Exploration

The Monopolar Quantum Relativistic Electron: An Extension of the Standard Model & Quantum Field Theory (Part 1)

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Abstract

In this paper, a particular attempt for unification shall be indicated in the proposal of a third kind of relativity in a geometric form of quantum relativity, which utilizes the string modular duality of a higher dimensional energy spectrum based on a physics of wormholes directly related to a cosmogony preceding the cosmologies of the thermodynamic universe from inflaton to instanton. In this way, the quantum theory of the microcosm of the outer and inner atom becomes subject to conformal transformations to and from the instanton of a quantum big bang or qbb and therefore enabling a description of the macrocosm of general relativity in terms of the modular T-duality of 11-dimensional supermembrane theory and so incorporating quantum gravity as a geometrical effect of energy transformations at the wormhole scale.

Part 1 of this article series includes: Introduction; The Electromagnetic Mass Energy and the $[v/c]^2$ Velocity Ratio Distribution; The Extension of Newton's Law in Relativistic Momentum & Energy and the Magnetopolar Self-Interaction of the Electron; and Frequency permutation states in the monopolar velocity distribution.

Keywords: Monopolar, quantum relativity, Standard Model, extension, quantum field theory.

Introduction

Despite the experimental success of the quantum theory and the extension of classical physics in quantum field theory and relativity in special and general application; a synthesis between the classical approach based on Euclidean and Riemann geometries with that of 'modern' theoretical physics based on statistical energy and frequency distributions remains to be a field of active research for the global theoretical and experimental physics community.

In this paper a particular attempt for unification shall be indicated in the proposal of a third kind of relativity in a geometric form of quantum relativity, which utilizes the string modular duality of a higher dimensional energy spectrum based on a physics of wormholes directly related to a cosmogony preceding the cosmologies of the thermodynamic universe from inflaton to instanton.

In this way, the quantum theory of the microcosm of the outer and inner atom becomes subject to conformal transformations to and from the instanton of a quantum big bang or qbb and therefore enabling a description of the macrocosm of general relativity in terms of the modular T-duality

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of 11-dimensional supermembrane theory and so incorporating quantum gravity as a geometrical effect of energy transformations at the wormhole scale.

Using a Feynman lecture at Caltech as a background for the quantum relative approach, **http://www.feynmanlectures.caltech.edu/II_28.html ,** this paper shall focus on the way the classical electron with a stipulated electromagnetic mass as a function of its spacial extent exposes the difficulty encountered by quantum field theories to model nature as mathematical point-particles without spacial extent.

In particular, a classical size for the proton can be found in an approximation $½R_e.X = R_p$ for a classical electron radius R_e and where the factor X represents the symmetry equilibrium for a ß = (v/c} = f(A) velocity ratio distribution for the effective electron rest mass m_e proportional to the spacial extent of the electron and evolving real solutions for the electron parameters from a quasi-complex space solution for its rest mass m_{eo}.

Using the $ß^2$ distribution in a unitary interval, then bounded in a function of the electromagnetic fine structure constant alpha; the SI-CODATA value for the rest mass of the electron is derived from first inflaton-based principles in the minimum energy Planck-Oscillator $E_o=½hf_o$ in a conformal mapping of the M-Sigma relation applied to the Black Hole Mass to Galactic Bulge ratio for the alpha bound. The M-Sigma ratio so can be considered as a scaling proportion between the interior of a Black Hole mapped holographically and radius-conformally as the internal monopolar volume of the electron as a basic premise of the quantum gravitational approach in quantum relativity and in scaling the Schwarzschild solution onto the electron.

A unification condition in a conformal mapping of the alpha fine-structure α onto X described by X ⇔ α in ℵ(Transformation) = $\{\aleph\}^3 : X \rightarrow \alpha\{\#\}^3 \rightarrow \# \rightarrow \#^3 \rightarrow (\#^2)^3 \rightarrow \{(\#^2)^3\}^3$ is applied in this context to indicate the relative interaction strengths of the elementary gauge interactions in proportionality: SNI:EMI:WNI:GI = SEWG = $\#:\#^3:\#^{18}:\#^{54}$.

For the symmetry equilibrium, the electric potential energy and the magnetic action energy are related for an electron velocity of $v_{eX} = 0.78615138.c$ and an effective mass energy of $m_{ef} = \gamma m_e = m_{ecf} = 1.503238892 \times 10^{-30}$ kg*. This mass-velocity relationship is supplemented by the Compton constant as: m_eR_e = Compton constant = $\alpha h/2\pi c = l_{planck}.\alpha.m_{planck} = m_{ec}r_{ec}$, which proportionalises the quantum relativistic size of the electron with its mass.

The Compton constant ensures Lorentz invariance across all reference frames in cancelling the length contraction with the relativistic mass increase in the product of the proper length l_o and the proper rest mass m_o as $l_o.m_o=l_o\gamma.m_o/\gamma$ in special relativity (SR) in the self-relative reference frame of the monopolar electron.

Subsequently then for an electron speed v_{eX} and for $r_{ec} = \alpha h/2\pi c m_{ecf} = 1.71676104 \times 10^{-15}$ m* as a decreased self-relative classical electron radius given by the Compton constant, we calculate a relatively negligible monopolar velocity component in $(v_{ps}/c)^2 = 1/\{1+r_{ec}^4/([2\pi\alpha]^2 r_{ps}^4)\} = 1.55261006 \times 10^{-35}$ and characteristic for any substantial velocity for the electron.

The analysis then defines a maximum velocity for the electron with a corresponding quantum relative minimum mass in the form of the electron (anti)neutrino in $v_e|_{max} = (1 - 3.282806345\times10^{-17})$ c and $m(\nu_e)=m(\nu_\tau)^2 = 0.00297104794$ eV* (0.002963740541 eV) respectively. At this energy then, no coupling between the electron and its anti-neutrino would be possible and the W^- weakon could not exist.

Subsequently, we shall indicate the effect of the Compton constant and of the quantum relativistic monopolar electron to calculate all of the neutrino masses from first principles in setting $m_\nu = m_{neutrino} = m_e.(r_{neutrino})/R_e$ and where r_ν naturally applies at the limit of the electron's dynamical self-interaction as indicated, that is the electron's quantum relativistic mass approaches that of the instanton of the qbb.

This leads to: $m_{\nu Electron}c^2 = m_\nu(\nu_{Tauon}{}^2)c^2 = m_\nu(\nu_{Muon}{}^2+\nu_{Higgs}{}^2)c^2 = \mu_o\{$Monopole GUT masses $ec\}^2 r_{ps}/4\pi c^2 R_e{}^2$ and where ν_{Higgs} is a scalar (anti)neutrino for the mass induction of the (anti)neutrinos in tandem with the mass induction of the scalar Higgs boson in the weak Goldstone interaction.

For the electrostatic electron the ß distribution at A=½, the Compton constant gives $\mathbf{m_{ec}r_{ec} = m_eR_e}$ for $\mathbf{ß^2 = 0}$ and at A=1, the Compton constant gives $\mathbf{m_{ec}r_{ec} = ½m_e.2R_e}$ for $\mathbf{ß^2 = X}$ and as the mean for a unitary interval is ½, the electron radius transforms into the protonic radius containing monopolar charge as internal charge distribution in $\mathbf{R_p = ½XR_e}$ and proportional to the effective electron rest mass m_e proportional to the spacial extent of the electron.

For the proton then, its 'charge distribution' radius becomes averaged as $R_{proton} = 0.85838052\times10^{-15}$ m* as a reduced classical electron radius and for a speed of the self-interactive or quantum relativistic electron of $v_{ps} = 1.576125021\times10^{-17}$ c. This monopolar quantum relativistic speed reaches its quantum relativistic $\{v/c = 1^-\}$ limit and its maximum QR monopolar speed of 0.0458 c at the instanton boundary and defines a minimum quantum monopolar relativistic speed for the electron at $v_{pse} = 1.50506548\times10^{-18}$ c for its electrostatic potential, where $U_e=\int\{q^2/8\pi\varepsilon_o r^2\}dr = q^2/8\pi\varepsilon_o R_e = ½m_ec^2$ for a classical velocity of $v_e=0$ in a non-interacting magnetic field B=0. $2U_e = m_ec^2$ so implies a halving of the classical electron radius to obtain the electron mass $m_e = 2U_e/c^2$ and infers an oscillating nature for the electron size to allow a synergy between classical physics and that of quantum mechanics.

A reduced classical electron size is equivalent to a decrease of the Compton wavelength of the electron, rendering the electron more 'muon like' and indicates the various discrepancies in the measurements of the proton's charge radius using Rydberg quantum transitions using electron and muon energies.

The calibration for the classical electron radius from the electron mass from SI units to star units is $(2.81794032\times10^{-15})$.[1.00167136 m*] = 2.82265011×10^{-15} m* and differing from $R_e = 2.777777778\times10^{-15}$ m* in a factor of (2.82265011/2.777777…) = 1.01615404.

A reduction of the classical electron radius from R_e = 2.777777778x10^{-15} m* to (2.777777778x10^{-15}).[0.998331431 m] = 2.77314286x10^{-15} m, then gives the same factor of (2.81794032/2.77314286) = 1.01615404, when calibrating from star units.

The units for the Rydberg constant are 1/m for a Star Unit* – SI calibration [m*/m] = 0.998331431… for a ratio [R_e/SI]/[R_e/*] = (2.77314286/2.777777) = (2.81794032/2.82265011)

Reducing the classical electron radius R_e from 2.81794032 fermi to 2.77314286 fermi in a factor of 1.01615404 then calibrates the effective electron mass m_e to R_e in the Compton constant
$R_e.m_e = ke^2/c^2$ = (2.77777778x10^{-15}).(9.29052716x10^{-31}) = 2.58070198x10^{-45} [mkg]* with
$R_e.m_e = ke^2/c^2$ = (2.81794033x10^{-15}).(9.1093826x10^{-31}) = 2.56696966x10^{-45} [mkg] with [mkg]* = (1.00167136)(1.00375313)[mkg] = 1.00543076 [mkg].
Using this reduced size of the electron then increases the Rydberg constant by a factor of 1.01615404

Using the Rydberg Constant as a function of Alpha {and including the Alpha variation Alpha$|_{mod}$ = $60\pi e^2/h$ = 60π(1.6021119x10^{-19})^2/(6.62607004x10^{-34}) = 1/137.047072} as $R_{y\infty}$ = Alpha$^3/4\pi R_e$ = Alpha$^2.m_ec/2h$ = $m_ee^4/8\varepsilon_o^2h^3c$ = 11.1296973x10^6 [1/m]* or 11.14829901x10^6 [1/m] defines variation in the measured CODATA Rydberg constant in a factor 10,973,731.6x (1.01615404). (137.036/137.047072)^3 = 11,148,299.0

Subsequently, using the Rydberg energy levels for the electron-muon quantum energy transitions, will result in a discrepancy for the proton's charge radius in a factor of 10,973,731.6/11,148,299.0 = 0.98434134… and reducing a protonic charge radius from 0.8768 fermi to 0.8631 fermi as a mean value between 0.8768 fermi and 0.8494 fermi to mirror the unitary interval from A=½ to A=1 for the electron's relativistic ß distribution.

The local geometry related to the Compton radius h/2πm is shown to manifest in a linearization of the Weyl wormhole wavelength $\lambda_{ps} = \lambda_{weyl}$ of the qbb in the photon-mass interaction as a quantum gravitational limit proportional to the mass of the electron in $r_{weyl} = \lambda_{weyl}/2\pi = 2G_oM_c/c^2$ = $h/2\pi cm_{ps}$ for a curvature mass $M_c = hc/4\pi G_om_{ps}$ conformally transforming M_c = 6445.79 kg* into 2.22..x10^{-20} kg* quantum gravitationally and in a corresponding increase of a sub Planck length linearization of $r_{cplanck} = 2G_om_{ps}/c^2$ = 5.4860785x10^{-47} m* (star units calibrated to the SI mensuration system) to the wormhole scale of the quantum big bang as a quantum geometric curvature effect.

The qbb results from a Planck scale conformal transformation of fundamental parameters in the inflaton, descriptive of energy transformations between five classes of superstrings culminating in the Weyl-E_{ps} wormhole as the final superstring class of heterotic symmetry 8x8 to manifest the supermembrane $E_{ps}E_{ss}$ as the wormhole of the 'singularity creation', which is a derivative from a monopolar Planck-Stoney cosmogenesis.

Recircularizing the Compton radius into a Compton wavelength in a {photon - gauge photon} interaction labeled as electromagnetic monopolar radiation or {emr - emmr}, then is shown to define the quantum energy of the vacuum per unit volume as a horn toroidal space-time volumar in Vortex-PE = $VPE_{ps} = ZPE_{weyl} = 4\pi E_{ps}/\lambda_{ps}^3$ and completing the encompassing energy spectrum in integrating the electric-, magnetic- and monopolar field properties in $\{½m_{electric} + ½m_{magnetic}(v/c)^2 + \delta m_{monopolic}\}c^2 = mc^2$.

The self-interaction of the electron in energy, so crystallizes its monopolar super brane origin in the addition of a quantum self-relative magnetic energy acting as a 'hidden' electromagnetic monopolar field in the volume of spacetime occupied by the electron as a conformal transformation from the inflaton epoch. A Planck-Stoney 'bounce' of the electronic charge quantum established the interaction potential between charge and mass energy to break an inherent supersymmetry to transform string class I into string class IIB in modular conformal self-duality of the monopole supermembrane. Following this initial transformation relating displacement to electric charge in the magneto charge of the monopole; a heterosis between string classes HO(32) and HE(64) enabled the bosonic superstring to bifurcate into fermionic parts in a quark-lepton hierarchy from the HO(32) superstring to the HE(64) superstring of the instanton of the qbb and who is called the Weyl or wormhole boson E_{ps} in this paper.

We shall also indicate the reason for the measured variation of the fine structure constant by Webb, Carswell and associates; who have measured a variation in alpha dependent on direction.
This variation in alpha is found in the birth of the universe as a 'bounce' or oscillation of the Planck length as a minimum physical displacement and becomes related to the presence of the factor γ^3 in the manifestation of relativistic force as the time rate of change of relativistic momentum p_{rel}.
Furthermore, the mass-charge ratio $\{e/m_{eo}\}$ relation of the electron implies that a precision measurement in either the rest mass m_{oe} or the charge quantum e, would affect this ratio and this paper shall show how the electromagnetic mass distribution of the electron crystallizes an effective mass m_e from its rest mass resulting in $m_{eo}\gamma = m_e'\gamma^2$ related to the coupling ratio between the electromagnetic (EMI) and the strong nuclear interaction (SNI), both as a function of alpha and for an asymptotic (not running) SNI constant defined from first principles in an interaction transformation between all of the four fundamental interactions.

Since $\{1-ß^2\}$ describes the $ß^2$ distribution of relativistic velocity in the unitary interval from A=0 to A=1, setting the quantum relativistic mass ratio $[m_{oe}/m_e]^2 = \{1-ß^2\}$ equal to a cosmological MSigma ratio conformally transformed from the Planck scale, naturally defines a potential oscillatory upper boundary for any displacement in the unit interval of A. An increase or decrease in the 'bare' electron mass, here denoted as m_{oe} can then result in a directional measurement variation due to the fluctuating uncertainty in the position of the electron in the unitary interval mirroring the natural absence or presence of an external magnetic field to either decrease or increase the monopolar part of the electron mass in its partitioning: $m_{electric} + m_{magnetic} + \delta m_{monopolar} = m_{ec}\{½+½[v/c]^2\} + \delta_{ps}m_{ec} = m_{ec}$ with $m_ec^2\sqrt{\{1 + v^2\gamma^2/c^2\}} = m_ec^2\gamma = m_{ec}c^2$ for $m = m_{ec}$ from the energy-momentum relation $E^2 = E_o^2 + p^2c^2$ of classical and quantum theory. The cosmic or universal value of alpha so remains constant in all cosmological time frames; with the fluctuation found to depend on a constant $\#=\sqrt[3]{\alpha}$ in a strong interaction constant as a function of alpha.

At the core of physical consciousness lies quantum consciousness, but there it is called selfinteraction of a particle or dynamical system in motion relative to its charge distribution. We shall indicate, that it is indeed the charge distribution within such a system and quantized in the fundamental nature of the electron and the proton as the base constituent of atomic hydrogen and so matter; that defines an internal monopolar charge distribution as a quantum geometric formation minimized in the classical size of the electron and the energy scale explored at that displacement scale.

Finally we describe the particles of the Standard Model and including a quantum geometric explanation for the CP violation of the weak interaction, from their genesis in the inflaton and a grand unification symmetry in a transformation of supermembranes and cosmic strings appearing today in a spectrum of cosmic rays:

SEWG-----------------SEWg--------SEW.G---------SeW.G--------S.EW.G------------S.E.W.G
Planck Unification I-------IIB-------HO32---------IIA--------HE64-------Bosonic Unification

The Electromagnetic Mass Energy and the $[v/c]^2$ Velocity Ratio Distribution

The magnetic energy stored in a magnetic field B of volume V and area $A=R^2$ for a (N-turn toroidal) current inductor $N.i=BdR/\mu_o$ for velocity v and self-induction $L=NBA/i$ is:
$U_m=½Li^2=½(\mu_o.N^2R)(BR/\mu_oN)^2=½B^2V/\mu_o$ and the Magnetic Energy Density per unit volume is then:

$$\mathbf{U_m/V=½B^2/\mu_o}$$

Similarly, the Electric Energy density per unit volume is:

$\mathbf{U_e/V=½\varepsilon_oE^2}$ say via the Maxwell equations and Gauss' law. So for integrating a spherical surface charge distribution $dV=4\pi r^2.dr$ from R_e to ∞:

$$\mathbf{U_e=\int\{q^2/8\pi\varepsilon_o r^2\}dr = q^2/8\pi\varepsilon_oR_e = ½m_ec^2}$$

$2U_e = m_ec^2$ so implies a halving of the classical electron radius to obtain the electron mass $m_e = 2U_e/c^2$ and infers an oscillating nature for the electron size to allow a synergy between classical physics and of quantum mechanics.

As Enrico Fermi stated in 1922; changing the rest mass of the electron invokes the ratio $ß^2=v^2/c^2$ in an attempt to solve the riddle of electromagnetic mass and the factor of 4/3 differentiating between the electron's relativistic momentum and its relativistic energy.:

"1. It's known that simple electrodynamic considerations[1] lead to the value $\mathbf{(4/3)U/c^2}$ for the electromagnetic mass of a spherical electricity-distribution of electrostatic energy **U**, when **c** denotes the speed of light. On the other hand, it is known that relativistic considerations for the mass of a system containing the energy **U** give the value $\mathbf{U/c^2}$. Thus we stand before a contradiction between the two views, whose solution seems not unimportant to me, especially with respect to the great importance of the electromagnetic mass for general physics, as the foundation of the electron theory of matter.
Especially we will prove: The difference between the two values stems from the fact, that in ordinary electrodynamic theory of electromagnetic mass (though not explicitly) a relativistically forbidden concept of rigid bodies is applied. Contrary to that, the relativistically most natural and most appropriate concept of rigid bodies leads to the value $\mathbf{U/c^2}$ for the electromagnetic mass. We additionally notice, that relativistic dynamics of the electron was studied by M. Born,[2] though from the standpoint only partially different from the ordinary electrodynamic one, so that the value $\mathbf{(4/3)U/c^2}$ for the Electron's mass was found of course.

In this paper, Hamilton's principle will serve as a basis, being most useful for the treatment of a problem subjected to very complicated conditions - conditions of a different nature than those considered in ordinary mechanics, because our system must contract in the direction of motion according to relativity theory. However, we notice that although this contraction is of order of magnitude $\mathbf{v^2/c^2}$, it changes the most important terms of electromagnetic mass, *i.e*, the rest mass."

The Heisenberg uncertainty principle relating energy with time and displacement with momentum in the expression $\Delta E.\Delta t = \Delta x.\Delta p \geq h/4\pi$ applied to the quantum mechanical scale of de Broglie wave matter $\lambda_{dB} = h/mv$ and the Compton mass-photon interaction $\Delta x = r_{compton} = h/2\pi cm$ shows a natural limit for the measurement of position in $\Delta p = \Delta mv \geq h/4\pi\Delta x = ½mc$.

When Δp exceeds mc , then ΔE exceeds mc in the Energy-Momentum relation $E^2 = (pc)^2 + (mc^2)^2$ and we can apply this natural limitation on measurement to the position of the electrostatic electron mass in a variable classical electron radius as $r_{ec} = \alpha h/2\pi cm = \alpha r_{compton} = \{\mu_o e^2c/2h\}.\{h/2\pi cm_{ec}\} = \mu_o e^2/4\pi m_{ec}$ and rendering the Compton mass-photon interaction modified in the electromagnetic fine structure constant α to relate the inverse proportionality between the electron's rest mass to its spacial extent in:

$$\mathbf{m_eR_e = \text{Compton constant} = \alpha h/2\pi c = l_{planck}.\alpha.m_{planck} = m_{ec}r_{ec}} \text{ ......} \mathbf{[Eq.1]}$$

The Compton constant ensures Lorentz invariance across all reference frames in cancelling the length contraction with the relativistic mass increase in the product of the proper length l_o and the proper rest mass m_o as $l_o.m_o=l_o\gamma.m_o/\gamma$ in special relativity (SR) in the self-relative reference frame of the monopolar electron.

In particular, a classical size for the proton can be found in an approximation $\frac{1}{2}R_e.X = R_p$ and where the factor X represents the symmetry equilibrium for a B=(v/c} velocity ratio distribution for the effective electron rest mass m_e proportional to the spacial extent of the electron. For the symmetry equilibrium, the electric potential energy and the magnetic action energy are related for an electron velocity of $v_e = 0.78615138.c$ and an effective mass energy of $m_{ef} = \gamma m_e = m_{ecf} = 1.503238892\text{x}10^{-30}$ kg* for $r_{ec} = \alpha h/2\pi m_{ecf} = 5.150283117\text{x}10^{-7}$ m* as a largely increased classical electron radius given by the Compton constant for a negligible monopolar velocity component in $(v_{ps}/c)^2 = 1/\{1+r_{ec}^4/([2\pi\alpha]^2 r_{ps}^4)\} = 1.916797918\text{x}10^{-69}$ for any substantial velocity for the electron.

For the proton then, its 'charge distribution' radius becomes averaged as $R_{proton} = 0.85838052\text{x}10^{-15}$ m* as a reduced classical electron radius and for a speed for the self-interactive or monopolar quantum relativistic electron of $2.96026005\text{x}10^{-13}$ c. This quantum relativistic speed reaches its $v/c = 1^-$ limit at the instanton boundary and defines a minimum quantum relativistic speed for the electron at
$v_e = 1.50506548\text{x}10^{-18}$ c for its electrostatic potential, where $U_e = \int\{q^2/8\pi\varepsilon_o r^2\}dr = q^2/8\pi\varepsilon_o R_e = \frac{1}{2}m_e c^2$ for a classical velocity of $v_e=0$ in a non-interacting magnetic field B=0.

Considering the surface charge distribution of the electron's electric potential to also exhibit a self-interactive term applying to a spacial distribution of the electron mass in its quantum relativistic volume, then this part can be defined as the self-interaction of a purely electromagnetic part of the electron's electrodynamic energy.

Then for a constant charge density in the electron's volume; $\rho=3q/(4\pi r^3)$ and $q=4\pi\rho r^3/3$ with $dq/dr = 4\pi\rho r^2 dr$

The electrostatic potential for this charge distribution $V(r) = q/4\pi\varepsilon_o r$ then contains an energy $dU = qdq/(4\pi\varepsilon_o r)$ for $U(r) = \int\{16\pi^2\rho^2 r^5/12\pi\varepsilon_o r\}\ dr = (4\pi\rho^2/3\varepsilon_o)\int r^4 dr = \frac{3}{5}.e^2/4\pi\varepsilon_o R_e = \frac{3}{5}.\mu_o e^2c^2/4\pi R_e = \frac{3}{5}.m_e c^2$ for an electron rest mass $m_e = 2U_e/c^2$ reduced by 40%.

In the linked Feynman lecture; the discrepancy between the electron radius and its electromagnetic mass is found in a factor of $U(r) = \frac{3}{4}.m_e c^2$ for $U_e = \mu_o e^2c^2/6\pi R_e = \frac{1}{2}(1+\frac{1}{3})m_e c^2 = \frac{2}{3}m_e c^2$ and here reduced by 33⅓%.

Then a question about the cause and origin of the discrepancy in the electrodynamic properties of the electron can be asked. As it seems that the total mass of the electron is somehow distributed between the electric and the magnetic field properties to which should be added a self-interaction effect to account for the differences.

But we can see, that should one use the measured electron mass from the R_e-definition as the electron's rest mass, that $m_{magnetic} + m_{electric} = m_e\{\frac{1}{2}+\frac{1}{2}(v/c)^2\} < m_e$, because of the mass-velocity dependency factor ß and the group velocities v<c. To account for the 'missing' mass we simply

introduce a 'missing', potential or inherent mass term δm_e and call it the monopolar selfinteraction mass of the electron to write: $m_{electric} + m_{magnetic} + \delta m_{monopolic} = m_{ec}\{½+½[v/c]^2\} + \delta_{ps}m_{ec} = m_{ec}$ with $m_{ec}c^2\sqrt{\{1 + v^2\gamma^2/c^2\}} = m_ec^2\gamma = m_{ec}c^2$ for $m = m_{ec}$ from the energy-momentum relation $E^2 = E_o^2 + p^2c^2$ of classical and quantum theory.

The aim is to redefine $\delta_{ps} = 1/2\gamma^2$ in $ß^2$ to relate the mass discrepancy to the monopolar nature of the quantum relativistic electron.

$$\boldsymbol{\delta_{ps} = ½\{1 - \{v/c]^2\} = 1/2\gamma^2 \text{ for } \gamma = 1/\sqrt{(1 - [v/c]^2)} = 1/\sqrt{(1 - ß^2)}}\text{.........} \textbf{[Eq.2]}$$

By the Biot-Savart and Ampere Law:
$B=\mu_oq.v./4\pi r^2$ and $\varepsilon_o=1/c^2\mu_o$ for the E=cB foundation for electrodynamic theory. So for integrating a spherical surface charge distribution $dV=4\pi r^2.dr$ from R_e to ∞:

$$\boldsymbol{U_m=\int\{\mu_oq^2v^2/8\pi r^2\}dr = \mu_oq^2v^2/8\pi R_e = ½m_ev^2 \quad m_{magnetic} = \mu_oe^2[v/c]^2/8\pi R_e = m_{ec}.Aß^2 = ½m_e.(v/c)^2}$$
$$\boldsymbol{\text{for a constant } A = (\mu_oe^2/8\pi R_e)/m_{ec} = m_e/2m_{ec} \text{ for } R_em_e = \mu_oe^2/4\pi = \alpha h/2\pi c}$$

Similarly, $U_e=\int dU_e=q^2v^2/8\pi\varepsilon_oR_e = kq^2/2R_e=½m_ec^2$ as per definition of the classical electron radius and for the total electron energy m_ec^2 set equal to the electric potential energy.
We term m_e here the effective electron mass and so differing it from an actual 'bare' rest mass m_o.

$m_{electric} = kq^2/2R_ec^2 = kq^2/e^* = q^2/8\pi\varepsilon_oR_e\,c^2 = U_e/c^2 = ½m_e$ and consider the electric electron energy to be half the total energy (akin the virial theorem for PE=2KE, say in the Bohr atom)

$PE=(-)ke^2/R_e = e^2/4\pi\varepsilon_oR_e = 2e^2/8\pi\varepsilon_oR_e = 2KE$ and where for a single hydrogen electron:

$R_{Bohr} = h^2/\pi m_ee^2\mu_oc^2 = R_e/\alpha^2 = R_{Compton}/\alpha = h\alpha/2\pi m_ec$ for an electromagnetic fine structure constant alpha $= \alpha = e^2/2\varepsilon_ohc = \mu_oce^2/2h$

$m_{magnetic} = \mu_oe^2[v/c]^2/8\pi R_e = m_{electric}.(v/c)^2 = ½m_e.(v/c)^2$ and which must be the KE by Einstein's $c^2dm=c^2(m_e-m_o)$

and for the relativistic electron mass $m=m_o/\sqrt{(1-ß^2)}=m_o\gamma$ = for $ß^2=(v/c)^2$

So we introduce a quantum relativistic (QR) monopolar rest mass m_{ec} with a Compton-de Broglie momentum $m_{ec}.c = h/\lambda_e = hf_e/c^2$ and consider there to be a frequency dependent photonic part in this rest mass and a part, which we have labeled as having an electromagnetic monopolar radiative or emmr origin.

The effective minimum rest mass for the electron in electro stasis in the absence of an external magnetic field in Maxwell's equations and as a function of the Compton constant then also harbours an internal emmr magnetic field as the sought-after self-interaction of the electron.

We shall find that the $ß^2$ distribution for the electron velocity defines a natural mirror boundary for an actual electron speed at 0, which so enables a complex electron velocity to decrease towards this complex boundary from a complex electron space and to then increase from this boundary as a real observed part.

We shall find that the classical electrostatic electron in the absence of its monopolar component can be considered to move with a speed of 0.177379525 c through an electrostatic potential of 8.25368811 keV*.
It is then a monopolar or self-interaction of the electron which effectively doubles its rest mass as a magnetic field applied internally and as a charge distribution for a quantum geometric electron and naturally contains the classical factor of (4/3) as a mean value in the $ß^2$ distribution.
The volume occupied by the monopolar magnetic charge distribution relates to quantum chromodynamics and its gluon-colour magnetopolar charges in representing quantized higher dimensional spacetime which can be considered as 'collapsed' in its nature as a 7-dimensional Calabi-Yau manifold but manifesting as a Riemann 3-sphere or 2-Torus (horn-toroidal) volumar quantizing 11-dimensional spacetime into Weylian wormholes in a mirror 12-dimensional Vafa spacetime.

This spacetime then compactifies the higher dimensional spacetime as a 3-dimensional surface, where a 11-dimensional surface manifold manifests in 3-D spacetime through open ended strings or Dirichlet branes attached in modular string dualities to a positively curved and spheroidal open-closed de Sitter (dS) spacetime, but is in mirror duality from a negatively curved and hyperbolic closed-open Anti de Sitter spacetime (AdS) to cancel the curved spacetimes in the Vortex-Potential-Energy or Zero-Point-Energy (ZPE) per unit volume or wormhole VPE of the Weylian spacetime quanta defined for a monopolar group velocity v_{ps} and the Compton parameters in:

$$\mathbf{Vortex\text{-}PE/V = VPE_{Eps} = ZPE_{weyl} = 4\pi E_{ps}/\lambda_{ps}{}^3 = 2\alpha^2 E_{ps}\{[c/v_{ps}]^2 - 1\}/r_{ec}{}^3 = E_{ps}/V_{ps}}$$

$$\mathbf{V_{ps} = (2\pi r_{ps}).(\pi r_{ps}{}^2) = 2\pi^2 r_{ps}{}^3} \quad \text{.......} \quad \textbf{[Eq.3]}$$

The Extension of Newton's Law in Relativistic Momentum & Energy and the Magnetopolar Self-Interaction of the Electron

Newton's law for force, mass and acceleration F = ma can be written in relativistic form as the change of the linear momentum over time and with an associated 'hidden' form of angular momentum change and acceleration in the change of rest mass as photonic energy and mass equivalent over time itself:

$$\mathbf{dp_{rel}/dt = d(m_o\gamma v)/dt = m_o d(\gamma v)/dt + \gamma v d(m_o)/dt = m_o d(\gamma v)/dt + \{\gamma v h/c^2\} df/dt}$$
$$\mathbf{= m_o\gamma^3.dv/dt + \{\gamma v h/c^2\} df/dt = F_a + F_\alpha \text{ for } \gamma = 1/\sqrt{\{1 - [v/c]^2\}}} \text{ ......}\mathbf{[Eq.4]}$$

The product $m_e.R_e$ = Compton constant = $h\alpha/2\pi c = \alpha.l_{planck}.m_{planck}$

A changing electron size r_e changes the electron rest mass m_o in proportionality $r_e \propto 1/m_o$ and where $m_o = m_{ec} = m_e$ as the electromagnetic relativistic quantum mass for $r_e = R_e = R_{compton}/\alpha$.
The boundary relativistic electron mass so becomes the Compton wormhole mass of the Quantum Big Bang $\alpha.m_{ps} = \alpha.hf_{ps}/c^2$

The classical electron's acceleration $a = F_a/m$ from its relativistic force $F_{rel} = d(p_{rel})/dt$ for a constant rest mass m_o is then supplemented by a quantum acceleration α from its quantum mechanical Compton mass $m_{ecompton} = m_{ec} = h\alpha/2\pi cr_e$ and where the classical rest mass m_o changes as $m_{ec}c^2 = (hvr_e/c^2).\gamma.(df/dt)$.

The frequency differential over time is maximized in $\{df/dt\}|_{max} = \{(f_{ps} - f_{ss})/f_{ss}\} = f_{ps}^2 - 1$ as the maximum entropy frequency permutation eigenstate $f_{ps}^2 = 9\text{x}10^{60}$ for its minimum state $f_{ss}^2 = 1/f_{ps}^2$ by modular string T-duality $f_{ps}.f_{ss} = 1$ of supermembrane $E_{ps}E_{ss}$ and wormhole frequency $f_{Weyl} = f_{ps}$.
In units of angular acceleration, df/dt so relates Planck's constant h and the Planck action in dE/dt = hdf/dt and the Heisenberg Uncertainty principle in dE.dt = h.df.dt in this string T-duality of the frequency self-states $f_{ps}|_{max}$ and $f_{ss}|_{min}$ and for the mass-eigen frequency quantum $f_{ss} = m_{ss}c^2/h$ by brane coupling constants $E_{ps}.E_{ss} = h^2$ and $E_{ps}/E_{ss} = f_{ps}^2$.

(1) Energy $E = hf = mc^2$ (The Combined Planck-Einstein Law)
(2) $E = hf$ iff $m = 0$ (The Planck Quantum Law $E=hf$ for light speed invariance $c=\lambda f$)
(3) $E = mc^2$ iff $f = f_o = f_{ss}$ (The Einstein Law $E = mc^2$ for the light speed upper limit)

(1) Whenever there is mass ($M = M_{inertial} = M_{gravitational}$) occupying space; this mass can be assigned either as a photonic mass {by the Energy-Momentum relation of Special Relativity: $E^2 = E_o^2 + (pc)^2$} and by the photonic momentum $p = h/\lambda = hf/c$} or as a 'rest mass' $m_o = m.\sqrt{[1-(v/c)^2]}$ for a 'rest energy' $E_o = m_oc^2$.

The 'total' energy for the occupied space so contains a 'variable' mass in the 'combined' law; but allows particularisation for electromagnetic radiation (always moving at the Maxwell light speed constant c in Planck's Law and for the 'Newtonian' mass M in the Einstein Law.

(2) If M=0, then the Einstein Law is suppressed in favour of the Planck Law and the space

contained energy E is photonic, i.e. electromagnetic, always dynamically described by the constancy of light speed c.

(3) If M>0, then there exists a mass-eigen frequency $f_{ss} = f_o = E_{ss}/h = m_{ss}c^2/h$, which quantizes all mass agglomerations $m = \Sigma m_{ss}$ in the mass quantum $m_{ss} = E_{ss}/c^2$.

Letting r_{ec} be the oscillating classical electron radius r_{ec} from its maximum value $R_e = \mu_o e^2/4\pi m_e = \alpha h/2\pi c m_e$ to its minimum qbb value $r_{ps}=\lambda_{ps}/2\pi$ from the de Broglie wave matter wavelength $\lambda_e = h/m_e c = c/f_e = hc/E_e = hc/m_e c^2$; the electron's energy for its quantum mechanical self-interaction part assigns the photon - mass interaction in the Compton constant in its linearized nature of the QR electron and can be stated as:

$h\sum f$ frequency energy states $= hf_e = m_{ec}c^2 = (hvr_{ec}/c^2).\gamma.(df/dt) = \{v\gamma\}\{r_{ec}.hf_{ps}^2/c^2\} = \{v\gamma\}\{hr_{ec}/\lambda_{ps}^2\}$ for the maximum frequency summation at $r_{ec} = r_{ps}$

for $v/\surd(1\text{-}[v/c]^2) = m_{ec}c^2\lambda_{ps}^2/hr_{ec} = \alpha c\lambda_{ps}^2/2\pi r_{ec}^2$ using $m_{ec}r_{ec}$ = constant $= h\alpha/2\pi c = m_e R_e$ and $v^2/\{1\text{-}[v/c]^2\} = \{\alpha c\lambda_{ps}^2/2\pi r_{ec}^2\}^2 = Ø^2$ solving for $v^2\{1+Ø^2/c^2\} = Ø^2$ with $(v/c\}^2 = Ø^2/(c^2+Ø^2) = 1/\{1+[c/Ø]^2\}$

The quantum relativistic mechanical electron's velocity distribution for a variable classical electron radius R_e in the proportional Compton rest mass m_{ec} and r_{ec} generalised in the wave matter constancy of de Broglie for the quantum relativistic part of rest mass $m_o = hf/c^2$ and a purely self-interacting electromagnetic monopolar part as electromagnetic monopolar radiation (emmr) so is:

"Juju's Electron Equation 31|31:" applied for the maximum integrated quantum energy state: $\{m_{electric} + m_{magnetic} + m_{emmr}\}c_2 = E_{weyl} = hf_{weyl} = E_{qbb} = m_{ps}c_2 = 1/e^*$

$$\{v_{ps}/c\}^2 = 1/\{1 + 4\pi^2 r_{ec}^4/\alpha^2\lambda_{ps}^4\} = 1/\{1 + r_{ec}^4/4\pi^2\alpha^2 r_{ps}^4\} \text{............ [Eq.5]}$$

$$\delta_{ps} = ½\{1 - \{v/c]^2\} = 1/2\gamma^2 \text{ for } \gamma = 1/\surd(1 - [v/c]^2) = 1/\surd(1 - ß^2) \text{..........[Eq.2]}$$

This sets the proportionality between monopolar emmr and electromagnetic emr in the constancy of light speed c: $v^2/(1\text{-}2\delta_{ps}) = c^2 = v_{ps}^2/\{1 + r_{ec}^4/4\pi^2\alpha^2 r_{ps}^4\}$ for the monopolar δ_{ps} and letting v_{ps} = xc as a fractional monopolar velocity colinear with v:

For $\delta_{ps} \rightarrow ½^+$ as $v \rightarrow 0$, ½ of the electron's mass will be monopolar in the internal magnetic field in lieu of the absence of an external magnetic field B=0, with the remaining half being the energy of the electro stasis.

For v=½ c; $v_{ps} = 2.006753867\text{x}10^{-18}$ c and $r_{ec} = 0.866025403\ R_e$ for δ_{ps} =½{1-0.25} = 0.375

For v= 0.651899075 c; v_{ps} = 3.035381866x10^{-18} c and r_{ec} = 0.758305739 R_e for δ_{ps} =½{1-0.315985704} = 0.34200715

For $\delta_{ps} \rightarrow 0^+$ as $v \rightarrow c^-$, ½$^-$ of the electron's mass will be magnetic in the external magnetic field B supplementing the remaining half of the electro stasis with a decreasing monopolar component δ_{ps} as a function of the monopolar velocity of the electron v_{ps}.

δ_{ps} = ½{1 - $[v/v_{ps}]^2\{4\pi^2\alpha^2 r_{ps}^4/(4\pi^2\alpha^2 r_{ps}^4 + r_{ec}^4)\}$ = ½{1 - $[v/v_{ps}]^2\{1/(1 + [r_{ec}/r_{ps}]^4/4\pi^2\alpha^2)\}\}$........ [Eq.6]

Then the upper limit for $r_{ec} = r_{ps}$ and the qbb wormhole boundary is: δ_{ps} = ½{1 - $[c^-/v_{ps}|_{max}]^2(4\pi^2\alpha^2)/(1+4\pi^2\alpha^2)\}$ = ½{1 - 1$^-$} = 0$^+$ for $v_{ps}|_{max}{}^2 = (4\pi^2\alpha^2 c^2)/(1+4\pi^2\alpha^2)$ showing that as $[v/c] \rightarrow 1^-$; $\delta_{ps} \rightarrow 0$ for ½ of the electron's mass being from the electric field and the other half being from the external magnetic field for increasing relativistic velocity v increasing the monopolar part in v_{ps} to its maximum at the wormhole qbb scale.
$v_{ps}|_{max} = xc = 2\pi\alpha c/\sqrt{(4\pi^2\alpha^2+1)}$ = 0.045798805 c as the maximized monopolar magnetic speed for the electron and decreasing to its minimum speed
$v_{ps}|_{min} = c/\sqrt{(1 + 4\pi^2(10^{10}/360)^4/\alpha^2)}$ c = 1.50506540x10^{-18} c for the classical electron radius scale given by R_e and the internal velocity of the electron in electro stasis.

The lower limit for $r_{ec} = R_e = 10^{10}\lambda_{ps}/360$ (from the Planck-Stoney-QR Unification) becomes:
δ_{ps} = ½{1 - $[v/v_{ps}|_{min}]^2(4\pi^2\alpha^2)/(4\pi^2\alpha^2+ [2\pi.10^{10}/360]^4)\}$ = ½{1 - $[v/v_{ps}|_{min}]^2(1/(1+ 4\pi^2.10^{40}/\alpha^2.360^4)\}$ = ½ - ½$[v]^2$(2.265221852x10^{-36})/(4.5151962x10^{-10}) = ½ - (2.508442326x10^{-27})v^2, showing that as $[v] \rightarrow 0^+$; $\delta_{ps} \rightarrow$ ½ for ½ of the electron's mass being monopolar.

The wave nature of the electron changes the Compton radius to its Compton wavelength however and the derivation of [Eq.5] results in a recircularization of parameters to give a statistical root-mean-square velocity for the QR electron.

$$(hv\lambda_{ps}/c^2).\gamma.(df/dt) = hv\lambda_{ps}.f_{ps}{}^2.\gamma/c^2 = hf_{ps} = m_{ps}c^2$$

$(v/\sqrt{(1-[v/c]^2)} = c$ and $v^2/\{1-[v/c]^2\} = c^2$ solving for $v^2 = c^2 - v^2$ and v^2 =½c^2 for an averaged Compton emr-emmr speed of

$$\mathbf{v_{\lambda c} = c/\sqrt{2}} \text{..........} \mathbf{[Eq.7]}$$

This formulation sets an upper and lower bound for $v_{electron}$ in the electron radius in the interval:

$$\langle R_e|_{max} \text{.......} R_{ec}|_{min} = \lambda_{ps}/2\pi = r_{ps} = r_{Weyl} = r_{wormhole} = r_{qbb} \rangle$$

The speed of the quantum mechanical electron of mass $m_{ec}= \alpha m_{ps}$ kg*, so is maximized in its minimum radius of the wormhole as 0.045799 c or 13,739,643.01 (m/s)* and limits the classical relativistic electron speed in:

$m_{ec}/\sqrt{\{1-(v_{ec}/c)^2\}} = \alpha m_{ps} = 1.621502875\text{x}10^{-22}$ kg* for $\{v_e/c\}^2 = 1 - \{m_e/\alpha m_{ps}\}^2$

$v_e|_{max} = \sqrt{\{1 - (5.72957797\text{x}10^{-9})^2\}}\ c = \sqrt{\{1 - 3.28280637\text{x}10^{-17}\}}\ c \sim \{1 - 1.64140319\text{x}10^{-17}\}\ c = c^-$

and as the self-energy $E_{ec}=m_{ec}c^2 = \alpha m_{ps}c^2 = \alpha E_{ps} = \alpha/e^*$ J* for the Weyl electron of the quantum big bang (qbb) or instanton following the inflaton of the string epoch.

This energy of self-interaction represents the original Zero-Point or VPE energy of the matrix of spacetime in the minimum Planck oscillator $|½E_o| = |h/4\pi| = ½E_{planck}$ which manifests the quantization for the parameters describing dynamical interaction within it.

As such a VPE-Volumar brane, the conformal transformation of the Planck oscillator into the Weyl oscillator can be used to define the concept of a 'physical consciousness awareness quantum' $\alpha\omega=df/dt$ in the maximized frequency entropy state in a brane volumar and as per [Eq.3]. Here a 4-dimensional Riemann sphere with volume $V_4(r) = ½\pi^2r^4$ manifests as a 3dimensional surface: $dV_4/dr = 2\pi^2r^3$ and so as the encompassing 'mother black hole' solution for the inner horizon of an open de Sitter holographic cosmology bounded by that inner black hole surface as a one-sided 11-dimensional hyper-surface, whose outside uses the mirror modular duality of string physics to define the outer horizon as a Möbian connected topology of closed Anti de Sitter space-time as a quasi-12th dimension, which can be labeled as a Vafa's 'father white hole', quantum entangling the inner- and outer horizons of the Witten manifold mirror in the membrane modular duality.

This allows a number of predictions for particular energy levels to be made.
For the maximized volumar brane at the Weyl energy and for the maximized frequency permutation state.

$V_{brane}.(df/dt)|_{max} = 2\pi^2R_{rmp}^3.f_{ps}^2 = e^* =1/E_{ps} = 2R_ec^2$ in a rest mass photonic or 'dark matter' radius $R_{rmp} = \sqrt[3]{\{e^*/2\pi^2f_{ps}^2\}} = 1.411884763\text{x}10^{-20}$ m* for the nuclear electron at

$$m_{fermi} = h/2\pi cR_{rmp} = 2.50500365\text{x}10^{-23} \text{ kg* or } 14.034015 \text{ TeV*}.$$

This is near the maximum energy potential of the Large Hadron Collider or LHC in Geneva, Switzerland and a form of the 'dark matter' particle should make an appearance at 14 Tev.

For the Compton electron $e^*/\alpha = 2R_ec^2/\alpha = 2R_{compton}c^2$; $R_{rmp} = \sqrt[3]{\{e^*/2\alpha\pi^2f_{ps}^2\}} = 7.279292496 \times 10^{-20}$ m* for the Compton electron at an energy of $m_{compton} = h/2\pi cR_{rmp} = 4.85868164 \times 10^{-24}$ kg* or 2.722024 TeV*

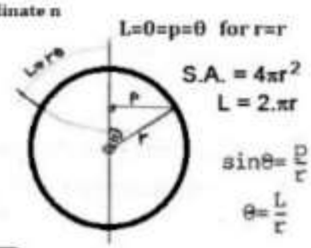
For the Bohr electron $e^*/\alpha^2 = 2R_ec^2/\alpha^2 = 2R_{bohr}c^2$; $R_{rmp} = \sqrt[3]{\{e^*/2\alpha^2\pi^2f_{ps}^2\}} = 3.75300456 \times 10^{-19}$ m* for the atomic Bohr electron at an energy of $m_{compton} = h/2\pi cR_{rmp} = 9.4238534 \times 10^{-25}$ kg* or 527.9613 GeV*

The classical electromagnetic rest-mass $m_{emr}=m_e$ becomes quantum mechanical in the string brane sourcesink energy E*-Gauge photon quantum of the Quantum Big Bang Weylian wormhole.

$E^* = E_{ps} = hf_{ps} = hc/\lambda_{ps} = m_{ps}c^2 = (m_e/2e).\sqrt{[2\pi G_o/\alpha hc]} = \{m_e/m_{Planck}\}/\{2e\sqrt{\alpha}\} = 1/2R_ec^2 = 1/e^*$

Radius of Curvature r(n) with Salefactor 1/a=1+1/n in dS as a function of cycletime coordinate n

$$r(n) = r_{max}\left(\frac{n}{n+1}\right) m^* \quad \text{and} \quad n = H_ot$$



The volume of the 4-D spacetime can however be found by integrating the surface area S.A. via arclength L, with L being an intrinsic parameter of the 3-D surface. dL=r.dθ

$$V_{Universe} = \int_0^{r\pi} 4\pi p^2\, dL = 2\pi^2 r(n)^3 \quad \text{for a local spheroidicity}$$

$$4\pi\int_0^{\pi} r^3\sin^2\theta\, d\theta = 4\pi r^3\int_0^{\pi} \tfrac{1}{2}[1-\cos 2\theta]d\theta = 2\pi^2 r(n)^3$$ for the asymptotic 4/10D dS 'flatness' cosmology within the nodal Hubble 5/11D AdS Universe

This classical macrovolumar is quantized in the microvolumar quantum of the Unified Field in 8π radians or 840°-(-600°)=1440°

$$\tfrac{1}{4}\pi\int_{-600°}^{840°} \{\sin(\tfrac{1}{2}[3x])-\cos(\tfrac{1}{4}[3x])\}^2 dx = \tfrac{1}{4}\pi\int_{-10\pi/3}^{14\pi/3} \{\sin^2(3x/2)+\cos^2(3x/4)-2\sin(3x/2)\cos(3x/4)\}\, dx$$

$$= \tfrac{1}{4}\pi\int_{-600°}^{840°} \{\tfrac{1}{2}(1-\cos[3x])+\tfrac{1}{2}(1+\cos\tfrac{1}{2}[3x] - \sin\tfrac{1}{2}[9x] - \sin\tfrac{1}{4}[3x]\}\, dx$$

$$\left\{ \text{by classical volumar of revolution (vor)} \quad V_{vor} = \int \pi y^2\, dx \quad \text{for } y=r \right\}$$

$$= \tfrac{1}{4}\pi\left[\theta - \sin[3x]/6 + \sin\tfrac{1}{2}[3x]/3 - 2\cos\tfrac{1}{2}[9x]/9 - 2\cos\tfrac{1}{2}[3x]/3\right]_{-10\pi/3}^{14\pi/3} = \tfrac{1}{4}\pi(8\pi) = 2\pi^2$$

The amplitude for the universal wavefunction becomes proportional to the quantum count of the space occupancy of a single spacetime quantum and as source energy (VPE or Vortex Potential Energy) quantum and as a consequence of the preinflationary supersymmetry of the F(x)=sinx +sin(-x) = 0 wavefunction defining this singularity (symbolised as the symbol for infinity).

A higher dimensional surface is Moebian connected to differentiate the quantum mechanical 'boundary' for the quantum tunneling of the macrocosmos as a magnified holofractal of the well understood microquantumization.

It then is the experienced and measured relativity of time itself, which becomes the quantum wall, with the 'reducing thickness' of the quantum boundary correlating with the evolution of the multiversal structure in the phase shifted time intervals defining the individual universes.

Monopolar charge quantum $e^*/c^2 = 2R_e \Leftarrow$ supermembrane displacement transformation $\Rightarrow$ $\sqrt{\alpha}.l_{planck} = e/c^2$ as electropolar charge quantum

$$m_e = 2e\sqrt{\alpha}.m_{planck}/2R_ec^2 = l_{planck}\sqrt{\alpha}.\sqrt{\alpha}.m_{planck}/R_e = \alpha.l_{planck}.m_{planck}/R_e =$$
$$\{e/c^2\}\{\sqrt{(2\pi ke^2/hc}\}\{\sqrt{(hc/2\pi G_o)}\}/R_e = \{\sqrt{(G_oh/2\pi c^3)}\}\{2\pi ke^2/hc\}\{\sqrt{(hc/2\pi G_o)}\}/R_e =$$
$$\{h/2\pi c\}\{2\pi ke^2/hc\}/R_e = \{ke^2/c^2\}/R_e = \{\mu_oe^2\}/4\pi R_e$$

The product $m_e.R_e$ = Compton constant = $h\alpha/2\pi c = \alpha.l_{planck}.m_{planck}$
A changing electron size r_e changes the electron rest mass m_o in proportionality $r_e \propto 1/m_o$ and where $m_o= m_e$ for $r_e= R_e = R_{compton}/\alpha = R_{bohr}/\alpha^2$

The boundary relativistic electron mass so becomes the Compton wormhole mass of the Quantum Big Bang $\alpha.m_{ps}= \alpha.hf_{ps}/c^2$

For the wormhole limit $r_e = r_{ps} = \lambda_{ps}/2\pi = R_e|_{minimum}$ in unified string Planck-Stoney units $m_e = \alpha m_{ps} = \alpha hf_{ps}/c^2 = \alpha h/c\lambda_{ps} = \alpha/e^*c^2 = \alpha/2R_ec^4 = h\alpha/2\pi cr_{ps} = \{60\pi he^2/2\pi hcr_{ps}\} = 30e^2/cr_{ps} = 1.62150288\text{x}10^{-22}$ kg* $= m_e\gamma = m_e/\sqrt{\{1 - [v/c]^2\}}$ for $v_{electron} = c^-$; $[v/c]^2 = 1\text{-}3.2828...\text{x}10^{-17}$ for $v = \{1\text{-}½(3.2828\text{x}10^{-17})\}$ $c \sim c$

The Compton constant so relates the pre-spacetime formulation in the Planck-Stoney oscillation to the post-qbb cosmic evolution of the light path x=ct as:

$$\sqrt{\alpha}.l_{planck}\sqrt{\alpha}.m_{planck} = \alpha h/2\pi c = \sqrt{\alpha}.r_{planck}\ \sqrt{\alpha}.M_{curvature} = \sqrt{\alpha}.m_{ps}\sqrt{\alpha}.r_{ps} = \alpha.m_{ps}.r_{ps} = m_{ec}.r_{ec} = m_eR_e$$

showing the limiting electron masses m_e and αm_{ps} to be attained precisely at the wormhole mass m_{ps} as the modulation with the shrinking classical electron radius R_e to the wormhole radius r_{ps} as the linearization of the Compton wavelength of the wormhole event horizon $\lambda_{ps}=2\pi r_{ps}$.

The Schwarzschild Classical Electron as a Planck function for a Quantum of Physicalized Consciousness

$$m_{ebh} = R_ec^2/2G_o = e^*/4G_o|_{mod\text{-}mass} = V_{rmp}.df/dt|_{max}/4G_o = 2\pi^2R_{rmp}^3.f_{ps}^2/4G_o = 1.125\text{x}10^{12} \text{ kg*}$$

is the Schwarzschild wave matter mass for a classical electron with curvature radius R_e and effective electron mass m_e in the electromagnetic interaction E*-Gauge photon of the supermembrane displacement transformation between the monopolar and electropolar universal charge quanta e* and e respectively?

The energy density for this modular 'dark matter-consciousness' electron as function of the 'Planck Vacuum' becomes:

$\rho_{planck} = m_{planck}/V_{planck} = m_{planck}/L_{planck}^3 = 2\pi c^5/hG_o^2 = \{8\pi c^3 \lambda_{ps}^2/hG_o\}.\{f_{ps}^2/4G_o\} = 1.855079\text{x}10^{96}$ (kg/m^3)*
$\rho_{ebh\text{-}rmp} = m_{ebh}/V_{rmp} = df/dt|_{max}/4G_o = f_{ps}^2/4G_o = 2.025\text{x}10^{70}$ (kg/m^3)* = $1.0916\text{x}10^{-26}\ \rho_{planck}$

$M_{rmp} = m_{fermi} = h/2\pi cR_{rmp} = 2.50500365\text{x}10^{-23}$ kg* or 14.034015 TeV*

is the Compton-de Broglie wave-matter mass for the Restmass Photon rmp as the 'dark matter' particular agent in the UFOQR and here redefined as the 'Particle of Universal or Cosmic Physicalized Consciousness'.

$R_{rmp} = \sqrt[3]{\{V_{rmp}/2\pi^2\}} = \sqrt[3]{\{2R_ec^2/(2\pi^2.df/dt|_{max})\}} = \sqrt[3]{\{e^*/2\pi^2 f_{ps}^2\}}|_{mod} = \sqrt[3]{\{1/2\pi^2 hf_{ps}^3\}}|_{mod} = 1.411884763...\text{x}10^{-20}$ m*

for a unitary calibration for the rmp in [m^3]* = [s^3/h]* and [m]* =[s]*/$\sqrt[3]{h}$ for M_{rpm} in [kg]* = [Js^2/m]*x$\sqrt[3]{h}$/[s]* = [Js/m]*x$\sqrt[3]{h}$ = [kg]*
$M_{rmp} = m_{fermi} = h/2\pi cR_{rmp} = \{h/2\pi c\}.\{\sqrt[3]{\{2\pi^2 hf_{ps}^3\}}|_{mod}\} = \{hf_{ps}/c\}\sqrt[3]{\{2\pi^2 h/8\pi^3\}}|_{mod} = \{E_{ps}/c\}\}\sqrt[3]{\{h/4\pi\}}|_{mod}$

$M_{rmp} = h/2\pi cR_{rmp} = \{E_{ps}/c\}\}\sqrt[3]{\{h/4\pi\}}|_{mod} = 2L_{planck}^2c^2/R_{rmp}R_e = L_{planck}^2c^2/G_oR_{rmp}$ in the equivalence of the Gravitational parameter applied to de Broglie wave matter M_{dB} in $4G_oM_{dB} = 2R_ec^2 = e^*$ with the Star Coulomb [C*]*as the unit for physicalized consciousness.

Closed Planck-String class I Finestructure Constant for monopolar mass displacement current $[M] = [ec]|_{mod} = [2\pi R.i]_{mod}$:
$M_{rmp}/m_{ebh} = 2hG_o/2\pi c^3R_{rmp}R_e = 2L_{planck}^2/R_{rmp}R_e = 2.226669925\text{x}10^{-35} = 1/4.491011392\text{x}10^{34}$ = Order{Planck-Length}

Dark Matter-Physicalized Consciousness Finestructure Constant:
$R_e/R_{rmp} = 4\pi G_oM_{rmp}m_{ebh}/hc = 62{,}625.09124 = 1/1.596804061\text{x}10^{-5}$

The nature of the universal Schwarzschild classical electron as a high-density form of de Broglie wave matter so becomes an elementary agency for quantum gravity manifesting from the hyperspace of the multi-dimensional cosmology as non-Baryonic form of matter energy and is related to the definition of physicalized consciousness in the Unified Field of Quantum Relativity (UFOQR).
The UFOQR is based on Vortex-Potential-Energy or VPE as the non-virtual, but Goldstone Boson gauged Zero-Point-Energy Heisenberg matrix of spacetimes.

Frequency permutation states in the monopolar velocity distribution

As the maximum frequency permutation state from the alpha-part of the relativistic force expression [Eq.4] is always applied to the monopolar velocity v_{ps} ; $df/dt|_{max} = f_{ps}^2 = 1/f_{ss}^2 = cf_{ps}/\lambda_{ps} = cf_{ps}/2\pi r_{ps}$ for an angular frequency $\omega_{ps} = 2\pi f_{ps}$ as Compton frequency; the maximum monopolar velocity ratio $\{v_{ps}/c\}^2$ applied to the mass $m = m_{ec}$ will be proportional to that maximized frequency state.

The de Broglie group velocity $v_{dB} = h/m_{ec}\lambda_{dB} = h/2\pi m_{ec}r_{dB}$ linearized so is recircularized in the monopolar velocity v_{ps} in the Compton constant $m_{ec}.r_{dB} = h/2\pi v_{ps}$ and with v_{ps} assuming c in the relativistic limit of the Compton radius.

For $\langle R_{ec}.m_{ec} = r_{ps}.m_{ec} = h\alpha/2\pi c \rangle|_{min}$, the minimized classical electron radius r_{ps} maximizes the monopolar speed of the electron in $\{v_{ps}/c\} = 1/\sqrt{\{1+1/4\pi^2\alpha^2\}} = 0.04579881$ as a conformal mapping of the wormhole radius of the electron onto its classical representation in the proportion $10^{10} = 360R_e/2\pi r_{ps}$ in a correlation between circular measure in linearized radians and angular degrees. This is in correspondence to the wave nature expressed in the Compton and de Broglie wavelengths and of the particle nature from the Compton and de Broglie radii in an encompassing electromagnetic and electromagnetic monopolar emr-emmr interaction.

This monopolar ß represents a magnetic mass $m_{mm} = \mu_o e^2(v_{ps}/c)^2/4\pi r_{ps} = R_e m_e(v_{ps}/c)^2/r_{ps} = m_{ec}(v_{ps}/c)^2 = (2.09753100\text{x}10^{-3})m_{ec} = 3.4011525\text{x}10^{-25}$ kg for the alpha-energy $E_{\alpha\omega} = m_{mm}c^2 = hf_{\alpha\omega} = 3.051037256\text{x}10^{-8}$ J* for a total frequency integral of $f_{\alpha\omega} = 4.59160179\text{x}10^{25} = \sum f_{ss} = \sum m_{ss}c^2/h = f_{\alpha\omega}/f_{ss} = 1.377480544\text{x}10^{56}$ frequency self-states and mass quantum m_{ss} eigen inertia states by $m_{ss} = hf_{ss}/c^2$ by the time instanton $f_{ps}f_{ss} = 1 = E_{ps}.e^*$ as universal and natural self-identity for the supermembrane $E_{ps}E_{ss}$, consisting of a high energy vibratory part E_{ps} and a low energy winding part E_{ss} in a mirror duality coupling.

This is a magnetic mass manifesting at the atomic scale at $3.06100\text{x}10^{-8}$ J* or 190.5433 GeV* for a wavelength of $\lambda_{mm} = h/m_m c = 6.53382\text{x}10^{-18}$ m* for a total electron mass
$m_{ec}/\sqrt{\{1-(v_{ec}/c)^2\}} = \alpha m_{ps} = 1.621502875\text{x}10^{-22}$ kg* as the Weyl mass having replaced the classical relativistic electron rest mass m_o by the quantum dynamic Compton rest mass m_{ec} as a function of the effective classical electron mass m_e.
$\alpha m_{ps}\{v_{ps}/c\}^2 = m_{mm}$ and so the Compton encompassing mass m_{ec} is reduced to the magnetic mass in the factor $\{v_{ps}/c\}^2$ characterizing the mass-radius relationship for all electrons.

For $\langle R_e.m_e = h\alpha/2\pi c \rangle|_{max}$, the maximized classical electron radius R_e minimizes the monopolar speed of the electron in:

$m_e = h\alpha/2\pi cR_e = ke^2/R_e c^2 = \mu_o e^2/4\pi R_e$ for $\{v_{ps}/c\} = 1/\sqrt{\{1+R_e^4/4\pi^2\alpha^2 r_{ps}^4\}} = 1/\sqrt{\{1+(2\pi.10^{10}/360)^4/4\pi^2\alpha^2\}} = 1.50506548\text{x}10^{-18}$ and as the speed of the quantum relativistic mechanical electron at rest in the classical frame $v_{ps} = 1.50506548 \times 10^{-18}$ c = 0.45151964 (nanometers per second)*.

The inversion speed of light is $v_{ps} = 1/c$ =3.3333... nanometers per second* in modular brane duality to define an impedance 'bubble' characterizing astrophysical 'Hill spheres' for orbital equilibrium conditions for satellites and moons in a Radius of Hill Impedance/Hubble Time as $R_{HI} = H_o/c$ as inversion displacement, which for a Universal Age of 19.12 Gy as Hubble time for a nodal Hubble constant oscillating between f_{ps} and $H_o=c/R_H$ = 58.04 (km/Mpc.s)* for $R_H = 1.59767545 \times 10^{26}$ m* and becomes R_{HI} = 19.12 Gy/c = 2.011229×10^9 m* and encompassing a 'planetary bubble radius' to approximately 5% to both the neighboring planets Venus and Mars.

This represents a magneto-monopolar mass $m_{mm} = \mu_o e^2(v_{ps}/c)^2/4\pi R_e = m_e(v_{ps}/c)^2 = (2.265221 \times 10^{-36})m_e = 2.1045107 \times 10^{-66}$ kg* for the alpha-energy $E_{\alpha\omega} = m_{mm}c^2 = hf_{\alpha\omega} = 1.8940596 \times 10^{-49}$ J* for a total frequency integral of $f_{\alpha\omega} = 2.84108945 \times 10^{-16} = \sum f_{ss} = \sum m_{ss}c^2/h = f_{\alpha\omega}/f_{ss} = 8.52326834 \times 10^{14}$ frequency self-states for the mass-frequency coupling $m_{ss} = hf_{ss}/c^2$. The classical electron rest mass $m_o = m_e$ so is reduced to the magneto-monopolar mass m_{mm} in the factor $\{v_{ps}/c\}^2$.

(*Continued in Part 2*)

Received February 22, 2019; Accepted March 31, 2019