

Essay

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 examined by assuming 3-dimensional space as the "fine-structure 0-scalar manifold" while considering "time" as the "symmetry-breaking" principle of entropy "effecting" space. Consequently, the fundamental idea of an "equation" from one event in time to the next is rendered unreliable owing to the nature of the movement of time and its effect on space (as a process of "symmetry-breaking"), which then opens 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 an explanation for the genesis of the four field forces via explaining atomic particle congress, ultimately as the development of electron shell modelling precisely to the Rydberg formula and associated ideas of quantum entanglement, finally explaining the idea of "inflation theory" as a feature of the Golden ratio equation for time.

Keywords: gravity; electromagnetism; fine structure constant; golden ratio; electrodynamics; fractal; symmetry-breaking; entropy; imaginary-particles; imaginary-time; black holes; Higgs particle; CERN; dark energy; dark matter; light cone; Rydberg constant; Rydberg formula; electron shell; quantum entanglement: inflation theory

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 a-priori definitions. 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; this is not a process of discounting the work we have done with spatial scalar/vector physics, not at all; we are taking those results to a new level, 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.):

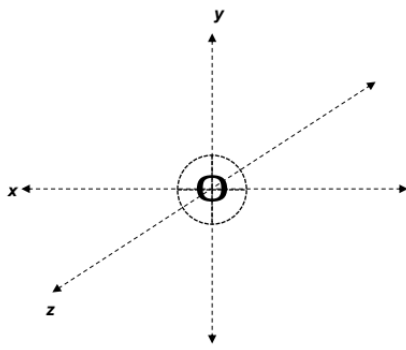


Figure 1.

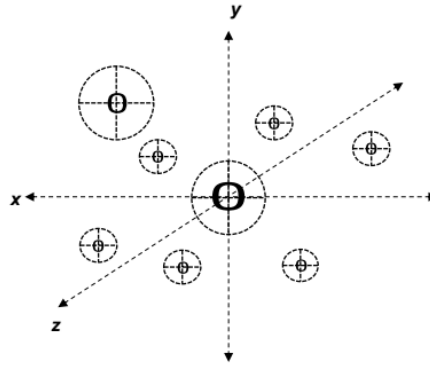


Figure 2.

A "location" in space 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 "changes" a reference of space, gives 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.). Now 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.):

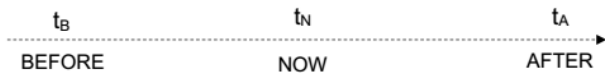


Figure 3.

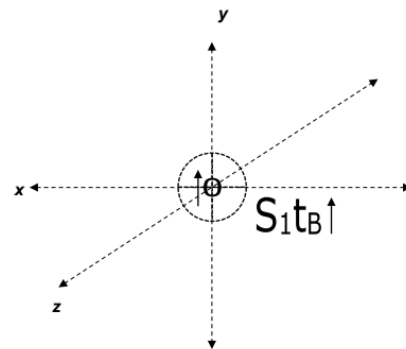


Figure 4.

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 $S_{1t_B}S_{2t_A}(t_N)$ (fig. 6.):

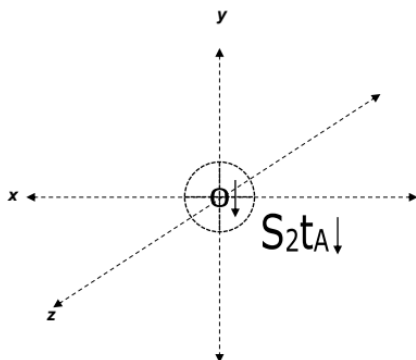


Figure 5.

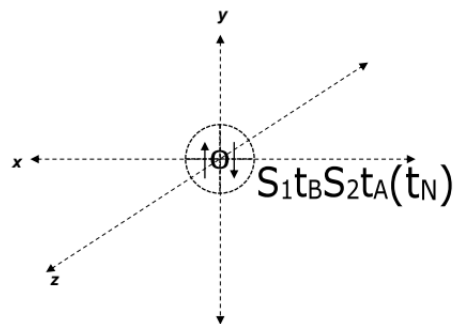


Figure 6.

Thus, we have a 9-d platform; two spatial references (S_1, S_2) connected by two time lines (t_B, t_A) merging to time line t_N . From t_B to t_A we have the effect of that spatial reference S_1 being “altered” in reference to t_B “everywhere” as a process of “symmetry-breaking”[4], an overall 9-d “quasicrystal”[5] template for space, with time imparting on each 0-scalar spatial reference” a “unique” temporal reference.

One of the features of time which we can intuitively state is that the state of $S_1 t_B$ to $S_2 t_A$ could represent a change in position of S_1 and not just a change in orientation/state. So, let’s suggest S_1 has moved a distance “ d ” from t_B to t_A :

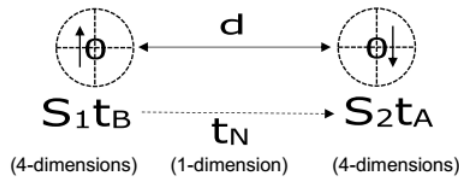


Figure 7.

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:

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

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 would “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 “eternal” 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 it’s “power”, its “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 “quanta” of light. Yet if light is “energy” and reality as we know it operates according to a process of entropy[6], 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.):

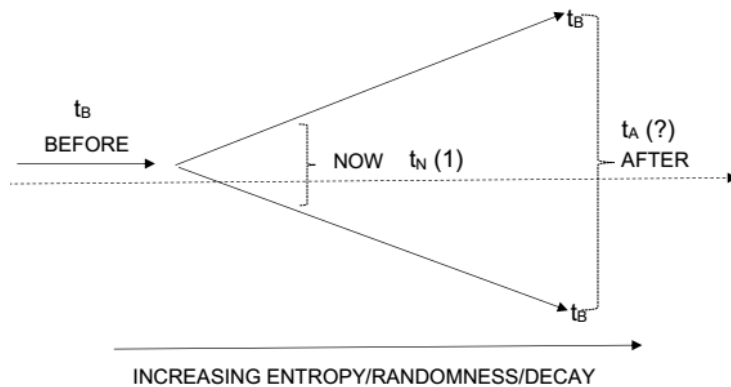


Figure 8.

Here t_N represents that process of time-dividing, becoming dual time as t_A , as two possible outcomes for t_B , 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:

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

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):

$$\begin{aligned} t_B^2 &= \phi \cdot (-1 / \phi) \\ &= -1 \end{aligned} \tag{7}$$

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:

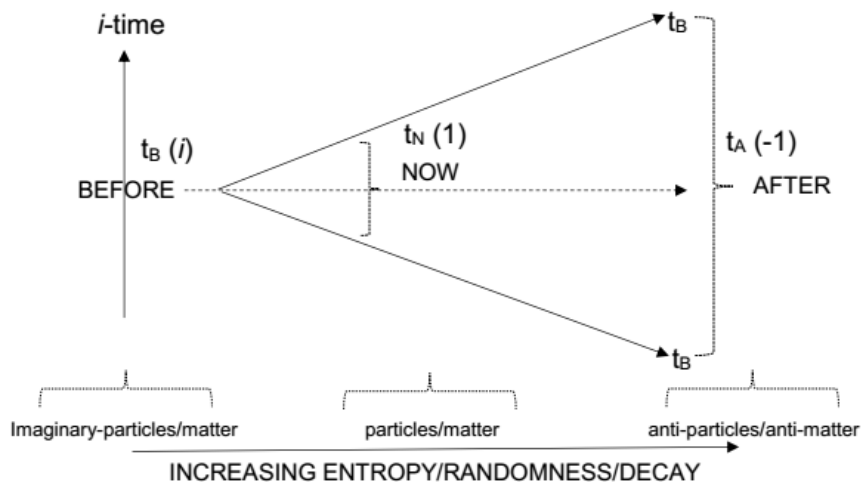


Figure 9.

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 anti-matter/particle (which represents a dual potential outcome according to a scale of φ or $-1 / \varphi$.

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 $1/\varphi$, is an idea related to energy manifold reversal of 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 “space-time”, space and time each expressing themselves as a 3-d manifold.

Let’s 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 :

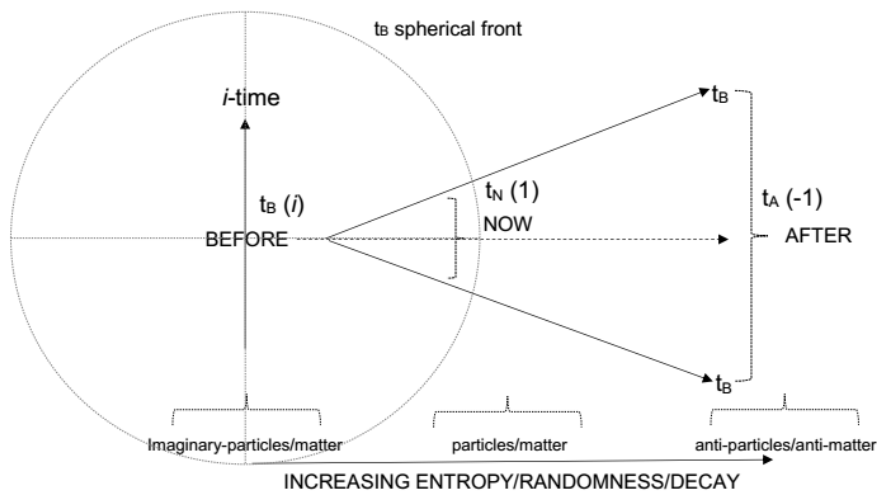


Figure 9.1.

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.):

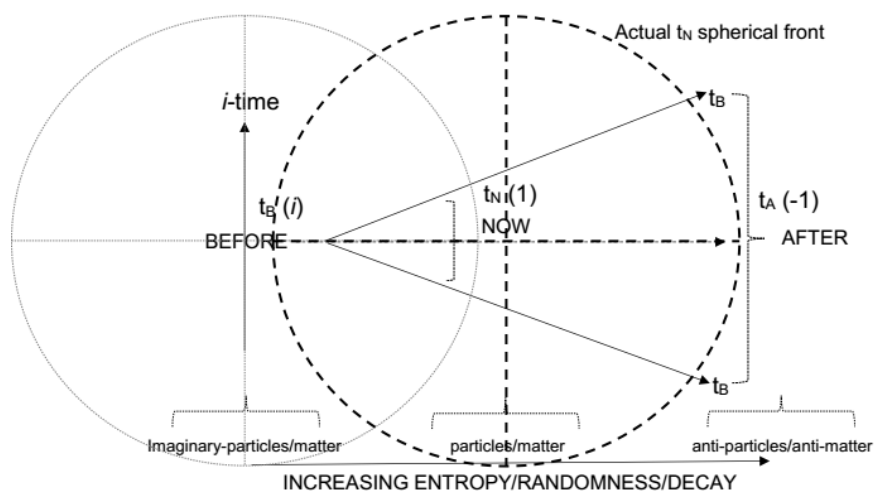


Figure 9.2.

and so on and so forth. This would suggest that t_N could represent a sinusoidal wave (x axis) as follows (flow of time along z axis):

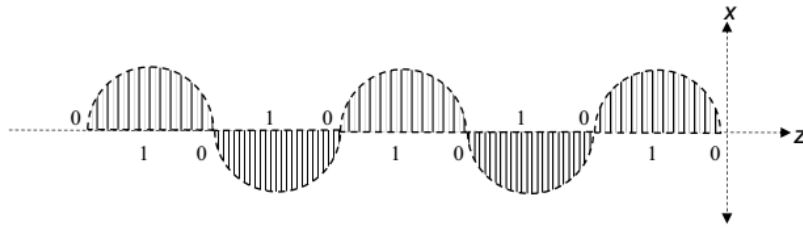


Figure 10.

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 (y axis) as follows:

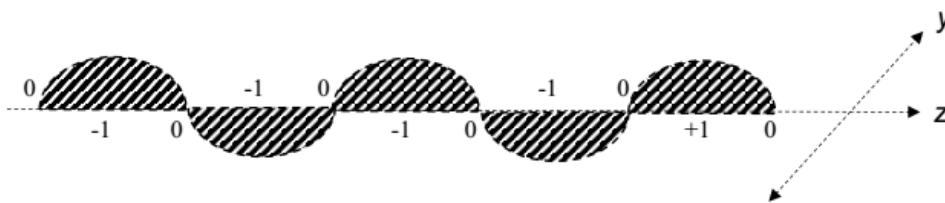


Figure 11.

Note there are two orientations for t_A as -1, left and right. Thus, combining the two we would have:



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 would have here is the very 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 to be the process of the "anti-particle/mass", but here as energy a process of negative-inversion of electrical field strength 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]:

$$\nabla \cdot E = - \delta B / \delta t$$

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 ($-\delta B$) 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 ($-\delta B$). 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 equation for time:

$$t = -B / E \quad (9)$$

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 $-1 / \varphi$.

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-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} :

$$G_{AB \langle \text{NEWTONS} \rangle} = M_C \cdot M_A \cdot M_B / t_{AB} \cdot t_{BA} \quad (\text{kg}^3 \text{t}^{-2}) \quad (10)$$

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 ($d/t = c$, $t = d/c$):

$$G_{AB \langle \text{NEWTONS} \rangle} = M_C \cdot c^2 \cdot M_A \cdot M_B / d^2 \quad (\text{kg}^3 \text{t}^{-2}) \quad (11)$$

Here “ $M_C \cdot c^2$ ” 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 $-1/\varphi$, thus times “2”, then the following can be considered for M_C :

$$M_C = M_{C1+C2} \cdot 2 / 3^2 \quad (12)$$

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

$$\begin{aligned} M_C &= 3.33... \cdot 10^{-27} \cdot 2 / 3^2 \\ &\sim 7.4... \cdot 10^{-28} \text{ (kg)} \end{aligned}$$

Now, if we apply this to $M_C \cdot c^2$:

$$\begin{aligned} M_C \cdot c^2 &= 7.4 \cdot 10^{-28} \cdot (2.99 \cdot 10^8)^2 \\ &\sim 6.67 \cdot 10^{-11} \\ &= G \text{ (gravitational constant, kg.d}^2\text{t}^{-2}) < \text{the equivalent of equation 10. as Nm}^2\text{kg}^{-2} > \end{aligned}$$

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-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} :

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

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”):

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

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? Research and experiment confirms the following:

Q_C is in proportion with: α (Fine Structure Constant)
 \hbar (Planck's reduced constant)
 $1/e^2$ (is "per" a unit of charge for the two bodies)
 $1/c$ (is "per" the speed of light)

These are all the qualities available to the electromagnetic phenomena. Thus, we can suggest the following:

$$\begin{aligned}
 Q_C &= \alpha \hbar / c e^2 \\
 k_e &= \alpha \hbar c / e^2
 \end{aligned}
 \tag{15}$$

This is a confirmed fact. The important feature here is to consider the use of time, and how we are developing our equations; Golden ratio (dual, φ or $-1/\varphi$) time fits this equation. Let's though develop further upon this. We are suggesting gravity emerges from electromagnetism on the atomic level, so let's develop some equations that relate the force of gravity with the force of "electrostatic charges" separated by the same distance, as what would happen on the atomic level (according to contemporary scientific values). Therefore, let us suggest that the ratio of equation 11. and equation 14. is as the following:

$$G_{AB} / Q_{AB} = G \cdot M_A \cdot M_B / k_e \cdot Q_A \cdot Q_B$$

If now we considered unit electrical charges for Q_B and Q_A , and equating through with the known values for the above constants, while also using the value of the Planck mass[15] for M_A and M_B we find that:

$$\begin{aligned}
 G_{AB} / Q_{AB} &= 1 / \alpha \\
 Q_{AB} / G_{AB} &= \alpha
 \end{aligned}
 \tag{16}$$

On this atomic level of value assembly it can be considered that mass and charge are directly related to the Fine Structure constant[16]. Thus, on a fundamental fine structure level we would have one pure mass, the pure mass for gravity, and one pure charge, the pure charge for electromagnetism. However, through our theory here, the pure mass would be related to charge and the pure charge would be related to mass. Let's suggest that the pure mass related to charge is the proton (p), and the pure charge related to mass is the electron (e). Each of these two fundamental particles would have the two fundamental forces associated to them; gravity and electromagnetism. Thus, the following would be in order as the electrostatic force between a proton p and an electron e on this 0-scalar atomic level:



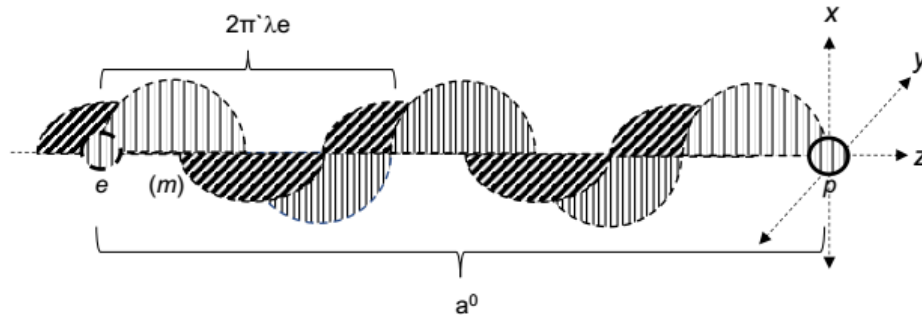
Figure 13.

4. Atomic modelling

The next new step of logic 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 , 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. Thus, we employ the following equation:

$$\lambda_e = 2\pi \cdot \alpha \cdot a^0 \quad (17)$$

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



(not drawn to scale)

Figure 14.

To prove 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. 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:

$$\begin{aligned} M_{(p+e)} / \alpha &= \sim 938 \text{ MeV}c^{-2} \cdot 137. \\ &= \sim 128 \text{ GeV}c^{-2} \end{aligned} \quad (18)$$

In other words:

$$\begin{aligned} \text{mass (atomic)} &\sim \alpha \cdot H^0 \text{ (Higgs particle mass)} \\ \text{mass (atomic)} / H^0 \text{ (Higgs particle mass)} &\sim \alpha \end{aligned} \quad (19)$$

In considering equation 15., ($Q_{AB}/G_{AB} = \alpha$), H^0 would represent a gravitational feature, while the mass of the proton (and, as we shall highlight, neutron, which would have a Q feature intrinsic to it) and the electron would represent the Q feature of the atom. Essentially, it is 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.

Our theoretical calculation falls well within the experimental calculated range of between $114 - 140 \text{ GeV}/c^2$ 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 $125 \text{ GeV}/c^2$ value. This result therefore suggests 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. It is like suggesting there exists the idea of a particle that essentially has no mass, yet behaves “as” a particle as though it should have mass, yet is entirely electromagnetic in means.

Consider the following; the energy of a Higgs particle when applied to $e = M \cdot c^2$ (E_H as the energy of the Higgs particle, M_H as its mass):

$$\begin{aligned} E_H &= M_H \cdot c^2 \\ &= 128 \text{ GeV}c^{-2} \cdot (2.99 \cdot 10^8)^2 \end{aligned} \quad (20)$$

$$\sim 1.16 \cdot 10^{19} \text{ GeV}$$

This value is close to the standard theorised value of Planck Energy E_P , $\sim 1.22 \cdot 10^{19} \text{ GeV}$. The implication being that the Higgs particle could well be related to a fundamental unit of quantised energy, which is what we're proposing. If indeed the calculation is the correct one, let us suggest the following: we know:

$$E_P = h\nu$$

(h as Planck's constant and ν as the Planck frequency).

In using equation G while incorporating $e = M \cdot c^2$, we could suggest the following if indeed $E_P = E_H$:

$$\begin{aligned} E_P &= M_H c^2 \\ &= M_P c^2 \alpha^{-1} \end{aligned}$$

Thus now, the energy of a proton M_P , as $e_P = M_P \cdot c^2$, we can derive the following:

$$\begin{aligned} E_P &= e_P \alpha^{-1} \\ h\nu &= e_P \alpha^{-1} \\ e_P &= h\nu\alpha \end{aligned} \tag{21}$$

This basically states that the energy of a proton is equivocally related to three fundamental constants. More to this, the energy of a photon E_P is equivalent to the energy of a proton (mass of basic atom) per the Fine Structure Constant; in other words, a fundamental connection using a fundamental constant. In considering equation 15., ($Q_{AB} / G_{AB} = \alpha$) then the energy of a proton is related to charge, and the energy of a photon is related to gravity-mass.

We can perhaps still do more to this equation though, for if $G = M_C \cdot c^2$, we find that essentially as $M_C = M_{C1+C2} \cdot 2 / 3^2$ and in considering $M_{C1+C2} = 2 \cdot M_P$, then:

$$\begin{aligned} G &= 2 \cdot 2 M_P \cdot c^2 / 9 \\ M_P \cdot c^2 / 9 &= G / 2 \cdot 2 \\ e_P &= 9 G / 2 \cdot 2 \\ G &= 2 \cdot 2 e_P / 9 \\ &= 2 \cdot 2 h\nu\alpha / 9 \end{aligned} \tag{22}$$

Thus, G represents a dual feature of $2h\nu\alpha/9$, of the atom, and thus as can only be a type of "folded" (added-over) electromagnetic feature $\langle Q_{AB} (e_P) \rangle$ using the scale of the Fine Structure constant. It would be like an 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 as the "m" wave, an antiparticle is generated (as defined in fig. 9.), and what is proposed here is that this particle would represent the "neutron" (fig. 15.). Although the neutron is not considered contemporarily as an anti-particle, the definitions we have used in this argument make it so.

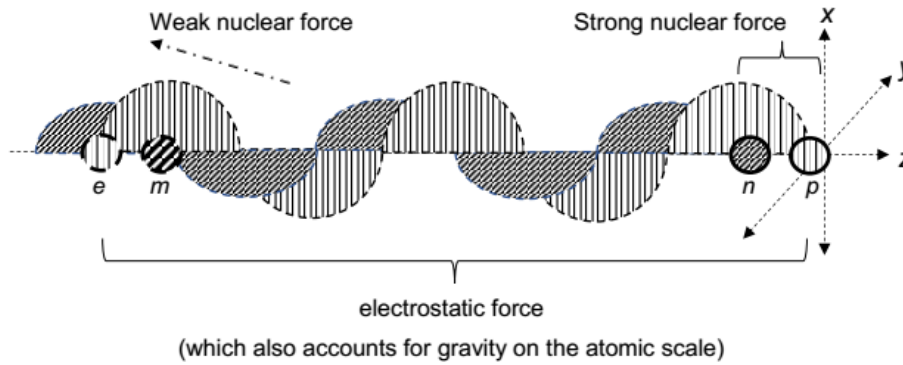


Figure 15.

The strength between n and p is essentially a mass/anti-mass association concept, one of attraction (like with electrostatic charges) and thus a G factor, which according to our equations on the atomic scale is 137 times that of the E value, which is correct. Furthermore, the strong nuclear force is linked by this associate to the weak nuclear force. By this process, we have the e/m force, the G force, a *strong nuclear* force[20] between a particle (p) and antiparticle (n), and a *weak nuclear* force[21] as the decay of a standard e/m phase force, and 3 key particles, an electron (e), a proton (p), and a neutron (n). The proton and neutron particles would pulse in and out of reality as governed by the passage of time here, yet represent 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 represents gravitational features, thus a type of “dark/invisible matter field” effect, an effect that clearly has mass and energy properties given our definitions here.

We must bear in mind though that the historical (t_B) value of time (as imaginary time, see First Principals (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.) <not drawn to scale> as a basic model of the atom for t_N (fig. 15.2.).

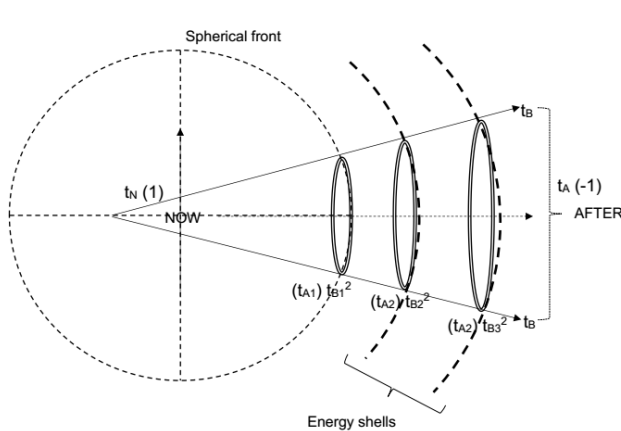


Figure 15.1.

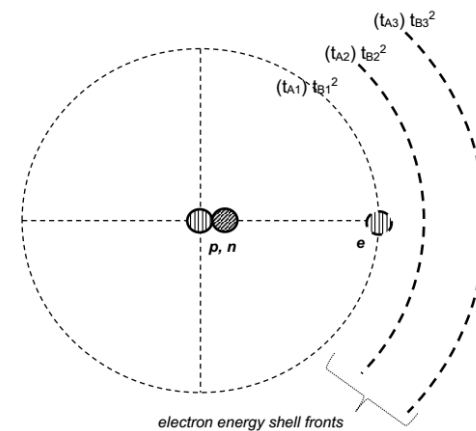


Figure 15.2.

According to the theory, the number of protons would 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. These *energy shells* would 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 say about 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. 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.).

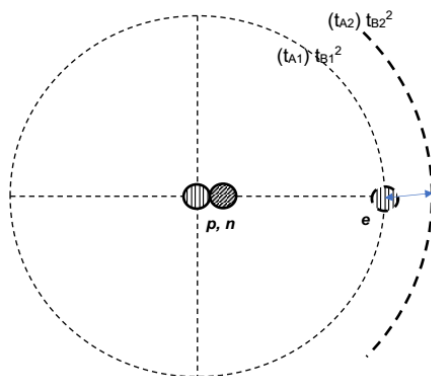


Figure 15.3.

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

$$(t_{A2} - t_{A1}) / (t_{A2} \cdot t_{A1})$$

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:

$$(t_{A2} - t_{A1}) / [(t_{A2} \cdot t_{A1}) \cdot t_C^2]$$

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

$$(t_{A2} \cdot t_{A1}) \cdot t_C^2 / (t_{A2} - t_{A1})$$

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

$$(t_{A2} \cdot t_{A1}) \cdot t_c^2 / [(t_{A2} - t_{A1}) \cdot \lambda_e]$$

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 $1/t_P^2$) 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 $1/t_P^2$ must be doubled, hence we are utilising a $2/t_P^2$ factor. Thus, the following equation suits for the overall wavelength of decay of an atom releasing quanta through electron shell decay:

$$\lambda = (t_{A2} \cdot t_{A1}) \cdot 2 \cdot t_c^2 / [(t_{A2} - t_{A1}) \cdot \lambda_e \cdot t_P^2] \quad (24)$$

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 principal 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:

$$\begin{aligned} \lambda &= (n_1^2 \cdot n_2^2) \cdot 2 \cdot t_c^2 / [(n_2^2 - n_1^2) \cdot \lambda_e \cdot Z^2] \\ 1/\lambda &= \lambda_e \cdot Z^2 / [(1/n_1^2) - (1/n_2^2)] \cdot 2(2\pi a_0)^2 \\ &= R_\infty \cdot Z^2 / [(1/n_1^2) - (1/n_2^2)] \end{aligned} \quad (25)$$

This is the well-known Rydberg formula and associated constant[22] $R_\infty = \lambda_e/2(2\pi a_0)^2$; 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	36

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-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 “divides” space, and thus gives itself a choice of two viable options in the context of space. Contemporary physics considers such phenomena as “quantum entanglement”. A prediction here is therefore that the two possibilities of quantum entanglement are of the order of the two Golden ratio output possibilities, namely ϕ or $-1/\phi$. Such as the electron shells.

5. Universal modelling

In continuing, how far could the atomic effect of the folded “dark field” of electromagnetic/expansive and gravitational/attractive 0-scalar space reach given the value of electron shells has its own limit as given the forces at play and their general interaction with each other? 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 that goes from a singular time quotient t_B to a squared-time quotient t_B^2 through distance, and thus as a perceived expansive acceleration of space, to the ends of any such 0-scalar space, to an infinitely large “fractal”[24][25][26]level, as per fig. 16.

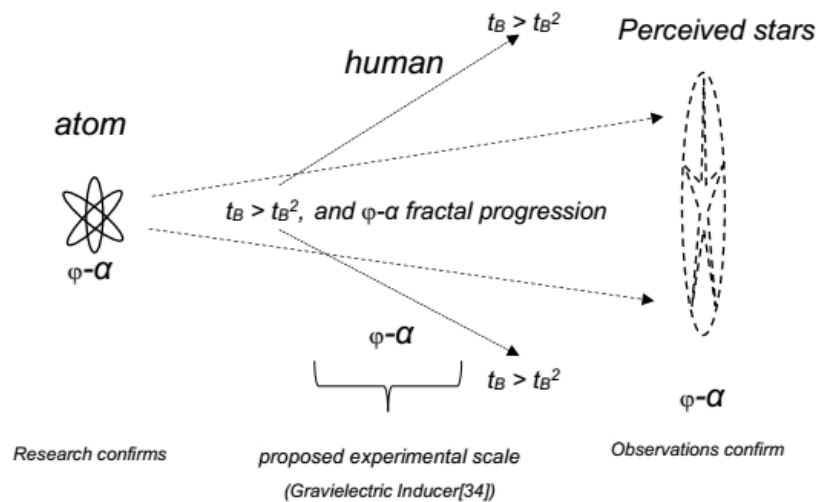


Figure 16.

This theorised perceived expansion of the Universe (owing to the Golden ratio time algorithm) would as “light” represent the key feature of light on the atomic level the frequency of a Compton wavelength (electron wavelength as $c/\lambda_e \sim 8.1 \cdot 10^{-19}$) “squared” (t_B^2), and thus a value of roughly 10^{-36} s^{-2} (exactly $6.7 \cdot 10^{-37}$). 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^{-2} . As a unit of time being measured as a unit of time with this value without any understanding of time other than it being a linear concept as a unit of time, 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; 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.

Inflation theory[27] today relies on highly theoretical auxiliary descriptors, such as the multiverse theory[28] and associated eternal inflation[29]. With that theory and auxiliary descriptor theories, the proposal is energy converting into matter making a new universe, and inside any such new universe that space would continue to expand, while outside any such universe space would still be expanding at speed, and thus more new universes

potentially would be created from this energy, hence the multiverse theory from Inflation theory. The proposal here though is that the flow of time into the future, represents t_B^2 , the relic of time (time past) squared, and as such the idea of rapid expansion (if the same distance is considered, distance per time per time, and thus the idea of acceleration) is not only upheld yet more properly explained in the context of the dimensions of the atom and associated field forces. Simply, past to future as time-squared produces the "effect" of an accelerating universe that may well be put down incorrectly to the idea of dark-energy in the absence of considering the Golden ratio for time. Here this theory presents a reasoning for the "idea" of inflation while basing this on actual measured data that can be proven in a context that represents the building block of what the idea of inflation is meant to lead to, namely matter and energy, with each proposed universal creation. On this point, contemporary physics also courts the idea of "strings", "strings" between particles, "strings" as the operators of particles, which essentially can be more accurately fulfilled using the Golden ratio for time. In terms of string theory[30], time past would represent three dimensions of time, and as time future this would be squared. Thus together, the past and future, we have 12 dimensions, 3 and 9, then another four for standard here and now space-time. Yet these are hypothetical musings more accurately defined with what has been presented.

On a gross universal scale the existence of mass responsible for the gravitational features of empty space as the idea of "dark matter" and "dark energy"[31][32] makes more sense according to the theory here; "dark energy" as time would give the effect of a forever expanding space, and "dark matter" would give the effect of gravity where no mass appears to be present. Note that the "dark energy" effect is due to the nature of the flow of time from t_B to t_A , time being "squared" as t_A (t_B^2), and thus the idea of an "accelerating" expansion of space when time is used as a quotient to distance. Moreover, given the nature of the neutron here, it would be logical to suggest that the neutron would be associated to a very "strong nuclear" force effect, and thus neutron stars[33] take on the appearance of a massive amount of gravity, together with being associated to a "magnetic" effect, as they represent that feature of the e/m manifestation/effect on space itself (fig. 9.), something modern science hasn't properly explained. Nonetheless, "this" would be the "fractal topology" of space-time, namely the idea of the small scale diverging to the large scale according to the Golden ratio of time propagation layering down these effects on space as a type of fractal topology; the fractal topology of space-time would merely be the result of the two proposed principles of 0-scalar spatial universality and the Golden ratio flow of time. Current research[34] aims to demonstrate that it is possible to produce a gravity field effect from electromagnetism using a dual coil structure (out of phase) wound according to a wavelength that is 1/137 that of the length of the coils in between a positive and negative charge structure, a fractal stepped up version of the gravity/electrodynamics of the atom.

6. Overview

In summary, we have developed the following:

- *A new theory of time:*
 - Incorporating the golden ratio.
 - Defining the past into an imaginary realm.
 - Defining the future into an inverse negative anti-particle realm.
 - Defining entropy.
 - Defining the process of time as electromagnetism.
- *A new theory of space:*
 - Incorporating time as the golden ratio.
 - Defining the force between masses in space.
 - Defining gravity on the atomic level, as associated to electromagnetism.

- *A new theory of the atom incorporating the theory of time and space:*
 - Incorporating time & space to a fine-structure calibrated atomic template.
 - Explaining the relationship between G and E.
 - Explaining the relative equations of G and E.
 - Explaining how neutrons are formed.
 - Explaining the strong nuclear force through a folded e/m field.
 - Explaining the weak nuclear force through a folded e/m field.
 - Explaining electron shells.
 - Deriving the Rydberg constant and formula.
 - Explaining quantum mechanics, including quantum entanglement.
- *A new theory of the stars incorporating the theory of time and space and the atom:*
 - Explaining dark matter and dark energy.
 - Explaining neutron stars.
 - Explaining the energy manifold flip level of $1/\phi$ in observed black holes.
 - Explaining Inflation theory, and thus dispelling ideas for a multiverse and eternal inflation.

Not to be forgotten:

- We have accepted all current results of singular-dimension time-theory.
- We are not challenging therefore any contemporary mathematical scientific results, only adding more scope to the idea of “time” as a way of addressing “many” loose ends of physics theory.
- Thus, this new theory is non-disruptive, only a suggested solution to the need for an all-encompassing theory of space-time.
- An experiment is offered to prove this new paradigm for time.

7. Conclusion

Presented here proposes a new process for the currently considered arrow/flow/universality/relativity of time; “time” is given far more structure and meaning that has not been previously conceived. Yet in this Golden ratio process, we can understand with simpler clarity the nature of atomic particles and associated field forces. In *no* manner should this apparent simplification of theory for space-time be considered a dumbing down process, for we are giving the idea of “time” *far* more pixilation, and we are using that pixilation of ideas to affect its relevance to the basic field forces and associated particles and phenomena thereof. We then find in this process that gravity/mass as an emergent feature of electromagnetism is set at the Fine Structure constant value of $1/137$. This value represents on the atomic level the balance between the universality of 0-scalar space and the associated non-synchronous divergence of time. This is not a challenge against contemporary ideas in science, this theory presents the idea of giving “time” more meaning to make mathematical spatial transformations that undergo symmetry-breaking become more sensible. Doing this uncovers many field force and structure etc. links in the way presented here.

Conversely, or rather what exists currently as a scientific community, is a mathematical process of considering space as 3-dimensional and time as one dimensional. Moreover, we as a science community have considered time to be a universal singularity. We have developed equations that suit both the atomic small scale to the universal large scale phenomena based on this feature of the mathematics we employ. In this process, we as contemporary scientists use 3-dimensional scalar/vector/inertial/torsional mathematical grid matrices to relate one region in space with another, as topographically accurate with what we observe of space-time as mathematics

allows, all using the idea of 3-dimensional space and one-dimensional time. In fact, this whole process has allowed us to focus “on” all those spatial features of mass/inertia/torsion and so on, while using one dimensional time. The problem with the process of using “space” as the base for equations and not time is that it is “very” complicated, as it forces us to consider mathematical matrices that through the process of the equation “as time itself” relates one 3-dimensional matrix with another as a process of cause and effect “in time”, “in the passage of time”. This obviously has its difficulties if indeed “time” as a concept is responsible for “symmetry-breaking” in scalar/vector space/particles.

Another problem is the way we conduct our research; if the basic particles are split up for research purposes, the $Q_{AB}(E_P)/G_{AB}(E_P) = \alpha$ features will be recognised in the split-up features of the particles by that process, and those split features would be considered as the make-up of the particles being split up to be examined, hence the idea of the subatomic world. Thus, depending on the type of splitting up process and the context of time being considered, 10's of subatomic particles could exist (perhaps 50 or so in all basic probability scales when combining two times with 3 or so basic particles and a magnetic moment). Here with this theory we are explaining the basic logic of the fundamental particles from first principles using a new a-priori for “time”. Through this new process, using “time” requires “far less” dimensionality of mathematical scope as an equation base compared to space.

As a final statement for the Golden ratio, if indeed everything emanates from energy as time upon 0-scalar space, and the two observed resultant properties of this phenomena are light and mass, and t_B in fact as light becomes as t_B^2 as t_A as an inclusive process of mass, then we can make the statement that energy is proportional to both mass and light-squared as a total equation for energy as the completeness of time; $e=mc^2$. Einstein was right in that regard, yet the detail of the Golden ratio had not been accounted for, which of course in its absence would result in propositions that fail to address this underlying paradigm of space-time and thus fail to deliver a complete theory for space-time.

Conflicts of Interest

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

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