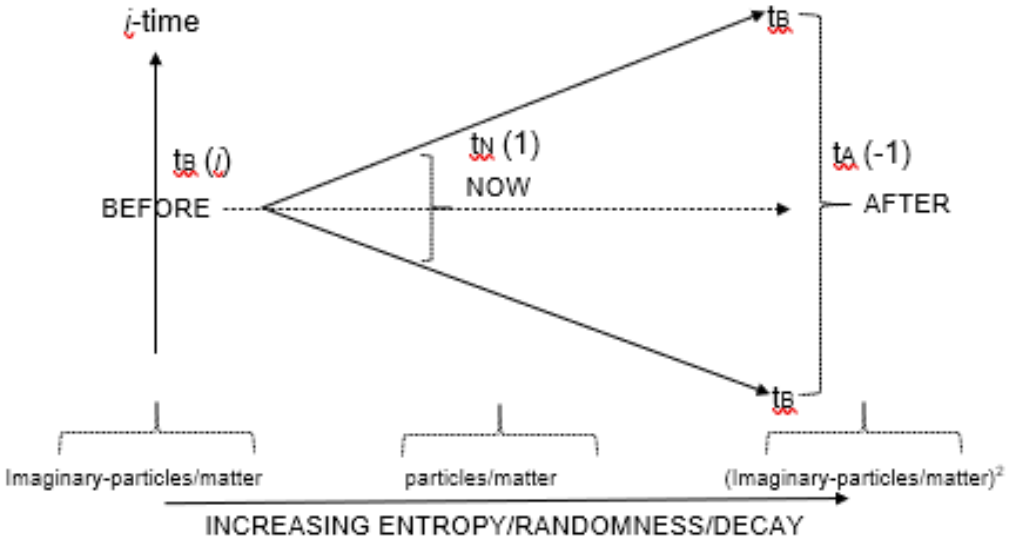

Figure 9.

The proposal here is that the past t_B is "imaginary" (i), as imaginary-particles/mass, the present t_N "real" (1), as real mass/particle, and the future t_A "inverse-negative" (-1) as what would be imaginary-particle/mass *squared* (which represents a dual potential outcome according to a scale of φ or $\frac{-1}{\varphi}$), *as a proposal*.

Fundamentally, the value "i" for t_B would represent the idea of time as entropy remaining fixed on such a threshold of consideration. Note also the ratio of t_N/t_B respective to time, a value of $\frac{1}{\varphi}$, is an idea related to energy manifold reversal of what is proposed to be black-holes [9], which also provides an indication confirming "c" being a universal constant.

From another standpoint, this value of "i" as imaginary time represents the ability of an imaginary point source of light to extend out linearly in all directions along a spatial 3-d vector 0-scalar matrix. So, the question of, "how does time embed itself in space?", is easy to answer; it can only do so as "imaginary time", more precisely as a "past" event. This would be the essence of "time and space ", space and time each expressing themselves as a 3-d manifold.

Let us now imagine a point of time extending outwards linearly in all directions from a single point, noting this flow would be at right angles to t_N (fig. 9.1.):

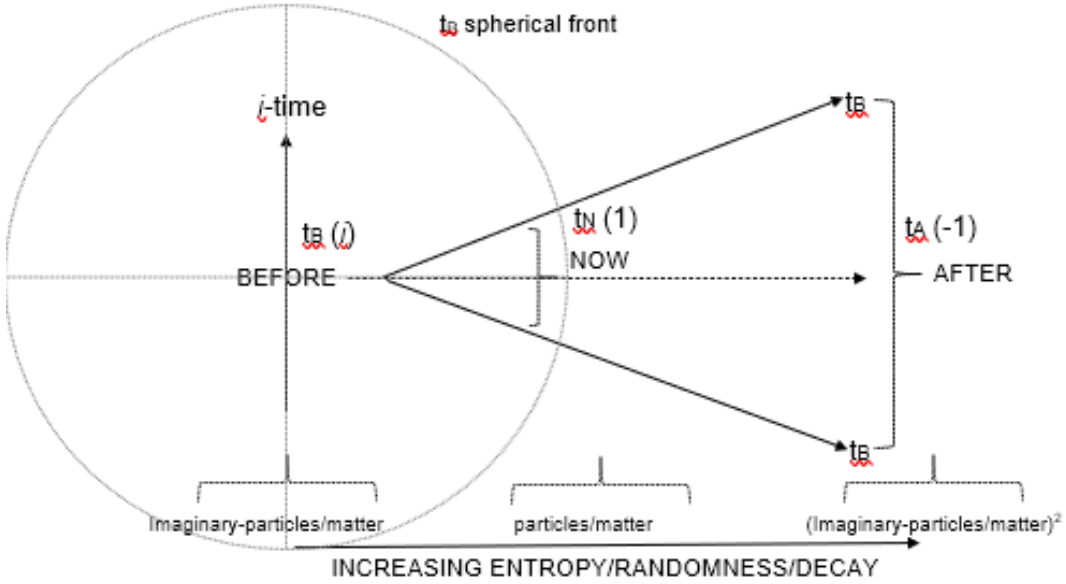

Figure 9.1.

Note that as t_N is at right angles to t_B we would have another spherical front from t_N (given a sphere at right angles to another sphere is still a sphere), (fig. 9.2.):

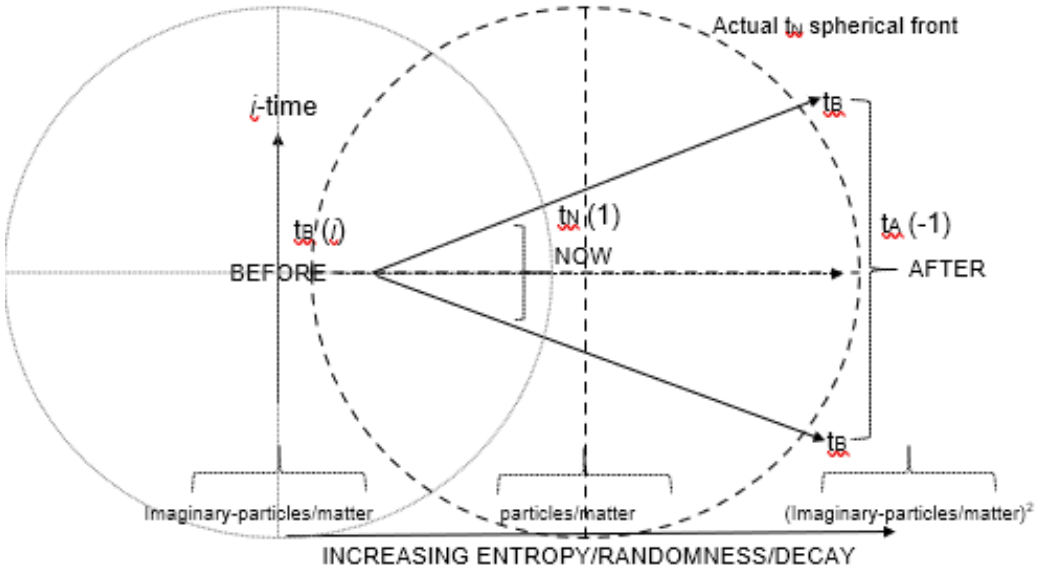

Figure 9.2.

This is the idea of time as a curvature "shape" of space *as the surface area of that extending spherical front of time*. As we shall now demonstrate, the circumference of this sphere would be the time-linear representation for t_B.

Ahead of the t_N front is t_A, time-before is t_B, and in between this front as t_N would be a type of reflection of time as t_B (t_B equated though in the format of t_A through that spherical wave front, as t_B^2, and as we shall demonstrate a type of gravitational effect).

Let us though be more descript with the spherical front for time. In fig. 9.3. we have t_B events perpendicular to $t_N > t_A$, yet we must bear in mind that according to the golden ratio equation we can only use t_B as our reference, and thus t_B^2 as a t_A concept:

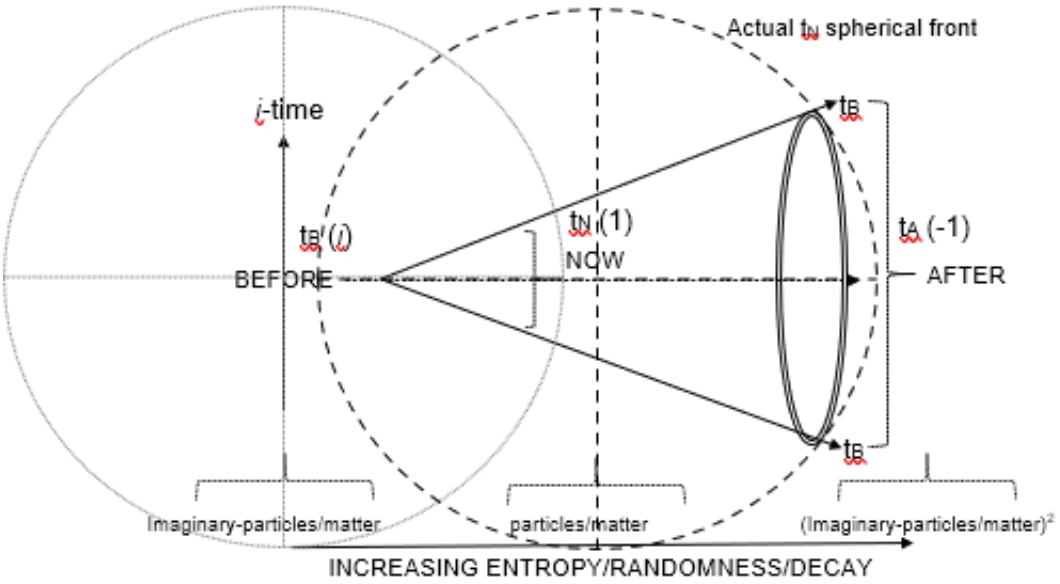

Figure 9.3.

In the t_A zone as illustrated we have a cone effect, a flow of time perpendicular to the *before>after* axis. This would be how t_A is expressed.

From a central axial stand-point, this circumference *on the scale of an atom* would equal the circumference of a Bohr-radius (a_0) atom, $2\pi a_0$. Let us nominate this circumference as t_C. As this is a t_B value it needs to be squared to relate to a t_A wavefront, and thus t_C^2. This value we shall confirm relevant to the energy shells in the atom.

Let us continue to suggest this process of time is the quality/phenomena itself of electromagnetism. Consider the flow of time mathematically in table 1.:

Table 1.

STEP 1:	t_N (1)	>	t_A (-1/1)	
STEP 2:			t_B (i^2)	> t_N (1^2)
STEP 3:	(see step 1, "squared")			

< *note here we are keeping t_B out of this equation owing to its imaginary status and limiting feature*>

First, we have the proposed process of time in fig. 9., now let us propose annexing here the idea of magnetism (B) as representing t_A (for the sake of argument) with t_N representing electricity (E). The reverse could apply, as these are just labels. The concept here of the flow of time is the focus, a focus central to t_N then t_A (as t_B^2) then t_N etc, and how that would work with an EM field.

For instance, when t_A is "1", at that same step of time t_A would be a "0". When t_A is -1, t_N would be "0", and so on and so forth. This would suggest that t_N could represent a sinusoidal wave as follows (flow of time along x axis) (fig 10.):

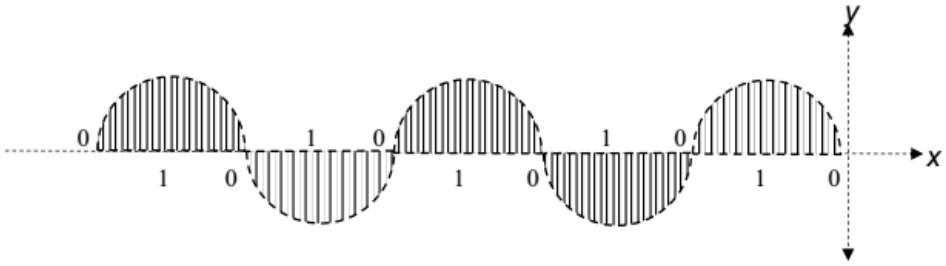

Figure 10.

Note there are two orientations for t_N as +1, up and down. We could also suggest therefore that t_A represents the following sinusoidal wave as follows (fig 11.):

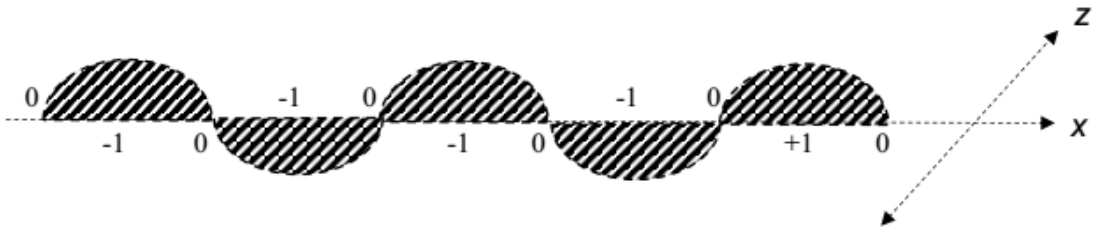

Figure 11.

Note there are two orientations for t_A as -1, left and right. Thus, combing the two we would have (fig 12.):

Figure 12.

Note the two orientations for each t_N and t_A are by t_A needing to represent a dual t_B (squared), which then gives rise to two possibilities for t_N (square relationship), and thus two possibilities for t_A, and so on and so forth, hence a type of "spreading out" (surface area) effect for this wavelength (not pictured).

What we could appear to have here is the a process of electromagnetic induction itself, as a continual process of $t_N > t_A \sim t_N > t_A$, etc…, as a process of negative inversion, the flow kept in the t_N zone, as a process of constant flux as it moves into the t_A zone effecting a negative inversion in the t_N zone. Furthermore, magnetism would appear by this arrangement to be a process of negative-inversion of electrical field strength, "e" and "m" as a process of constant forward negative inverse feedback looping of time, without end it seems. Consider the following as Maxwell's equation [10][11]:

$$\nabla \cdot E = -\frac{\delta B}{\delta t}$$

This equation simply states that a change in electrical flow ($\nabla \cdot E$) in a solenoid induces a magnetic field that acts to oppose that change in electrical field (- δB) per change in time (δt). Another way of saying it is that the electrical energy ($\nabla \cdot E$) accumulated in a closed circuit is equivalent to the time rate of change (δt) of the magnetic flux it encloses (- δB). Note also the lower value of time (δt), the greater the electrical "induction" value, in that a shorter/more-rapid time results in greater electrical charge values ($\nabla \cdot E$).

As a new understanding of this equation, the relationship between electricity and magnetism (as this phenomena of induction) can be considered as an imbalance itself between E and B, according to our golden ratio equation for time *(eq. 9.)*:

$$t = -\frac{B}{E} \tag{9}$$

In this equation "t" is represented again as time, B represented as the magnetic field, and E represented as the electrical flow. The new thinking is that if time t is equivalent to E and B spatially inverted to one another in a negative fashion, as though trying to right itself towards a diversity without end, counteracting itself (-), as a state of constant asymmetry, then "inversion" as a concept between B and E seems likely to be "time", as we have demonstrated it to mathematically be, a constant dual outcome scale of either φ or $-\frac{-1}{\varphi}$.

Thus, we could consider electromagnetism to be the fundamental feature for the golden ratio application for time. How can we involve gravity in this process, as a proposal?

2. Gravitational modelling

Now let us add a few features of time to space; gravity [12] as the feature of 0-scalar space given mass by time (our proposal), would be proportional to the following:

- the mass of one event M_A,
- the mass of another event M_B,
- a "*fine-structure*" mass context relevant to an overall space and time feature of the event M_c,

Gravity would also be indirectly proportional to the following:

- the time difference from M_A to M_B, t_{AB}, a process of "symmetry-breaking" with t_{BA},
- the time difference from M_B to M_A, t_{BA}, a process of "symmetry-breaking" with t_{AB},

Note that t_{BA} and t_{AB} would be features of t_N. Thus, the following equation would apply as the gravity between the two events of M_A and M_B as G_{AB} *(eq. 10.)*:

$$G_{AB<NEWTONS>} = \frac{M_C M_A M_B}{t_{AB} t_{BA}} \ (kg^3 t^{-2}) \tag{10}$$

Note that t_{AB} and t_{BA} are synonymous (same value) yet represent two different time references for M_A and M_B. Thus, the following equation would apply if we were to eliminate "time" from the equation by using ($\frac{d}{t} = c, t = \frac{d}{c}$) (eq. 11.):

$$G_{AB<NEWTONS>} = \frac{M_C c^2 M_A M_B}{d^2} \ (kg^3 t^{-2}) \tag{11}$$

Here $M_C c^2$ would represent the value of "G", the gravitational constant. M_C would represent a *fine-structure* mass-context relevant to two spatial references, yet as though the one reference in there being a "vector-tensor" [13] effect in play on the *fine-structure* level. Note equation 11 is relevant to a dual context of "time", so we need to consider applying a 3-dimensional 0-scalar context of space in view of this dual feature reference for time.

Thus, let's consider two *fine-structure* mass contexts; *fine-structure* mass context 1 M_{C1} and *fine-structure* mass context 2 M_{C2}. Together, they represent the collective mass of M_{C1} and M_{C2} as M_{C1+C2}. Yet this *fine-structure* mass M_{C1+C2} is a spatial dimensional entity. Simply, we have two mass entities that represent the one mass as a *fine-structure* context with a vector-tensor manifold in effect (3 vectors for each); in this universal context there would exist two 3-dimensional spatial scalar/vector paradigms for the dual time-reference, "as one" though; thus we are transforming their reference to each other given their separate references for time, much like in the inertial Lorentz transformation model [14], yet here executed more simply while considering two references of time, t_{AB} and t_{BA}, as a process of defining gravity (a spatial tensor for each vector).

Considering that the *fine-structure* mass M_{C1+C2} in a spatial context relevant to the dual time spatial dimensional equation (eq. 10.) requires to be "per" not just one 3-dimensional 0-scalar context but another, one "3" for each *fine-structure* mass context, thus a value of 3^2, together with needing to represent a double temporal t_N context (golden ratio process of two possible outcomes, φ or $\frac{-1}{\varphi}$, thus times "2", then the following can be considered for M_C (*eq. 12.)*

$$M_C = \frac{2M_{C1+C2}}{3^2} \tag{12}$$

Adding known values; the most basic *fine-structure* mass context M_C is the mass of a proton ($1.67\ldots \cdot 10^{-27}$ kg) and a neutron ($1.67\ldots \cdot 10^{-27}$ kg) representing generally the mass of a basic atom as the value of $3.33\ldots \cdot 10^{-27}$. Thus:

$$M_C = 3.33 \cdot 10^{-27} \cdot \frac{2}{3^2} \cong 7.4. \cdot 10^{-28} \ (kg)$$

Now, if we apply this to M_C. c^2:

$$M_C c^2 = 7.4 \cdot 10^{-28} \cdot (2.99 \cdot 10^8)^2 \cong 6.67 \cdot 10^{-11} = G\ (kgd^2t^{-2})$$

< the equivalent of equation 10. as Nm^2kg^{-2} >

Thus, it seems we can involve gravity in the process of using the golden ratio for time as a primary electromagnetic feature. Let us now look at the electromagnetic equations for charge.

3. Electrodynamic modelling

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

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

Electrostatic force would also be indirectly proportional to the following:

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

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

$$Q_{AB<NEWTONS>} = \frac{Q_C Q_A Q_B}{t_{AB} t_{BA}}\ (C^3 t^{-2}) \tag{13}$$

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

$$Q_{AB<NEWTONS>} = \frac{Q_C c^2 Q_A Q_B}{d_{AB} d_{BA}}\ (C^3 t^{-2}) \tag{14}$$

Here "d" is the distance between the two charges. We know via experiment that $Q_C \cdot c^2 = k_e$, where k_e is Coulomb's constant. Yet what is Q_C? What is the fundamental "charge" context of electrostatic interactions? In the absence of modelling time-axes like we have with 0-scalar space (an important issue we shall reserve for a subsequent paper) we can only consider what research and experiment confirms, as per following *(eq. 15.)*:

$$Q_C = \frac{\alpha\hbar}{ce^2}$$
$$k_e = \frac{\alpha\hbar c}{e^2} \tag{15}$$

The important feature here is our need though to consider the use of time as the golden ratio, and how we are developing our equations; golden ratio (φ or $\frac{-1}{\varphi}$) time fits this equation; although we are "assuming" the use of the Planck scale of determination, in a subsequent paper we shall identify the actual axioms for time that are able to replace the use of Planck constant and scale, yet for the time being let us consider that these are all the qualities available to the electromagnetic phenomena we can consider.

Nonetheless, through Electrodynamic (section 3) and Gravitational (section 2) modelling, using the golden ratio (section 1), we can consider that on a fundamental level we would need to have *mass*, *mass* for gravity, and *charge*, *charge* for electromagnetism, as qualities of time and space with this golden ratio time-equation in mind. They would nonetheless need to be be linked to each other via a basic electrodynamic means given how we have defined time as that fundamental electrodynamic quality; we would thus logically have a mass with charge, the proton (*p*), related to a particle that itself would be predominately a charged structure, the electron (*e*), yet each of these two fundamental particles would have the two fundamental forces associated to them; gravity and electromagnetism.

The following figure thus far would be in order as the electrostatic force between a proton *p* and an electron *e* on this 0-scalar atomic level *(fig. 13.)*:

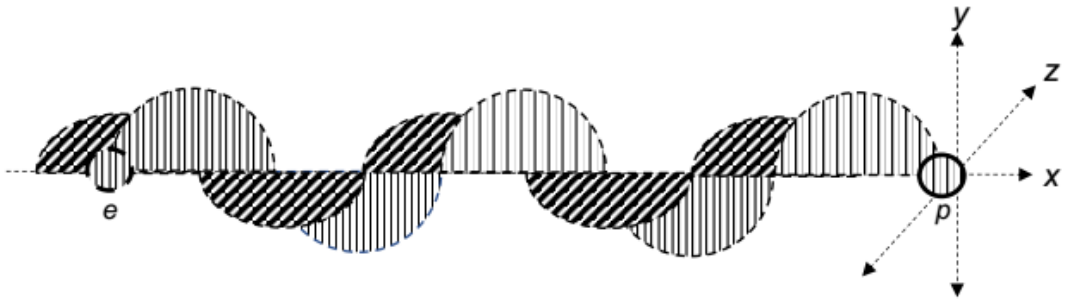

Figure 13.

(not drawn to scale)

4. Proposed time-equation basic Atomic modelling

The next new step of logic with this golden ratio time-equation preliminary proposal is considering that there would thus need to exist a directly proportional relationship between the wavelength of the electromagnetic field of the atom and the distance between *p* and *e* in our need to understand a scale of applying the golden ratio scale of time to 0-scalar space, and the only dimensionless constant available for the atom regarding the strength of electromagnetic interaction with the electrical field of atomic points, namely the *p* and *e*, is the Fine Structure Constant (α), a variable which would be integral to the relationship between such as a measure of distance and electromagnetic strength of association of those fundamental particles. Thus, based on research, we employ the following equation *(eq. 17.)*:

$$\lambda_e = 2\pi \cdot \alpha \cdot a^0 \tag{16}$$

$$\grave{\lambda}_e = \alpha \cdot a^0 \tag{17}$$

Here we employ the Bohr radius (a^0) [17], lambda ($\grave{\lambda}_e$) representing the “reduced Compton wavelength” as the natural representation for mass on the quantum scale, and alpha (α) as the fine structure constant 1/137 (fig. 14.):

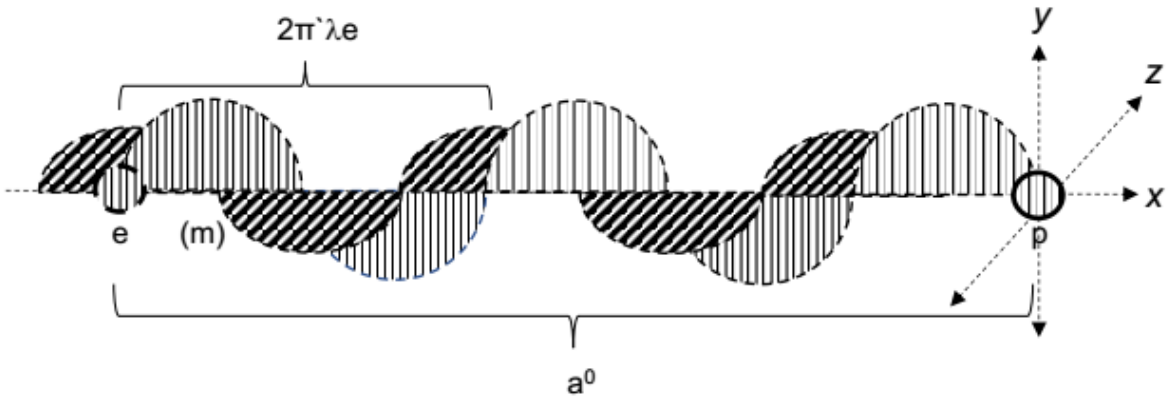

Figure 14.

(not drawn to scale)

To highlight this "mass" feature of the Fine Structure constant of the atom and its generation through electromagnetic means, we need to account for the energy associated to it, to the mechanism of this feature of the atom. Let us suggest that it would simply be represented as a mass, the mass of for instance the most basic mass of an atom, a proton and an electron, divided by the fine structure constant, as per current known values *(eq. 18., 19.)*:

$$\frac{M_{(p+e)}}{\alpha} \cong 128\ GeVc^{-2} \tag{18}$$

$$mass\ (atomic) \cong \alpha \cdot H^0\ (Higgs\ particle\ mass)$$

$$\frac{mass(atomic)}{H^0(Higgs\ particle\ mass)} \cong \alpha \tag{19}$$

Here the suggestion is that the "mass" of an atom is relevant to the fine structure constant and an underlying elementary electrodynamic process. According to research it appears to be the Higgs [18] particle that "provides" the atom with Gravitational features, and this happens "through" Q for the actual mass of the particles, and thus through electrodynamic means, as our theoretical calculation falls well within the experimental calculated range of between 114 - 140 GeV/$c^{2.}$ of the Higgs Boson, noting that the experimental research would, owing to inherent energy losses in measuring the value from an observer reference, be slightly above the discovered 125GeV/c^2 value. This result therefore could suggest that there exists a process of mass, as exemplified in pre-CERN [19] theory regarding the Higgs particle, that can be relayed via the Fine Structure Constant scale to warrant the idea of mass/gravity of the atom, hence the idea of an emergence of gravity from a scale that accords the electromagnetic strength of the atom. This is an idea that will be further investigated in a subsequent paper.

In continuing, if G = $M_C c^2$, we find that essentially as $M_C = \frac{2M_{C1+C2}}{3^2}$ and in considering M_{C1+C2} = 2.M_P, then *(eq. 20-23.)*:

$$G = \frac{2 \cdot 2M_P c^2}{9} \tag{20}$$

$$\frac{M_P c^2}{9} = \frac{G}{2 \cdot 2} \tag{21}$$

$$e_P = \frac{9G}{2 \cdot 2} \tag{22}$$

$$G = 2 \cdot 2 \cdot \frac{e_P}{9} \tag{23}$$

It appears therefore G would represent a dual (2x) feature of $2\,\frac{e_P}{9}$, of the atom, and thus as can only be a type of "folded" (added-over) feature as a stand-alone entity (for a mass) in using the scale of the Fine Structure constant held at 1/137; the effect according to the suggestion of the theory here would be as an electromagnetic (e/m) field out of phase with itself, folded over onto itself. The thinking here is that if the "e" wave folds back onto itself with the "m" wave, a particle (and perhaps anti-particle) is generated (as defined in fig. 9.). In a subsequent paper we shall more closely examine how this feature works by more closely examining the axioms for time when applied to space.

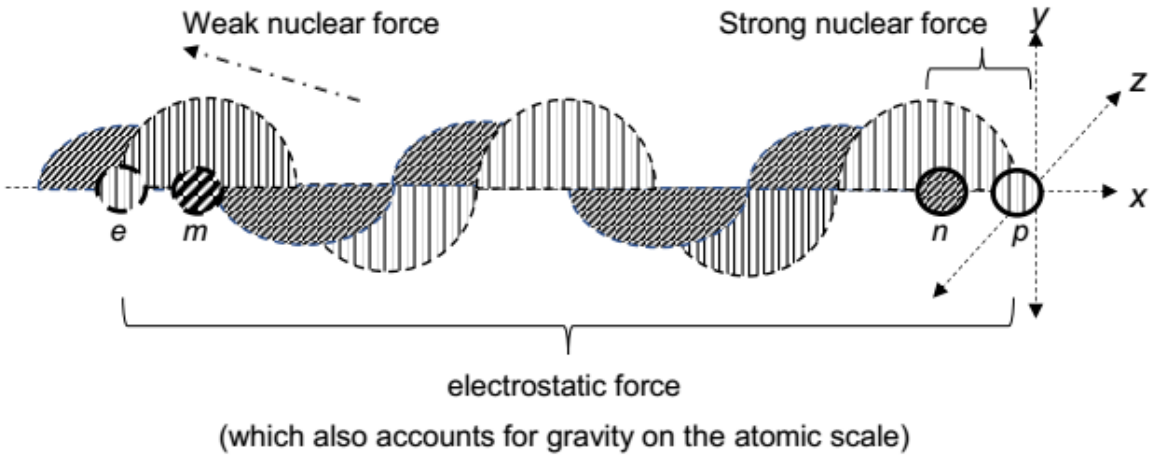

Figure 15: as the EM wave folds back onto itself,
a particle is generated (as defined in fig. 9.).

The association between *n* and *p* essentially would be according to the proposals here (*e/m* folding) one of attraction. Furthermore, the strong nuclear force would be linked by this time-equation to the weak nuclear force. By this process, we have the *e/m* force, the G force, a *strong nuclear* force [20] between particles (p) and (n), and a *weak nuclear* force [21] as the decay of a standard *e/m* phase force, and 3 key subatomic particles, an electron (e), a proton (p), and a neutron (n).

As per this time-equation proposal, the proton and neutron particles could pulse in and out of reality as governed by the passage of the golden ratio time-equation here, representing the same atomic "space" precinct, out of phase though on their e/m alignment, as upon of course the effect of the e/m field that represents their apparent strength of association. This type of *folded-over* energy of light therefore would represent gravitational features, thus a type of "field" effect in space, an effect having mass and energy properties (given our definitions here), yet all of such as proposals nonetheless in the context of this new algorithm for time (golden ratio) which of course need further examination (reserved for subsequent papers).

What of the actual t_A time front that energy "effects" into existence? We must bear in mind that the time-past (t_B) value of time (as imaginary time, see First Principles (2)) extends outwards along a spatial 3-d 0-scalar spatial matrix as a spherical front (fig. 9.1., 9.2., 9.3.). Therefore, on the atomic level, beyond the 0-scalar spatial reference away from which the time front moves as imaginary time, there would exist spherical fronts of this electromagnetic (as we know as "energy shells") coupling from a light/atomic source that aligns with the golden

ratio equation for time; this would extend outwards effecting charge and matter according to the equations we have generated (fig. 15.1., 15.2.) as a basic model of the atom for t_N (fig. 15.2.).

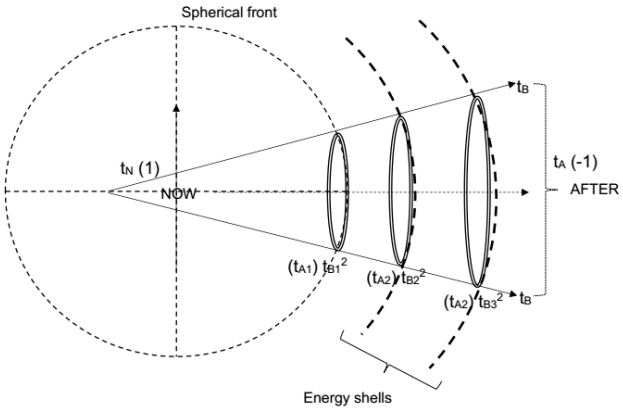

Figure 15.1.

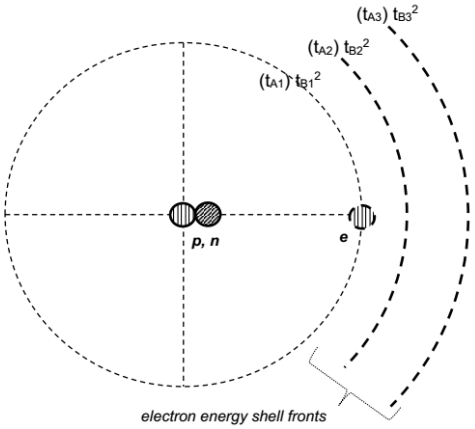

Figure 15.2.

According to the basic proposed theory, the number of protons should intuitively match the number of electrons (fitting into the dynamic of the Fine Structure of the atom), yet the dynamic status of the electron would be according to a spherical array of *energy zones* that accord to the process of all the forces at play in the atom and the effect of the golden ratio for the process of time and associated manifestation of t_N energy points as per section 1. Thus, we could consider that these *energy shells* should also represent a process of how an atom could change its energy level status care of rearranging the status of its electrons in the energy shells; the further out the energy shell, the greater the level of energy as per the process of time/entropy when used as the golden ratio. What does the golden ratio time-equation suggest for these electron shells?

First, we must be mindful that time as the golden ratio is a “sliding scale”, a way of “measuring” time as a manifestation of particles in distance as time passes. Atomically, “time” is measured as a golden ratio metric according to golden ratio timed particle placement, and here we are considering the logistics beyond the fine structure constant scale of determination. As we are using this new “metric” for time, t_{A1} is “1”, t_{A2} is “2”, t_{A3} is “3”, and so on and so forth. Yet these steps in being represented as t_B must be squared (as $t_B^2 = t_A$). So, a potential quantum wavelength step for t_{A1} as t_N would represent:

- $t_{A1} = 1^2$

  And a potential quantum wavelength step for t_{A2} as t_N would represent:
- $t_{A2} = 2^2$

  And so on and so forth.
- $t_{A3} = 3^2$

To calculate a process of atomic energy decay care of the electron changing energy states is also a different equation. We could say that the wavelength difference between t_{A2} and t_{A1} is a simple subtraction, yet it is not, as both $t_{A1}$and t_{A2} represent a code relevant to the golden ratio that has already happened, thus we must create a new point source of light for $t_{A1}$and t_{A2} with this new t_{A2}–t_{A1} event (fig. 15.3.).

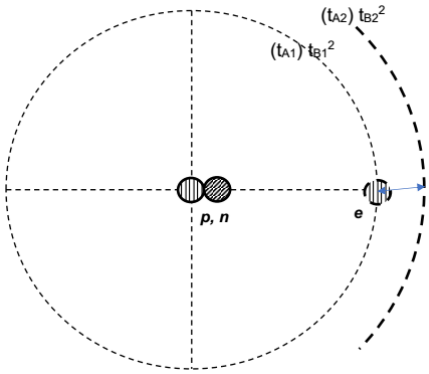

Figure 15.3: both $t_{A1}$and t_{A2} represent a code relevant to the golden ratio that has already happened as a "past" event, thus we must create a new point source of light for $t_{A1}$and t_{A2} with this new t_{A2}–t_{A1} event.

Simply, it would represent $t_{A2} - t_{A1}$ "per" a t_{A2} and t_{A1} event:

$$\frac{t_{A2} - t_{A1}}{t_{A2} \cdot t_{A1}}$$

Yet we need a standard t_B measurement of the circumference for a metric of time, as t_C^2 (fig. 9.3.), and thus here for this equation "per" a circumference squared. Thus:

$$\frac{1}{t_C^2} \cdot \frac{t_{A2} - t_{A1}}{t_{A2} \cdot t_{A1}}$$

However, this is inverted to become a t_N value (negative inversion, as a process of decay <release of energy>:

$$t_C^2 \cdot \frac{t_{A2} \cdot t_{A1}}{t_{A2} - t_{A1}}$$

Now adding the quotient of the (Compton) wavelength of the electron λ_e to get a real value for the electron wavelength energy release:

$$t_C^2 \cdot \frac{t_{A2} \cdot t_{A1}}{t_{A2} - t_{A1}} \cdot \frac{1}{\lambda e}$$

Now we need to factor in "space", as we are assuming our current calculations are for just one basic atomic (proton) event. Thus, we must create a basis for a multiplicity of atomic events, and thus a "quotient" of any number of proton-electron (atomic) events. As we know for a t_A event, each electron for each atomic event value must be "squared", as per $t_B^2 = t_A$, a t_A value. So, let's call the number of protons which form the basis of the atom as t_P. Thus, we would have a quotient value of t_P^2 (thus $\frac{1}{t_P^2}$) as a t_B entity value for t_A. But it is not as simple as this; as there are two possible t_N outcomes this overall value of $\frac{1}{t_P^2}$ must be doubled, hence we are utilising a $\frac{2}{t_P^2}$ factor.

Thus, the following equation suits for the overall wavelength of decay of an atom releasing quanta through electron shell decay *(eq. 24.)*:

$$\lambda = 2 \cdot t_C^2 \cdot \frac{t_{A2} \cdot t_{A1}}{t_{A2} - t_{A1}} \cdot \frac{1}{\lambda e \cdot {t_P}^2} \tag{24}$$

Now, let's make this equation more user friendly by labelling the electron shells as n_1 for t_{A1}, n_2 for t_{A2}, and so on and so forth, where n_1 and n_2 are integers such that $n_1<n_2$ corresponding to the principle quantum numbers of the orbitals/shells occupied before and after. Let us also suggest $t_P = Z$. Also, let's factor in the circumference value for t_C^2 and eq. 17. Thus *(eq. 25.)*:

$$\lambda = 2 \cdot t_C^2 \cdot \frac{n_1^2 \cdot n_2^2}{n_2^2 - n_1^2} \cdot \frac{1}{\lambda e \cdot Z^2}$$

$$\frac{1}{\lambda} = Z^2 \cdot \frac{1}{\left(\frac{1}{n_1^2}\right) - \left(\frac{1}{n_2^2}\right)} \cdot \frac{\lambda_e}{2(2\pi a_o)^2} = R_\infty Z^2 \cdot \frac{1}{\left(\frac{1}{n_1^2}\right) - \left(\frac{1}{n_2^2}\right)} \tag{25}$$

This is the well-known Rydberg formula and associated constant [22] $R_\infty = \frac{\lambda_E}{2(2\pi a_o)^2}$; here we have derived it directly from pure theory using the golden ratio as the key algorithm for time imprinting on space.

How can we determine how many electrons therefore inhabit each shell in a multiplicity of proton-electron *e/m* quantum atomic links? Once again, we refer to the equation of time while considering that each time step in the future regarding a potential placement of energy relies on squaring each historical step, while also doubling the result given two possibilities exist. This is also a t_A value as t_B^2, which is doubled, and thus for the value of the energy shell is expressed as $2n_x^2$, where "x" is the value of the energy shell from 1 (the first) upwards. Thus, the following table suggests the possible number of electrons for each energy shell:

Table 2.

n	*electrons ($2n^2$)*
1	2
2	8
3	18
4	32

Logically, each energy shell would fill up its values before progressing to a higher energy state; understanding how to use this equation and what it means to the electron shells really defines how it represents what is happening on the quantum level using an entirely new algorithm for time. Note that the issue of quantum entanglement [23] is the idea of the doubling process of time; more precisely, of time choosing between one of two potential future events (according to time incorporating the idea of randomness), which can be scaled in any event in space and time, from 0 to infinite distance. This random process of time is not immediately evident in the golden ratio, not as a "randomised" event per-se, but a feature of it nonetheless that only words can describe as set in a defined application of operation with space, namely that time is proposed to "divide" space, and thus gives itself a choice of two viable options in the context of space as per the one context of time. Contemporary physics considers such phenomena as "quantum entanglement". A suggestion here is therefore that the two possibilities of quantum entanglement are of the order of the two golden ratio output possibilities, namely φ or $\frac{-1}{\varphi}$, an idea to be followed up in subsequent papers.

5. Proposed Time-equation basic Universal modelling

How far therefore would the time-equation and associated 0-scalar space reach given the value of electron shells have their own limit at play? In the theory here, as according to a Fine Structure Constant scale of 0-scalar space and bi-temporal ($t_B > t_A$) time, time through distance from a singular time quotient t_B to a squared-time quotient t_B^2, would more than likely manifest as a perceived expansion of space, to the ends of any such 0-scalar space, to an infinitely large "fractal" [24][25][26] level, depending of course on the constraints between the golden ratio time-equation, space, particles, and the field forces prescribed therewith. Exactly the measure of that is the question, namely a perceived expansion that would as "light" represent the key feature of light on the atomic level as the "inverse" of the frequency of a Compton wavelength $\frac{\lambda_e}{c} \sim 8.1 \cdot 10^{-19}$ s, yet "squared" (t_B^2), and thus a value of roughly 10^{-36} s (exactly $6.7 \cdot 10^{-37}$ s); such thus would not necessarily be the result of an effect of space expanding yet an effect of light (time-equation) in space.

The idea here is that with each oscillation of energy of the electron, there would be a squaring effect in play as a time-front into the future, which of course would suggest such a rate of expansion of space (as measured through the electromagnetic spectrum). Yet this is a theoretical value, as a t_A entity. Thus, without the benefit of understanding the golden ratio for time, we could calculate that the Universe's peak expansion acceleration from electromagnetic ground-zero data occurs close to 10^{-36} s from an event horizon big bang event; thus we could say that upon the first 10^{-36} seconds the universe found its greatest inflation rate while still expanding at an accelerating rate, after which there would be a perceived slowing of this expansion, which is in fact the same effect we find according to the golden ratio's calculation for the layering of electron shells and associated quantum energy release and their closer proximity to each other as time/energy moves outwards from the atom, as though paradoxically a closer gathering of shells and thus slowing of expansion. This shall be explained in greater detail by examining more closely the axioms for space and time regarding the golden ratio in a subsequent paper.

6. Conclusion

Proposed here is a new process for the currently considered arrow/flow/universality/relativity of time; "time" is given far more structure not previously utilised in physics theory and execution, giving the idea of "time" *far* more pixilation, and using that pixilation to instruct its relevance upon the basic field forces and associated particles and phenomena thereof. This therefore has been a *general overview* of the fundamental reasoning behind the possibility of gravity emerging from electrodynamics *using* the golden ratio as an algorithm for time, detailing the two possible outcomes for each quantum step of determination of wave-function expression of light as "time" using the two results of the golden ratio equation, and relating that with the idea of mass and thence gravity from an EM basis, in very general terms.

Conversely, or rather what exists currently as scientific theory, is a mathematical process of considering space as 3-dimensional and time as a one-dimensional arrow, while primarily measuring mass as momentum. In that process, we as contemporary scientists use 3-dimensional scalar/vector/inertial/torsional mathematical grid matrices to relate one mass in space with another, as topographically accurate with what we observe of space and time as mathematics allows regarding locating mass in space as per the equations of momentum/inertia, all using the idea of 3-dimensional space and one-dimensional time. In fact, that whole process has only allowed us to focus "on" all those spatial features of mass/inertia, while using one dimensional time. The problem with that process of using "mass" as the base for equations and not time is that it obliges us to consider mathematical matrices that

merely relate one 3-dimensional matrix of mass/inertia with another “in one-dimensional time”. This obviously has its difficulties if indeed “time” as a concept is responsible for “symmetry-breaking” in scalar/vector space/particles beyond “one-dimensionality” momentum/inertial determination of mass-behaviour.

In short, this paper has aimed to highlight the worth of the golden ratio as an algorithm for time, and is to be followed up on in greater depth in subsequent papers where we shall more closely address the axioms of time when related to space, and how those axioms confirm the fundamental ideas of the golden ratio and its relevance to linking the equations of Gravity and Electromagnetism, while modelling more accurately the precise dimensions of the atom and associated subatomic and elementary particle and field congress.

Conflicts of Interest

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

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