The Monopolar Quantum Relativistic Electron

An extension of the standard model and quantum field theory

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so such particles have a contribution to their inertia (mass) due
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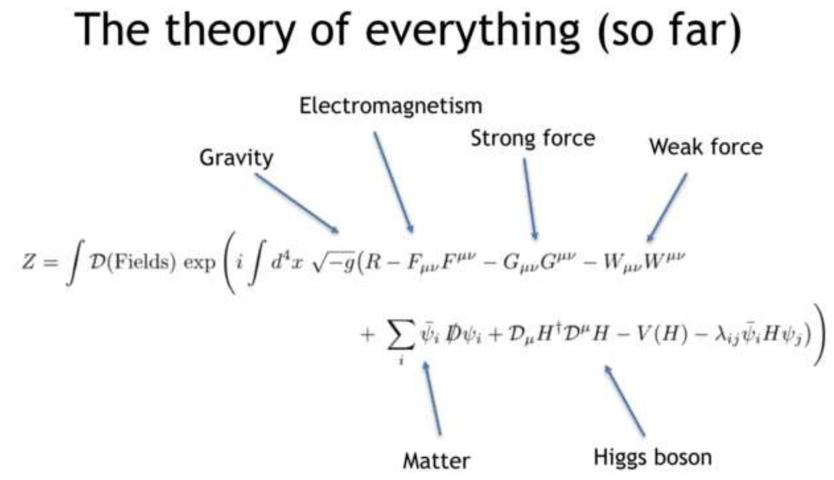
http://www.feynmanlectures.caltech.edu/II_28.html



$$Z = \int \mathcal{D}(\text{Fields}) \exp\left(i \int d^4x \sqrt{-g}\left(R - F_{\mu\nu}F^{\mu\nu} - G_{\mu\nu}G^{\mu\nu} - W_{\mu\nu}W^{\mu\nu} + \sum_i \bar{\psi}_i \not{\mathcal{D}} \psi_i + \mathcal{D}_\mu H^\dagger \mathcal{D}^\mu H - V(H) - \lambda_{ij}\bar{\psi}_i H \psi_j\right)\right)$$

As David Tong of Cambridge University concludes in his lecture at the Royal Institute :

The three ways for physics to go forwards and advance in correspondence to the experimental results obtained from the LHC:

1. Allow more time for the results of experiments to improve the Standard Model;

2. Construct better and more powerful experimental equipment to probe the universe to discover its secrets

3. Return to the old equation(s) and search for missing and hidden parts

https://youtu.be/zNVQfWC_evg

A evolution of the definition for the electron:

Classical - Classical Relativistic - Quantum Mechanical - Electron Quantum Field - Monopolar Classical Quantum Relativistic

Abstract:

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

Using the linked Feynman lecture at Caltech as a background for the quantum relative approach; 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 $\frac{1}{2}R_e.X = R_p$ 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 $E_o=\frac{1}{2}hf_o$ 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) = $\{ℵ\}^3$: X → $α\{\#\}^3$ → # → $\#^3$ → $(\#^2)^3$ → $\{(\#^2)^3\}^3$ 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 $l_o.m_o=l_o\gamma.m_o/y$ 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 $v_e|_{max} = (1 - 3.282806345 \times 10^{-17})$ 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

$m_v = m_{neutrino} = m_e.(r_{neutrino})/R_e$ and where r_v 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: $m_{vElectron}c^2 = m_v(\nu_{Tauon}^2)c^2 = m_v(\nu_{Muon}^2+\nu_{Higgs}^2)c^2 = \mu_o\{\text{Monopole GUT masses ec}\}^2 r_{ps}/4\pi R_e^2$ and where v_{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} = $0.85838052\text{x}10^{15}$ m* as a reduced classical electron radius and for a speed of the self-interactive or quantum relativistic electron of $v_{ps} = 1.576125021\text{x}10^{-17}$ 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 $v_{pse} = 1.50506548\text{x}10^{-18}$ c for its electrostatic potential, where $U_e=\int\{q^2/8\pi\varepsilon_o r^2\}dr = q^2/8\pi\varepsilon_o R_e = ½m_ec^2$ 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 an increase 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 $(2.81794032\text{x}10^{-15})$.[1.00167136 m*] = $2.82265011\text{x}10^{-15}$ m* and differing from R_e = $2.777777778\text{x}10^{-15}$ m* in a factor of (2.82265011/2.777777…) = 1.01615404.

A reduction of the classical electron radius from $R_e = 2.777777778\text{x}10^{-15}$ m* to $(2.777777778\text{x}10^{-15})$.[0.998331431 m] = $2.77314286\text{x}10^{-15}$ 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 $R_e.m_e = ke^2/c^2$ = $(2.77777778\text{x}10^{-15}).(9.29052716\text{x}10^{-31}) = 2.58070198\text{x}10^{-45}$ [mkg]* with

$R_e.m_e = ke^2/c^2 =$ $(2.81794033\text{x}10^{-15}).(9.1093826\text{x}10^{-31}) = 2.56696966\text{x}10^{-45}$ [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 $\text{Alpha}|_{mod} = 60\pi e^2/h = 60\pi(1.6021119\text{x}10^{-19})^2/(6.62607004\text{x}10^{-34}) = 1/137.047072$}
as $R_{y\infty} = \text{Alpha}^3/4\pi R_e = \text{Alpha}^2.m_ec/2h = m_ee^4/8\varepsilon_o{}^2h^3c = 11.1296973\text{x}10^6$ [1/m]* or $11.14829901\text{x}10^6$ [1/m]
defines variation in the measured CODATA Rydberg constant in a factor $10,973,731.6\text{x}(1.01615404).(137.036/137.047072)^3 = 11,148,299.0$

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 $2.22..\text{x}10^{-20}$ kg* quantum gravitationally and in a corresponding increase of a sub Planck length linearization of $r_{cplanck} = 2G_om_{ps}/c^2 = 5.4860785\text{x}10^{-47}$ 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 $m_e c^2\sqrt{\{1 + v^2\gamma^2/c^2\}} = m_e c^2\gamma = m_{ec}c^2$ 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 ∞:

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

$2U_e = m_ec^2$ 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 **(4/3)U/c²** 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 $r_{ec} = \alpha h/2\pi cm = \alpha r_{compton} = \{\mu_o e^2 c/2h\}.\{h/2\pi cm_{ec}\} = \mu_o e^2/4\pi m_{ec}$ 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:

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

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 $½R_e.X = R_p$ 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
$v_e = 1.50506548 \times 10^{-18}$ c for its electrostatic potential, where $U_e = \int\{q^2/8\pi\varepsilon_o r^2\}dr = q^2/8\pi\varepsilon_o R_e = ½m_e c^2$ 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 $U(r) = \int\{16\pi^2\rho^2 r^5/12\pi\varepsilon_o r\}\,dr = (4\pi\rho^2/3\varepsilon_o)\int r^4 dr = ⅗.e^2/4\pi\varepsilon_o R_e = ⅗.\mu_o e^2 c^2/4\pi R_e = ⅗.m_e c^2$ 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 $U(r) = ¾.m_e c^2$ for $U_e = \mu_o e^2 c^2/6\pi R_e = ½(1+⅓)m_e c^2 = ⅔m_e c^2$ 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 $m_{magnetic} + m_{electric} = m_e\{½+½(v/c)^2\} < m_e$, 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 $m_e c^2\sqrt{\{1 + v^2\gamma^2/c^2\}} = m_e c^2\gamma = m_{ec} c^2$ 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:

$B=\mu_o q.v./4\pi r^2$ 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 ∞:

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

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:

$$\textbf{Vortex-PE/V} = \textbf{VPE}_{Eps} = \textbf{ZPE}_{weyl} = 4\pi E_{ps}/\lambda_{ps}^3 = 2\alpha^2 E_{ps}\{[c/v_{ps}]^2 - 1\}/r_{ec}^3 = E_{ps}/V_{ps}$$

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

The Extension of Newton's Law in Relativistic Momentum and 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:

$$dp_{rel}/dt = d(m_o\gamma v)/dt = m_o d(\gamma v)/dt + \gamma v d(m_o)/dt = m_o d(\gamma v)/dt + \{\gamma v h/c^2\}df/dt$$

$$= m_o\gamma^3.dv/dt + \{\gamma v h/c^2\}df/dt = F_a + F_\alpha \text{ for } \gamma = 1/\sqrt{\{1 - [v/c]^2\}} \quad \text{......} \textbf{[Eq.4]}$$

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 $m_{ecompton} = m_{ec} = h\alpha/2\pi c r_e$ 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 $f_{ps}^2 = 9x10^{60}$ 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 $\lambda_e = h/m_ec = c/f_e = hc/E_e = hc/m_ec^2$; 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 $v/\sqrt{(1-[v/c]^2)} = m_{ec}c^2\lambda_{ps}^2/hr_{ec} = \alpha c\lambda_{ps}^2/2\pi r_{ec}^2$ using $m_{ec}r_{ec}$ = constant $= h\alpha/2\pi c = m_eR_e$ and $v^2/\{1-[v/c]^2\} = \{\alpha c\lambda_{ps}^2/2\pi r_{ec}^2\}^2 = Ø^2$ 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: $\{m_{electric} + m_{magnetic} + m_{emmr}\}c^2 = E_{weyl} = hf_{weyl} = E_{qbb} = m_{ps}c^2 = 1/e^*$

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

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

This sets the proportionality between monopolar emmr and electromagnetic emr in the constancy of light speed c: $v^2/(1-2\delta_{ps}) = c^2 = v_{ps}^2/\{1 + r_{ec}^4/4\pi^2\alpha^2 r_{ps}^4\}$ 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; $v_{ps} = 3.035381866\text{x}10^{-18}$ 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}.

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

Then the upper limit for $r_{ec} = r_{ps}$ and the qbb wormhole boundary is: $\delta_{ps} = ½\{1 - [c^-/v_{ps}|_{max}]^2(4\pi^2\alpha^2)/(1+4\pi^2\alpha^2)\} = ½\{1 - 1^-\} = 0^+$ for $v_{ps}|_{max}{}^2 = (4\pi^2\alpha^2c^2)/(1+4\pi^2\alpha^2)$ 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 = $1.50506540 \times 10^{-18}$ 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:
$\delta_{ps} = ½\{1 - [v/v_{ps}|_{min}]^2(4\pi^2\alpha^2)/(4\pi^2\alpha^2 + [2\pi.10^{10}/360]^4)\} = ½\{1 - [v/v_{ps}|_{min}]^2(1/(1+4\pi^2.10^{40}/\alpha^2.360^4)\}$
$= ½ - ½[v]^2(2.265221852 \times 10^{-36})/(4.5151962 \times 10^{-10}) = ½ - (2.508442326 \times 10^{-27})v^2$, 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

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

This formulation sets an upper and lower bound for $v_{electron}$ in the electron radius in the interval: $\langle R_e|_{max} .... R_{ec}|_{min} = \lambda_{ps}/2\pi = r_{ps} = r_{Weyl} = r_{wormhole} = r_{qbb} \rangle$

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:

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

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

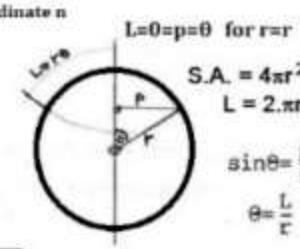
and as the self-energy $E_{ec} = m_{ec}c^2 = \alpha m_{ps}c^2 = \alpha E_{ps} = \alpha/e^*$ J* for the Weyl electron of the quantum big bang (qbb) or instanton following the inflaton of the string epoch.

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.

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

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



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. $dL=r.d\theta$

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

$$4\pi\int_0^{\pi} r^3 \sin^2\theta \, d\theta = 4\pi r^3 \int_0^{\pi} ½[1-\cos 2\theta]d\theta = 2\pi^2 r(n)^3$$ 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°

$$¼\pi\int_{-600°}^{840°} \{\sin(½[3x])-\cos(¼[3x])\}^2 dx = ¼\pi\int_{-10\pi/3}^{14\pi/3} \{\sin^2(3x/2)+\cos^2(3x/4)-2\sin(3x/2)\cos(3x/4)\} dx$$

$$= ¼\pi\int_{-600°}^{840°} \{½(1-\cos[3x])+½(1+\cos½[3x] - \sin½[9x] - \sin¼[3x]\} dx$$

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

$$= ¼\pi\left[\theta - \sin[3x]/6 + \sin½[3x]/3 - 2\cos½[9x]/9 - 2\cos½[3x]/3\right]_{-10\pi/3}^{14\pi/3} = ¼\pi(8\pi) = 2\pi^2$$

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.

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.
$V_{brane}.(df/dt)|_{max} = 2\pi^2 R_{rmp}^3.f_{ps}^2 = e^* = 1/E_{ps} = 2R_e c^2$ in a rest mass photonic or 'dark matter' radius $R_{rmp} = \sqrt[3]{\{e^*/2\pi^2 f_{ps}^2\}} = 1.411884763\text{x}10^{-20}$ m* for the nuclear electron at
$m_{fermi} = h/2\pi cR_{rmp} = 2.50500365\text{x}10^{-23}$ kg* or 14.034015 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 $e^*/\alpha = 2R_e c^2/\alpha = 2R_{compton}c^2$; $R_{rmp} = \sqrt[3]{\{e^*/2\alpha\pi^2 f_{ps}^2\}} = 7.279292496\text{x}10^{-20}$ m* for the Compton electron at an energy of $m_{compton} = h/2\pi cR_{rmp} = 4.85868164\text{x}10^{-24}$ kg* or 2.722024 TeV*

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

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

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

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

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 $m_e = \alpha m_{ps} = \alpha hf_{ps}/c^2 = \alpha h/c\lambda_{ps} = \alpha/e^*c^2 = \alpha/2R_e c^4 = h\alpha/2\pi cr_{ps} = \{60\pi he^2/2\pi hcr_{ps}\} = 30e^2/cr_{ps} = 1.62150288\text{x}10^{-22}$ 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:
$\sqrt{\alpha}.l_{planck}\sqrt{\alpha}.m_{planck} = \alpha h/2\pi c = \sqrt{\alpha}.r_{planck}\ \sqrt{\alpha}.M_{curvature} = \sqrt{\alpha}.m_{ps}\sqrt{\alpha}.r_{ps} = \alpha.m_{ps}.r_{ps} = m_{ec}.r_{ec} = m_e R_e$ 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

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

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

$M_{rmp} = m_{fermi} = h/2\pi cR_{rmp} = \{h/2\pi c\}.\{\sqrt[3]{\{2\pi^2 hf_{ps}^3\}}|_{mod}\} = \{hf_{ps}/c\}\sqrt[3]{\{2\pi^2 h/8\pi^3\}}|_{mod} = \{E_{ps}/c\}\}\sqrt[3]{\{h/4\pi\}}|_{mod}$

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

Closed Planck-String class I Finestructure Constant for monopolar mass displacement current [M] = $[ec]|_{mod} = [2\pi R.i]_{mod}$:

$M_{rmp}/m_{ebh} = 2hG_o/2\pi c^3 R_{rmp}R_e = 2L_{planck}^2/R_{rmp}R_e = 2.226669925\text{x}10^{-35} = 1/4.491011392\text{x}10^{34}$ = Order{Planck-Length}

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

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:
$m_e=h\alpha/2\pi cR_e = ke^2/R_ec^2 = \mu_oe^2/4\pi R_e$ for $\{v_{ps}/c\} = 1/\sqrt{\{1+R_e^4/4\pi^2\alpha^2r_{ps}^4\}} = 1/\sqrt{\{1+(2\pi.10^{10}/360)^4/4\pi^2\alpha^2\}} = 1.50506548\text{x}10^{-18}$ and as the speed of the quantum relativistic mechanical electron at rest in the classical frame $v_{ps} = 1.50506548\text{x}10^{-18}$ 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 $R_H = 1.59767545\text{x}10^{26}$ m* and becomes R_{HI} = 19.12 Gy/c = $2.011229\text{x}10^9$ m* and encompassing a 'planetary bubble radius' to approximately 5% to both the neighboring planets Venus and Mars.

This represents a magneto-monopolar mass $m_{mm} = \mu_oe^2(v_{ps}/c)^2/4\pi R_e = m_e(v_{ps}/c)^2 = (2.265221\text{x}10^{-36})m_e$ = $2.1045107\text{x}10^{-66}$ kg* for the alpha-energy $E_{\alpha\omega} = m_{mm}c^2 = hf_{\alpha\omega} = 1.8940596\text{x}10^{-49}$ J* for a total frequency integral of $f_{\alpha\omega} = 2.84108945\text{x}10^{-16} = \sum f_{ss} = \sum m_{ss}c^2/h = f_{\alpha\omega}/f_{ss} = 8.52326834\text{x}10^{14}$ 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 $\{v_{ps}/c\}^2$.

The Mass Distribution for the Quantum Relativistic Classical Electron

We set Constant A in $Am_{ec} = \mu_oe^2/8\pi cR_e$ for $A\beta^2 = 1/\sqrt{[1 - \beta^2]} - 1$
from: $c^2(m - m_{ec}) = \mu_oe^2v^2/8\pi R_e = m_{ec}c^2(1/\sqrt{[1-\beta^2]} - 1) = m_{ec}v^2A$ with a total QR monopolar mass $m = m_{ec}/\sqrt{(1-[v/c]^2)}$

This leads to a quadratic in ß²: $1 = (1 + A\beta^2)^2(1-\beta^2) = 1 + \beta^2(2A+A^2\beta^2-2A\beta^2-A^2\beta^4 - 1)$ and so:
$\{A^2\}\beta^4+\{2A-A^2\}\beta^2+\{1-2A\} = 0$ with solution
in roots:

$$\mathbf{\beta^2 = ([A-2] \pm \sqrt{[A^2+4A]})/2A = \{(\tfrac{1}{2}-1/A)\pm\sqrt{(\tfrac{1}{4}+1/A)}\}}$$

and

$$A = -\{1 \pm 1/\sqrt{(1-ß^2)}\}/ß^2$$

solving (in 4 roots) the quadratic $(2Aß^2+2-A)^2 = A^2 + 4A$……[Eq.8]

This defines a distribution of $ß^2 = (v/c)^2$ and $ß = v/c$ velocity ratios in $m_{ec}.Aß^2 = \mu_o e^2[v/c]^2/8\pi R_e$

The electromagnetic mass m_{ec} in the relation $m_{ec}A = ½m_e$ is then the monopolar quantum relativistic rest mass and allows correlation by the Compton constant and between its internal magnetopolar self-interaction with its external magnetic relativistic and kinetic effective electron ground state mass m_e respectively.
In particular $m_e = 2Am_{ec}$ and is m_{ec} for A=½ as the new minimization condition. In string parameters and with m_e in *units, **$m_eA=30e^2c/e^*=½m_e=4.645263574\times10^{-31}$** kg*
In terms of the superstring quantum physical theory, the expression $[ec]_{unified} = 4.81936903\times10^{-11}$ kg* or $[ec^3]_u = 2.7\times10^{16}$ GeV* as the Grand-Unification (GUT) energy scale of the magnetic monopole, which represents the first superstring class transformation from the Planck-string class I of closure to the self-dual opening of class IIB, as the magnetic monopole of the inflaton epoch.

$$E^* = E_{weyl} = E_{ps} = hf_{ps} = hc/\lambda_{ps} = m_{ps}c^2 = (m_e/2e).\sqrt{[2\pi G_o/\alpha hc]} = \{m_e/m_P\}/\{2e\sqrt{\alpha}\} = 1/2R_ec^2 = 1/e^* \text{ ......}$$
[Eq.9]

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

This implies, that for A=1, $m_{ec} = ½m_e$, where **$m_e = 9.290527155\times10^{-31}$ kg*** from particular algorithmic associations of the QR cosmogony and is related to the fine structure of the magnetic permeability constant $\mu_o = 120\pi/c = 1/\varepsilon_o c^2$, defining the classical electronic radius.
As $ß\geq0$ for all velocities v, bounded as group speed in c for which $ß^2=ß=1$, (and not de Broglie phase speed: **$v_{dB} = (h/mv_{group})(mc^2/h) = c^2/v_{group} > c$**);
a natural limit for the ß distribution is found at A = ½ and A = ∞.

The electron's rest mass m_{ec} so is binomially distributed for the ß quadratic. Its minimum value is half its effective mass m_e and as given in:

$\mu_o e^2/8\pi m_e R_e = ½m_e$ for a distributed rest-mass $m_{ec}/R_e = m_e/r_{ec}$ in A and $m_{electric} = kq^2/2R_ec^2 = \mu_o e^2/8\pi R_e = U_e/c^2 = ½m_e$ for A=½ and its maximum for A=∞ is the unity v=c for ß=1

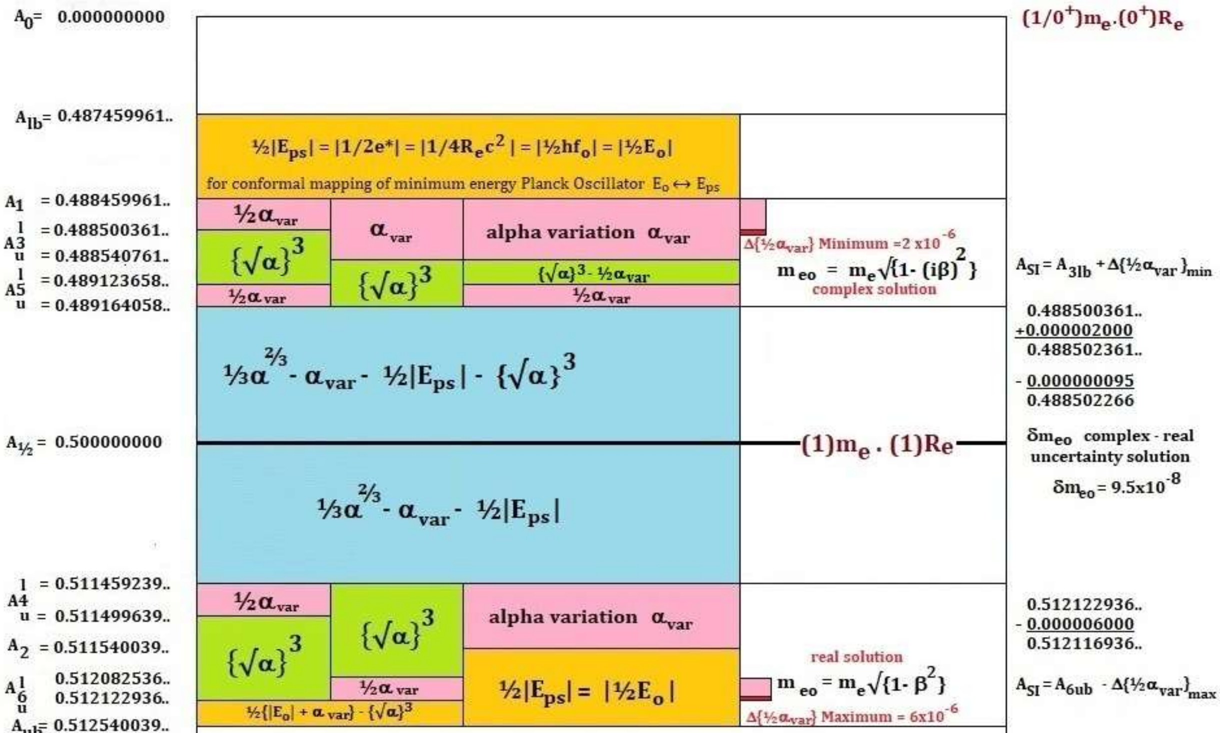
The classical rest-mass m_o of the electron and as a function of its velocity from v=0 to v=c so is itself distributed in its magnetic mass potential about its effective rest mass $m_e=\mu_o e^2/4\pi R_ec^2$ and as a function of the classical electron radius R_e.

Its minimum condition is defined by the electric potential energy in $m_o=½m_e$ for a value of A=½ with effective rest mass m_e being the rest mass for a stationary electron v=0 without magnetic inertia component.
For v=c, the mass of the electron incorporates a purely relativistic and quantum relative self interacting magnetic monopolar value for which $m_o=0$ and the effective rest mass m_e assumes the minimum rest energy for the electron at A=1 and generalised as $m_e=2Am_o$.

The classical rest mass $m_o=hf/c^2$ so decreases from its maximum value as $m_o=m_e$ to $m_o=0$ as a function of the velocity distribution and in the extension of the classical force to incorporate the rest mass differential $d(m_o) = hd(f)/c^2$ by $F_{Newton} = F_a + F_\alpha$ = F-acceleration + F-alpha as the sum of the classical Newtonian linear momentum change and the quantum mechanical angular acceleration momentum change in the self-interaction for the electron. [Eq.4]

Derivation of the electron restmass from a super-membraned Planck Oscillator

The bare electron mass m_{eo} should be found in two intervals defined in the alpha variation applied to both a complex halving part $A_{3\,upper\,bound}$ - $A_{3\,lower\,bound}$ for a minimised δ_{min} added to $\frac{1}{2}\alpha_{var}$ and a real halving part $A_{6\,lower\,bound}$ - $A_{6\,upper\,bound}$ for a maximised δ_{max} subtracted from $\frac{1}{2}\alpha var$.
To calibrate the(*)-measurement system to the SI-mensuration units within the context of the alpha variation, the electromagnetic charge-mass ratio for the electron is used with:
$\{e/m_{eo} = 1.606456344\times10^{-19}C^*/9.143202823\times10^{-31}\,kg^* = 1.756995196\times10^{11}\,C^*/kg^*\}$ and
$\{e/m_{eo} = 1.602111894\times10^{-19}C/9.10901554\times10^{-31}\,kg = 1.758820024\times10^{11}\,C/kg\}$ minimised in the alpha variation maximum.



$A_{3/5}$ = 0.600000000.. — Volume Charge for the classical electron for $U_e = \frac{3}{5}\,\mu_0 e^2/4\pi R_e \neq \mu_0 e^2/8\pi R_e = \frac{1}{2}m_e c^2 = U_e$ — $(5/6)m_e.(6/5)R_e$

$A_{3/4}$ = 0.750000000 — Surface Charge for the classical electron for $U_e = \mu_0 e^2/6\pi R_e \neq \mu_0 e^2/8\pi R_e = \frac{1}{2}m_e c^2 = U_e$ — $(2/3)m_e.(3/2)R_e$

As $\beta^2 = (1 - \{m_e/m_{ec}\}^2)$ and $(1 - \{m_{eo}/m_e\}^2)$ as a distribution of mass ratios, it can be linked to the Compton constant in $m_e/m_{ec} = r_{ec}/R_e$ in an inverse proportionality and so the unitary interval and the electron's mass and spacial extent distribution.

A conformal mapping of the minimum Planck energy as a Planck oscillator $E_o = \frac{1}{2}hf_o$ at the Planck energy of superstring class I onto the heterotic superstring HE(8x8) in the qbb energy quantum $E_{ps} = E_{weyl}$ associates and couples the unitary interval to the displacement bounce of the inflaton. We denote the E_{ps} energy quantum as $|E_{ps}|$ in its unified modular self state where $E_{ps}.e^* = 1 = E^*e^*$

The alpha variation $\alpha_{var} = 1 - (1.6021119\times10^{-19}/1.60217662\times10^{-19})^2 = 1 - 0.9999192 = 8.08\times10^{-5}$ by [Eq.10]

$A_{ub} - A_{4l} = A_{3u} - A_{lb} = 0.0010808... = 0.0010 + 0.00008078 = \frac{1}{2}|E_{ps}| + [\sim]\alpha_{var}$.

A_{1^*} = 1.000000000 — $(1/2)m_e.(2)R_e$

Minimum Planck Oscillator $\frac{1}{2}\lvert E_o\rvert \Leftrightarrow \lvert E_{ps}\rvert^* = 1/\lvert e^*\rvert$	$\frac{1}{2}\lvert E_{ps}\rvert$	$\frac{3}{4}\lvert E_{ps}\rvert$	$1\lvert E_{ps}\rvert$	$5/4\lvert E_{ps}\rvert$	$3/2\lvert E_{ps}\rvert$
Value in energy (Joules; Joules*)	1/1000	1/666⅔	1/500	1/400	1/333⅓
Value as modulated to A-interval as M-Sigma	1×10^{-3}	1.5×10^{-3}	2×10^{-3}	2.5×10^{-3}	3×10^{-3}
$\lvert E_{ps}\rvert^*/\lvert e^*\rvert$ to reunitize-renormalize $E^*e^*=1$	2×10^{-6}	3×10^{-6}	4×10^{-6}	5×10^{-6}	6×10^{-6}
⅔-value in partition interval $\frac{2}{3}m_e.\frac{3}{2}R_e$ for mean A=¾	1/2	3/4	1	5/4	3/2
Fraction of Renormalization effect	1/3	1/2	2/3	5/6	1
Value of $\Delta(\frac{1}{2}\alpha_{var})$ in $A_{6lb} - A_{6ub}$ (real) and in $A_{3ub} - A_{3lb}$ (complex)	2×10^{-6} complex min	3×10^{-6}	4×10^{-6}	5×10^{-6}	6×10^{-6} real max

The $\frac{1}{2}a_{var}$ sub-interval so is adjusted by 6×10^{-6} from $A_{6ub} - \Delta\{\frac{1}{2}\alpha_{var}\} = A_{SI}$ for β^2_{SI} for m_{eo}SI for the real solution

Electromagnetic Mass Distribution for the Quantum Relativistic Electrodynamic Electron

$A=\mu_o e^2/8\pi m_{ec}R_e$ $=ke^2/2m_{ec}R_ec^2$ $=ke^2/m_{ec}e^*$ $=ke^2\lvert E_{ps}^*\rvert/m_{ec}$	$ß^2 = 1-\{m_{eo}/m_e\}^2$ $= 1-\{m_{eo}R_e/m_{ec}r_{ec}\}^2$ $ß^2 \Rightarrow (iß)^2$ for $A < ½$	x root	y root	self-relative-QR-m_{eo} m_{eo} kg*/ m_{eo} kg $m_{eo} = m_e\sqrt{(1-ß^2)}$ $= m_e/\gamma$ $ß^2 \Rightarrow (iß)^2$ for $A < ½$	v/c	$(v_{ps}/c)^2 =$ $1/\{1+r_{ec}^4/4\pi^2\alpha^2r_{ps}^4\}$ for magnetopolar.velocity.in c (m/s)* $r_{ec} = R_e/\gamma = \sqrt{(1-ß^2)}\, R_e$ $r_{ec}/R_e = m_e/m_{ec}$ in m*	self-relative-QR-r_e
0	0 ± 0	$1/0^+$	$-1/0^+$	$[1/0^+]m_e$	$i/0^+$	algorithmic metaphysicality inflaton spacetime as complex $v_{ps} = ic = ci$	$[\propto]$ R_e
$1-½\sqrt{2} =$ 0.292893218		$-1 = i^2$ x-root is complex	$1+½\sqrt{2} =$ -4.82842714 y-root is complex	0 0	i	1 c 1 0 0 R_e	$(2/0^+)R_e$
$\{1-½\sqrt{2}\}+O(10^{-17})$ $= 0.292893218^+$ $-\{1\pm1/\sqrt{[1-ß^2]}\}/ß^2$ $\sim -1\{1\pm1+½ß^2\}/ß^2$	$ß_{complexImage}^2 = -2.914213561.......$ $\pm$ 1.91421356200...	-0.999999999...... $\{i.m_e/\alpha m_{ps}\}^2 =$ $-1+3.282806345\text{x}10^{-17}$	-4.82842714^+	0^+ 0^+	i^-	$v_{ps}= 2\pi\alpha c/\sqrt{\{1+4\pi^2\alpha^2\}}$ =0.045798805 ic 13,739,641.79 [m/s]* $r_{ec}=r_{ps}=180R_e/(\pi 10^{10})$ $1.591549431\text{x}10^{-23}$ $5.729577953\text{x}10^{-9}$ R_e	349,065,850.6 R_e
$A_{lb} =$ 0.487459961	$ß_{lb}^2 =$ -1.55145054 $\pm$ 1.517053242	-0.034397297	-3.068503782	$9.129344446\text{x}10^{-31}$ $9.095208981\text{x}10^{-31}$	0.185i	$1.558679858\text{x}10^{-18}$ ic $4.676039573\text{x}10^{-10}$ $2.729585632\text{x}10^{-15}$ 0.982650855 R_e	1.018 R_e
$A_1 =$ 0.488459961.	$ß_1^2 =$	-0.031582303	-3.062919108	$9.142642017\text{x}10^{-31}$	0.177i	$1.554149091\text{x}10^{-18}$ ic $4.662447273\text{x}10^{-10}$	1.016 R_e

	-1.547250706 ± 1.515668402			9.108456831x10^{-31}		2.733561478x10^{-15} 0.984082159 R_e	
A_{3l} = 0.488500361	$ß_{3l}^2$ = -1.547081394 ± 1.515612547	-0.031468847	-3.062693941	9.143177565x10^{-31} 9.108990376x10^{-31}	0.177i	1.55396695x10^{-18} ic 4.661900851x10^{-10} 2.733721674x10^{-15} 0.984139803 R_e	1.016 R_e
A_{SI} = complex 0.488502266 [e/m]= 1.758820024 x10^{-11} C/kg with α_{var} A-root complex=real	**$ß_{SI}^2$ = -1.54707341 ± 1.515609914**	**-0.031463495**	**-3.062683324**	**9.14320282x10^{-31} 9.109015537x10^{-31} δm_{eo} =- 9.5x10^{-8} uncertainty solution complex - real**	**0.177i**	**1.553958288x10^{-18} ic 4.661874865x10^{-10} 2.733729293x10^{-15} 0.984142545 R_e**	**1.016 R_e**
A_{SI} = complex 0.488502361 [e/m]= 1.758820024 x10^{-11} C/kg with α_{var} min	**$ß_{SI}^2$ = -1.547073013 ± 1.515609783**	**-0.03146323**	**-3.062682796**	**9.143204074x10^{-31} 9.109016786x10^{-31}**	**0.177i**	**1.553957936x10^{-18} ic 4.661873808x10^{-10} 2.733729603x10^{-15} 0.984142657 R_e**	**1.016 R_e**
A_{3u} = 0.488540761	$ß_{3u}^2$ = -1.54691211 ± 1.5155567	-0.03135541	-3.06246881	9.143712983x10^{-31} 9.109523792x10^{-31}	0.177i	1.553784965x10^{-18} ic 4.661354894x10^{-10} 2.733881762x10^{-15} 0.984197434 R_e	1.016 R_e
A_{5l} = 0.489123658	$ß^{5l2}$ = -1.54447277 ± 1.514751719	-0.029721051	-3.059224489	9.151423661x10^{-31} 9.117205639x10^{-31}	0.172i	1.551167736x10^{-18} ic 4.653503207x10^{-10} 2.73618718x10^{-15} 0.985027384 R_e	1.015 R_e
A_{5u} = 0.489164058	$ß_{5u}^2$ = -1.544303917 ± 1.514695982	-0.029607935	-3.058999899	9.151957085x10^{-31} 9.117737069x10^{-31}	0.172i	1.550986921x10^{-18} ic 4.652960762x10^{-10} 2.736346668x10^{-15} 0.9850848 R_e	1.015 R_e
½	**-3/2 ± 3/2**	**0.0**	**-3**	**$m_{eo} = m_e = m_{ec}$** 9.290527148x10^{-31} 9.255789006x10^{-31}	**0**	**1.5050654x10^{-18} c 2.7777777...x10^{-15} = 1.00 R_e**	**R_e**
0.50078795	$ß_{realimage}^2$ = -1.496853158 ± 1.498950686	0.002097530539 0.00209752801	-2.995803844	9.280778463x10^{-31} 9.246076772x10^{-31}	0.0458	1.508228953x10^{-18} c 4.524686858x10^{-10} 2.774863014x10^{-15} 0.998950685 R_e	1.001576 R_e

A_{4l} = 0.511459239	**$ß_{4l}^2$** = -1.455190021 ± 1.484988222	0.029798201	-2.940178243	9.151059822x10^{-31} 9.1163843161x10^{-31}	0.173	1.551286282x10^{-18} c 2.73608263x10^{-15} = 0.98498975 R_e	1.015 R_e
A_{4u} = 0.511499639	**$ß_{4u}^2$** = -1.455035593 ± 1.484936225	0.029900632	-2.939971818	9.15057674x10^{-31} 9.116361885x10^{-31}	0.173	1.55145488x10^{-18} c 2.73593396x10^{-15} = 0.98493623 R_e	1.015 R_e
A_2 = 0.511540039	**$ß_2^2$** = -1.45488119 ± 1.484884234	0.030003044	-2.939765424	9.150093721x10^{-31} 9.115880672x10^{-31}	0.1732.86	1.55161873x10^{-18} c 2.7357895x10^{-15} = 0.98488423 R_e	1.015 R_e
A_{6l} = 0.512082536	**$ß_{6l}^2$** = -1.452810201 ± 1.484186714	0.031376513	-2.936996915	9.143613382x10^{-31} 9.109424564x10^{-31}	0.177	1.553818818x10^{-18} c 2.73385198x10^{-15} = 0.98418671 R_e	1.016 R_e
A_{SI} = real 0.512116936 [e/m]= 1.758820024 x10^{-11} C/kg with α_{var} max	**$ß_{SI}^2$ = -1.452679026 ± 1.484142522**	**0.031463496**	**-2.936821548**	**[1.02/1.02]m_e√(1-x) 9.14320282x10^{-31} 9.109015537x10^{-31}**	**0.177**	**1.553958371x10^{-18} c 2.73372922x10^{-15} = 0.98414252 R_e**	**1.016 R_e**
A_{6u} = 0.512122936	**$ß_{6u}^2$** = -1.452656072 ± 1.484134815	0.031478742	-2.936790887	9.143130852x10^{-31} 9.108943838x10^{-31}	0.177	1.553982826x10^{-18} c 2.73370771x10^{-15} = 0.98413478 R_e	1.016 R_e
A_{ub} = 0.512540039	**$ß_{ub}^2$** = -1.451067085 ± 1.483599368	0.032532283	-2.934666453	9.138156632x10^{-31} 9.103988218x10^{-31}	0.180	1.555675057x10^{-18} c 2.73222047x10^{-15} = 0.98359937 R_e	1.017 R_e
4(⅔√3-1) 0.618802153	-1.116025404 ±1.366025404 -¼(1+2√3)±½√(4+2√3)	¼	-2.4820500808 -(¾+√3)	[1.24/1.24]m_e√(1-x) 8.045832525x10^{-31} 8.015748411x10^{-31}	0.500	2.006753867x10^{-18} c v_{ps} = 6.020261601x10^{-9} 2.405626121x10^{-15} = 0.866025403 R_e	1.238 R_e
¾ Mean: ½{½+1} ∑surface charge	-⅚ ± √(19/12)	0.424972405	-2.09164	**[3/2]⅔m_e√(1-x)** 7.045060062x10^{-31} 7.018717929x10^{-31}	0.652	2.617379438x10^{-18} c v_{ps} = 7.852138314x10^{-9}	3R_e/2

						2.10640483x10^{-15} = 0.75830574 R_e	
⅚ ∑Volume charge	-7/10 ± √(29/20)	0.504159457	- 1.90415945 8	**[5/3]⅗m_e√(1-x)** 6.542012566x10 -31 6.517551374x10 -31	**0.710**	3.035381866x10^{-18} c v_{ps} = 9.106145598x10^{-10} 1.9559985x10^{-15} = 0.70415946 R_e	5R_e/3
1	**-½ ± ½√(5)**	**0.618033988**	**- 1.61803398 8**	**[2]½m_e√(1-x) 5.741861551x10 -31 5.720392198x10 -31**	**0.786**	**3.94031237x10^{-18} c v_{ps} = 1.182093711x10^{-9} 1.71676108x10^{-15} = 0.61803399 R_e**	**2 R_e**
1+½√2 = 1.707106781		**0.828427125** **x-root is real**	**-1 = i^2** **y-root is complex**	**[3.41/3.41]m_e√(1-x) 3.848262343x10 -31 3.833873334x10 -31**	**0.910**	**8.77216401x10^{-18} c 2.631649203x10^{-9} 1.150593228x10^{-15} 0.414213562 R_e =(√2 - 1) R_e**	**3.41421356 2 R_e = (2+√2) R_e**
2	0 ± ½√(3)	0.866025403	- 0.86602540 3	**[4]¼m_e√(1-x)** 3.400568951x10 -31 3.387853908x10 -31	0.931	1.123396092x10^{-17} c 3.370188275x10^{-9} 1.01673724x10^{-15} = 0.36602540 R_e	4 R_e
2.47213603	**0.095491515 ± 0.809016986**	**0.904508501**	**- 0.71352554 71**	**[4.94/4.94]m_e√(1-x) 2.870930718x10 -31 2.860196042x10 -31**	**0.951**	**1.576125021x10^{-17} c 4.728375064x10^{-9} R_{proton} = 0.85838052x10^{-15} = 0.309016987 R_e**	**4.94427206 R_e**
3	⅙ ± √(7/12)	0.930429282	- 0.59719594 9	**[6]⅙m_e√(1-x)** 2.450493743x10 -31 2.44133112x10^{-31}	0.965	2.163360455x10^{-17} c 6.490081364x10^{-9} 7.32673935x10^{-16} = 0.26376262 R_e	6 R_e
4	¼ ± √(½)	0.957106781	- 0.45710678 1	**[8]⅛m_e√(1-x)** 1.924131173x10 -31 1.916936668x10 -31	0.978	3.50886558x10^{-17} c 1.052659674x10^{-8} 5.75296616x10^{-16} = 0.20710678 R_e	8 R_e

174,532,925.3 -{1±1/√[1-ß²]}/ß² ~-1{1±1+½ß²}/ß²	**0.499999...4 ± 0.500000...5** ~ $½^- ± ½^+$	**0.999999999...... $\{m_e/\alpha m_{ps}\}^2$ = 1-3.282806345x10^{-17}**	**-0.000000...1**	**[#/#]m_e√(1-x) 5.323079946x10^{-39} 5.303176457x10^{-39} minimum mass (electron-neutrino) 0.00297104794 eV* $m_{ve} = mv_\tau^2$ = 0. 002982..eV***	**0.999**	**qbb boundary of physicality 0.045798805 c 13,739,641.79 $r_{ec} = r_{ps} = (m_e/\alpha m_{ps})R_e$ 1.59154943x10^{-23} = 5.7296x10^{-9} R_e**	**349,065,850.6 R_e**
∞	$½^- ± ½^+$	**1^-**	**0^-**	**[∞^-]$0^+$$m_e$√(1-x)=$m_e$ m_{eo}=0+**	**1^-**	**algorithmic metaphysicality inflaton spacetime as complex v_{ps} = ic = ci**	[∞] **R_e**

The X-root is always positive in an interval from 0 to 1 and the Y-root is always negative in the interval from -3 to 0.

For A=∞: $ß^2=½^-±½^+$ for roots $x=1^-$ and $y=0^-$; for v=c with $U_m = (½v^2)\mu_o e^2/8\pi R_e = (½v^2)\mu_o e^2/4\pi R_e = ½m_e c^2 = m_{magnetic}c^2 = m_{electric}c^2$ and $m_o = 0m_e$

$Aß^2 = ([1-ß^2]^{-½}-1) = 1+½ß^2-3ß^4/8+5ß^6/16 -35ß^8/128+...-1$

The Binomial Identity gives the limit of A=½ in: $A=½ - ß^2\{3/8 - 5ß^2/16 + 35ß^4/128 -...\}$ and as the non-relativistic low velocity approximation of $E=mc^2$ as $KE=½m_o v^2$.

Letting $ß^2$=n, we obtain the Feynman-Summation or Path-Integral for dimensionless cycle time $n = H_o t = ct/R_{Hubble}$ with H_o=dn/dt in the UFoQR for $1 = (1-ß^2)(1+ß^2)^2$ as $ß^4+ß^2-1=0$ for T(n) = n(n+1)= 1.

The bare rest mass of the electron in the Coulombic charge quantum and the mensuration calibration in the alpha fine structure

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 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, letting $\{1 - ß^2\} = \{\sqrt{\alpha}\}^3 = 6.232974608...x10^{-4}$, 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: $m_{electric} + m_{magnetic} + \delta m_{monopolic} = m_{ec}\{½+½[v/c]^2\} + \delta_{ps}m_{ec} = m_{ec}$ with $m_e c^2\sqrt{\{1 + v^2\gamma^2/c^2\}} = m_e c^2\gamma = m_{ec}c^2$ 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 an asymptotically constant strong interaction constant as a function of alpha.

In the SI measurement system Planck's constant h = $6.62607004x10^{-34}$ Js and the speed of light is c = $2.99792458x10^{-8}$ m/s and the electron charge are e=$1.60217662x10^{-19}$ C for a bare electron mass of $9.10938356x10^{-31}$ kg.

In a mensuration system in which c would be precisely $3x10^8$ (m/s)*; the following conversions between the SI-system and the *-system are applied in this paper.

Furthermore, there exists one fundamental constant in the magnetic permeability constant μ_o = $4\pi x10^{-7}$ H/m which becomes numerically equal in the Maxwell constant $\mu_o = 1/\varepsilon_o c^2$ in an applied fine structure $\mu_o.\varepsilon_o = \{120\pi/c\}.\{1/120\pi c\} = 1/c^2$ (s/m)^2; (s/m)^2*. Subsequently in the calculation of alpha, the speed conversion must be incorporated for unitary consistency.

Alpha remains constant for a cosmology descriptive of a non-accelerating cosmology; but will result in a change in the electric charge quantum in a cosmology, which measures an accelerated spacial expansion, which can however be the result of a self-intersection of the light path for particular cosmological redshift intervals in an oscillating cosmology.

{https://cosmosdawn.net/index.php/en...-alpha-variation-and-an-accelerating-universe}

Here a particular alpha variation reduces the SI-measurement for the square of the charge quantum e in a factor of $(1.6021119x10^{-19}/1.60217662x10^{-19})^2$ = 0.99991921...for a calibrated:

alpha variation $\alpha_{var} = 1 - (1.6021119x10^{-19}/1.60217662x10^{-19})^2 = 1 - 0.9999192 = 8.08x10^{-5}$.........**[Eq.10]**

Alpha $\alpha = \mu_o ce^2/2h = 2\pi.(2.99792458)(1.6021119)^2x10^{-37}/(6.62607004x10^{-34}) = 60\pi e^2/h = 7.2967696x10^{-3} = 1/137.047072$

{s}	=	1.000978394	{s*}	=	0.999022562	{s}
{m}	=	1.001671357	{m*}	=	0.998331431	{m}

{kg}	=	1.003753126	{kg*]	=	0.996260907	{kg}
{C}	=	1.002711702	{C*}	=	0.997295631	{C}
{J}	=	1.005143377	{J*}	=	0.994882942	{J}
{eV}	=	1.00246560	{eV*}	=	0.997540464	{eV}
{K}		0.99465337	{K*}	=	1.00537537	{K}

From the unification polynomial $U(x) = x^4 + 2x^3 - x^2 - 2x + 1 = 0$ and derivative $U'(x) = 4x^3 + 6x^2 - 2x - 2$ with minimum roots at $x_1 = X$ and $x_2 = -(X+1) = Y$ and maximum root at $x_3 = ½$ we form the factor distribution (1-X)(X)(1+X)(2+X) = 0 and form a unification proportionality:

SNI:EMI:WNI:GI = [Strong Nuclear Interaction #]:[Electromagnetic Interaction $\#^3$]:[Weak Interaction $\#^{18}$]:[Gravitational Interaction $\#^{54}$]
under the Grand Unification transformation of X ⇔alpha α

$$\mathbf{X \Leftrightarrow \alpha \text{ in } \aleph(\text{Transformation}) = \{\aleph\}^3 : X \rightarrow \alpha\{\#\}^3 \rightarrow \# \rightarrow \#^3 \rightarrow (\#^2)^3 \rightarrow \{(\#^2)^3\}^3} \text{..........}\mathbf{[Eq.11]}$$

This redefines the Interaction proportion as: SNI:EMI:WNI:GI = $[\#]:[\#^3]:[\#^{18}]:[\#^{54}]$ = [1X]:[X]:[1+X]:[2+X] for the X Alpha Unification, which is of course indicated in the unitary interval from
A = 0 to A =1 in the $ß^2$ distribution for the electron mass.

SNI:EMI	[1-X]:[X]	X	X	$\#:\#^3$ $\#^{-2}$	$\alpha^{-2/3}$ $1/\sqrt[3]{\alpha^2}$	Invariant Upper Bound	X-Boson
SNI:WNI	[1-X]:[1+X]	[2X-1]	X^3	$\#:\#^{18}$ $\#^{-17}$	$\alpha^{-1/3(17)}$ $1/\sqrt[3]{\alpha^{17}}$		
SNI:GI	[1-X]:[2+X]	$[1-X]^2$	X^4	$\#:\#^{54}$ $\#^{-53}$	$\alpha^{-1/3(53)}$		

					$1/\sqrt[3]{\alpha^{53}}$		
EMI:WNI	[X]:[1+X]	[1-X]	X^2	$\#^3:\#^{18}$ $\#^{-15}$	α^{-5} $1/\sqrt[3]{\alpha^{15}}$		
EMI:GI	[X]:[2+X]	[2X-1]	X^3	$\#^3:\#^{54}$ $\#^{-51}$	α^{-17} $1/\sqrt[3]{\alpha^{51}}$		
WNI:GI	[1+X]:[2+X]		X	$\#^{18}:\#^{54}$ $\#^{-36}$	α^{-12} $1/\sqrt[3]{\alpha^{36}}$	Invariant Lower Bound	L-Boson

For the unitary interval at A=½ the Compton constant defines $m_e.R_e$, but at A=1, the constancy becomes ½$m_e.2R_e$ and at the average value at A=¾ it is ⅔$m_e.(3/2)R_e$.
This crystallizes the multiplying (4/3) factor calculated from the integration of the volume element to calculate the electromagnetic mass in the Feynman lecture and revisited further on in this paper. if the electrostatic potential energy is proportional to half the electron mass is changed by a factor of (4/3), then the full electron mass will be modified to ⅔ of its value.
Using the $ß^2$ velocity distribution, one can see this (4/3) factor in the electromagnetic mass calculation to be the average between the two A-values as ½(½+1) = ¾ for a corrected electron mass of ⅔m_e and for a surface distribution for the electron.
The problem with the electromagnetic mass so becomes an apparent 'missing mass' in its distribution between the electric- and magnetic external fields and the magnetopolar self interaction fields as indicated in this paper.

In the diagram above the mass of the electron is distributed as m_{ec} in the unitary interval applied to the Compton constant and where exactly half of it can be considered imaginary or complex from A=0 to A=½. The mass of the electron at A=0 is however simply half of its effective mass m_e, which is realised at the half way point at A=½ as the new origin of the electron's electrostatic energy without velocity in the absence of an external magnetic field. We have seen however, that the electrostatic electron carries a minimum eigen-velocity and so magnetopolar self-energy, calculated as $v_{ps} = 1.50506548\text{x}10^{-18}$ c and manifesting not as a dynamic external motion, but as $f_{\alpha\omega} = 2.84108945\text{x}10^{-16} = \sum f_{ss} = \sum m_{ss}c^2/h = f_{\alpha\omega}/f_{ss} = 8.52326834\text{x}10^{14}$ mass- or frequency self states.

But how can the bare electron mass be obtained from first principles?
This bare electron rest mass must be less, than the effective mass m_e at A=½ and more than half of m_e at the absolute 0 state at A=0.
We know this discrepancy to be ⅓m_e on mathematical grounds and so one might relate the Compton constant in the ⅓R_e to set the ⅓m_e interval as being centered on A=½ for two bounds A_1 and A_2 in the 'complex' region where $ß^2$ is negative and where $ß^2$ is positive respectively. To approximate the two bounds, we shall define the sought interval for the bare electron mass m_{eo} as a function of alpha and as a function of the classical electron radius.

The monopolar energy is defined in the Weyl energy of the qbb and in $E_{ps} = 1/e^* = 1/2R_ec^2$ and using the modular string duality we use the magneto charge quantum not as inverse energy E_{weyl}, but as energy to set $m^*= E^*/c^2 = 2R_e^*$ and so the unification factor for the electron mass m_{ec} at A=1.
As can be seen in the diagram, the alpha variation becomes a delta energy added to the magneto charge quantum to finetune the electron rest mass interval.
The elementary interaction ratios can be applied to the quantum nature of the electron in the form of the original superstring transforms (discussed further later in this paper) and apply here in the EMI/SNI = $\alpha^{⅔}$ to set the electron's interaction relative to the SNI and a decreasing size of the electron centered at the R_e scale decreasing towards the nuclear center with increasing speed in the 'real interval'.

As we require ⅔m_e as the average in the surface charge interval from A=½ to A=1 we define the sought bounding interval for the bare electron mass as ⅓$\alpha^{⅔}$+ ⅓$\alpha^{⅔}$ = ⅔$\alpha^{⅔}$.
The lower bound for m_{eo} so is A_{lb} = ½ - ⅓$\alpha^{⅔}$ = 0.487459961.... and the upper bound becomes A_{ub} = ½ + ⅓$\alpha^{⅔}$ = 0.512540039... for a total A-interval of $A_{lb} + A_{ub}$ = 0.0025080078... = 2(0.012540039).
We so can define $m_e(m_{eo};ß^2) = m_e/\sqrt{(1 - ß^2)} = m_{eo}/(1 - ß^2)$ for any m_{eo} in the interval defined in the $ß^2$ distribution and [Eq.8] with the effective rest mass $m_e = 9.290527148\text{x}10^{-31}$ kg* in * units.

$ß_{lb}^2$ (0.487459961...) = -1.55145054... + 1.517053242... = -0.034397297... (equilibrium in x-root) for $m_{eo} = m_e\sqrt{(1 - i^2ß^2)} = 9.129344446\text{x}10^{-31}$ kg* for $9.095208981\text{x}10^{-31}$ kg.
$ß_o^2$ (0.5000000000) = -1.50000000... + 1.5000000000... = 0.000000000... (complex in x-root) for $m_{eo} = m_e\sqrt{(1 - 0)} = 9.290527148\text{x}10^{-31}$ kg* for $9.255789006\text{x}10^{-31}$ kg.
$ß_{ub}^2$ (0.512540039...) = -1.451067085... + 1.483599368... = 0.032532283... (real in x-root) for $m_{eo} = m_e\sqrt{(1 - ß^2)} = 9.138156632\text{x}10^{-31}$ kg* for $9.103988218\text{x}10^{-31}$ kg.

So we know that the bare electron mass will be near 0.982651 of the real m_e in the complex region of the unitary interval.
To correlate the complex solution for m_{eo} with the real solution for m_{eo}, we are required to shorten the interval A_{ub} - Al_b in a symmetry for the electron mass. This will result in a complex solution

in the complementary x-root. We can ignore the y-roots for $ß^2$, as they are all negative in view of the x-root always being negative in the described interval.

A reasonable approach is to remain in the described interval and next utilize the Compton constant in the form of the magneto charge quantum as the inverse of the Weyl wormhole energy, also noting the scale of magnitude of the $1/e^* = 1/2R_ec^2$ being of the same order as alpha as $\alpha/E_{weyl} = \alpha e^* = 3.648381483$ or $e^* = 0.274094144.\alpha$.
Additionally, a conformal mapping of the minimum Planck energy as a Planck oscillator $E_o = ½hf_o$ at the Planck energy of superstring class I onto the heterotic superstring HE(8x8) in the qbb energy quantum $E_{ps} = E_{weyl}$ associates and couples the unitary interval to the displacement bounce of the inflaton.
We denote the E_{ps} energy quantum as $|E_{ps}|$ in its unified modular self-state where $E_{ps}.e^* = 1 = E^*e^*$

As $ß^2 = (1 - \{m_e/m_{ec}\}^2)$ and $(1 - \{m_{eo}/m_e\}^2)$ as a distribution of mass ratios, it can be linked to the Compton constant in $m_e/m_{ec} = r_{ec}/R_e$ in an inverse proportionality and so the unitary interval and the electron's mass and spacial extent distribution.

We set the interval $A_2 = A_{ub} - ½|E_{ps}| = 0.512540039... - 0.001 = 0.511540039...$ and the conjugate interval as $A_1 = A_{lb} + ½|E_{ps}| = 0.487459961... + 0.001$
$= 0.488459961...$ $ß_1^2\ (0.488459961...) = -1.547250706... + 1.515668402... = -0.031582303...$ (complex in x-root) for $m_{eo} = m_e\sqrt{(1 - i^2ß^2)} = 9.142642017\text{x}10^{-31}$ kg*
for $9.108456831\text{x}10^{-31}$ kg. $ß_2^2\ (0.511540039...) = -1.45488119... + 1.484884234... = 0.030003044...$(real in x-root) for $m_{eo} = m_e\sqrt{(1 - ß^2)} = 9.150093721\text{x}10^{-31}$ kg* for $9.115880672\text{x}10^{-31}$ kg.

For the final interval fine structure we apply the alpha variation, also noting that the excess of the original upper and lower bounds is near the fractional divergent parts.

$\{A_{ub} - ½\} + \{½ - A_{lb}\} = 2(0.012540039) = 0.025080078 = 2(⅓\alpha^{⅔}) = 1/40 + 0.000080078... = ½|E_{ps}|(25) + 0.000080078... = ½|E_{ps}|(25) + [\sim]\alpha_{var}$ in $7.22\text{x}10^{-7}$ parts.
$A_{ub} - A_{4l} = A_{3u} - A_{lb} = 0.0010808... = 0.001 + 0.0000080078 = ½|E_{ps}| + [\sim]\alpha_{var}$. $A_{ub} = ½ + ⅓\alpha^{⅔} = 0.512540039... = 0.51254 + 0.000000039...$ and $A_{lb} = 0.487459961... = 1 - 0.5124 - 0.00000039...$

The alpha variation $\alpha_{var} = 1 - (1.6021119\text{x}10^{-19}/1.60217662\text{x}10^{-19})^2 = 1 - 0.9999192 = 8.08\text{x}10^{-5}$ by [Eq.10]

$A_{3l} = A_1 + ½\alpha_{var} = 0.488459961... + 0.0000404... = 0.488500361...$ and its image is $A_{4u} = A_2 - ½\alpha_{var} = 0.511540039... - 0.0000404... = 0.511499639...$
$A_{3u} = A_1 + \alpha_{var} = 0.488459961... + 0.0000808... = 0.488540761...$ and its image is $A_{4l} = A_2 - \alpha_{var} = 0.511540039... - 0.0000808... = 0.511459239...$ $ß_{3l}^2\ (0.488500361...)$
$= -1.547081394... + 1.515612547... = -0.031468846...$ (complex in x-root) for $m_{eo} = m_e\sqrt{(1 - i^2ß^2)} = 9.143177565\text{x}10^{-31}$ kg* for $9.108990376\text{x}10^{-31}$ kg.

$ß_{3u}^2$ (0.488540761...) = -1.54691211... + 1.5155567... = -0.03135541... (complex in x-root) for $m_{eo} = m_e\sqrt{(1 - i^2ß^2)}$ = 9.143712983x10^{-31} kg* for 9.109523792x10^{-31} kg.
$ß_{4u}^2$ (0.511499639...) = -1.455035593... + 1.484936225... = 0.029900632...(real in x-root) for $m_{eo} = m_e\sqrt{(1 - ß^2)}$ = 9.15057674x10^{-31} kg* for 9.116361885x10^{-31} kg.
$ß_{4l}^2$ (0.511459239...) = -1.455190021... + 1.484988222... = 0.029798201...(real in x-root) for $m_{eo} = m_e\sqrt{(1 - ß^2)}$ = 9.151059822x10^{-31} kg* for 9.1163843161x10^{-31} kg.

The bare electron mass m_{eo} should be found in two intervals defined in the alpha variation applied to both a complex halving part $A_{3\ upper\ bound} - A_{3\ lower\ bound}$ for a minimized δ_{min} added to $\frac{1}{2}\alpha_{var}$ and a real halving part $A_{6\ lower\ bound} - A_{6\ upper\ bound}$ for a maximized δ_{max} subtracted from $\frac{1}{2}\alpha_{var}$.

To calibrate the units of the (*) mensuration system with the SI-measurement system, the mass charge ratio for the electron and assuming a unit defined consistency, is applied in:
{e/m_{eo} = 1.606456344x10^{-19} C*/9.143202823x10^{-31} kg* = 1.756995196x10^{11} C*/kg* } and {e/m_{eo} = 1.602111894x10^{-19} C/9.10901554x10^{-31} kg = 1.758820024x10^{11} C/kg } minimized in the alpha variation maximum.

There is a deviation in the symmetry between the complex solution and the real solution for the bare electron mass and this deviation mirrors the original bounce of the Planck length and the minimum Planck Oscillator $|E_o = E_{ps} = E_{weyl}|$ at the cosmogenesis of the inflaton. We recall the supermembrane displacement transformation of [Eq.9]:

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

We so apply this bounce of the original definition for the minimum displacement to our described interval in adjusting the alpha variation interval using [Eq.11]:
X ⇔ α in ℵ(Transformation) = $\{ℵ\}^3 : X \rightarrow \alpha\{\#\}^3 \rightarrow \# \rightarrow \#^3 \rightarrow (\#^2)^3 \rightarrow \{(\#^2)^3\}^3$ by the factor $(\sqrt{\alpha})^3$ and so setting the cosmogenic displacement bounce of the qbb as being proportional to our lower and upper bounded A valued interval for the $ß^2$ distribution.

$$\tfrac{2}{3}\alpha^{2/3} \propto (\sqrt{\alpha})^3 \text{ in } \tfrac{2}{3}\alpha^{2/3} \approx 1/40 + \alpha_{var} = \{\tfrac{2}{3}\alpha^{-5/6}\}(\sqrt{\alpha})^3$$

for proportionality constant $\{\tfrac{2}{3}\alpha^{-5/6}\}$ = 1/{1/40 - 1.477074222x10^{-4}} = 1/{1/40 - 1.828.α_{var}}…......

[Eq.12]

For $(\sqrt{\alpha})^3$ = 6.232974608x10^{-4} then:
$A_{5l} = A_{3l}$ + 6.232974608x10^{-4} = 0.488500361...+ 6.232974608x10^{-4} = 0.489123658...
$A_{5u} = A_{3u}$ + 6.232974608x10^{-4} = 0.488540761...+ 6.232974608x10^{-4} = 0.489164058...

$A_{6u} = A_{4u} + 6.232974608x10^{-4} = 0.511499639...+ 6.232974608x10^{-4} = 0.512122936...$
$A_{6l} = A_{4l} + 6.232974608x10^{-4} = 0.511459239...+ 6.232974608x10^{-4} = 0.512082536...$

for the $ß^2$ solutions:

$ß_{5l}^2$ (0.489123658...) = -1.54447277... + 1.514751719... = -0.029721051... (complex in x-root) for $m_{eo} = m_e\sqrt{(1 - i^2ß^2)} = 9.151423661x10^{-31}$ kg* for $9.117205639x10^{-31}$ kg.
$ß_{5u}^2$ (0.489164058...) = -1.544303917... + 1.514695982... = -0.029607935... (complex in x-root) for $m_{eo} = m_e\sqrt{(1 - i^2ß^2)} = 9.151957085x10^{-31}$ kg* for $9.117737069x10^{-31}$ kg.
$ß_{6u}^2$ (0.512122936...) = -1.452656072... + 1.484134815... = 0.031478742...(real in x-root) for $m_{eo} = m_e\sqrt{(1 - ß^2)} = 9.143130852x10^{-31}$ kg* for $9.108943838x10^{-31}$ kg.
$ß_{6l}^2$ (0.512082536...) = -1.452810201... + 1.484186714... = 0.031376512...(real in x-root) for $m_{eo} = m_e\sqrt{(1 - ß^2)} = 9.143613382x10^{-31}$ kg* for $9.109424564x10^{-31}$ kg.

The real solution for the bare electron mass so converges at A = 0.512082536... = 1 - 0.487917464 to its complex mirror solution at A = 0.488540761... = 1 - 0.511459239... for a $\Delta A = (\sqrt{\alpha})^3 = 6.232974608x10^{-4}$ to indicate the nature of the electron mass as a function of the cosmogenesis from definiton to inflaton to instanton to continuon.

The M-Sigma conformal mapping onto $\{m_{eo}/m_e\}^2$ in the $ß^2$ distribution

As the $ß^2$ distribution is bounded in $\{A_{ub} - A_{lb} = ⅔\alpha^{⅔}\}$ as a sub-unitary interval in a smaller subinterval of $½\alpha_{var}$; the SI-CODATA value for the rest mass of the electron is derived from first inflaton-based principles in a conformal mapping of the M-Sigma relation applied to the Black Hole Mass to Galactic Bulge ratio for the alpha bound.

Minimum Planck Oscillator $½\|E_o\| \Leftrightarrow \|E_{ps}\|^* = 1/\|e^*\|$	$½\|E_{ps}\|$	$¾\|E_{ps}\|$	$1\|E_{ps}\|$	$5/4\|E_{ps}\|$	$3/2\|E_{ps}\|$
Value in energy (Joules; Joules*)	1/1000	1/666⅔	1/500	1/400	1/333⅓
Value as modulated to A-interval as M-Sigma	$1x10^{-3}$	$1.5x10^{-3}$	$2x10^{-3}$	$2.5x10^{-3}$	$3x10^{-3}$
$\|E_{ps}\|^*/\|e^*\|$ to reunitize-renormalize E*e*=1	$2x10^{-6}$	$3x10^{-6}$	$4x10^{-6}$	$5x10^{-6}$	$6x10^{-6}$
⅔-value in partition interval $⅔m_e.(3/2)R_e$ for mean A=¾	1/2	3/4	1	5/4	3/2
Fraction of Renormalization effect	1/3	1/2	2/3	5/6	1

Value of $\Delta(\frac{1}{2}\alpha_{var}\}$ in A_{6lb} - A_{6ub} and in A_{3ub} - A_{3lb}	$2x10^{-6}$ complex minimum	$3x10^{-6}$	$4x10^{-6}$	$5x10^{-6}$	$6x10^{-6}$ real maximum

The $\frac{1}{2}a_{var}$ sub-interval so is adjusted by $6x10^{-6}$ from A_{6ub} - $\Delta(\frac{1}{2}\alpha_{var}\}$ = A_{SI} for $ß_{SI}^2$ for $m_{eo}SI$ for the real solution

The Planck-Stoney Bounce in conformal supermembrane cosmology

The pre-Big Bang 'bounce' of many models in cosmology can be found in a direct link to the Planck-Stoney scale of the 'Grand-Unification-Theories'.
In particular it can be shown, that the Square root of Alpha, the electromagnetic fine structure constant, multiplied by the Planck-length results in a Stoney-transformation factor
$L_P\sqrt{\alpha} = e/c^2$ in a unitary coupling between the quantum gravitational and electromagnetic fine structures and so couples the unitary measurement of displacement in the Planck-Length oscillation equal to Coulombic charge quantum 'e' divided by the square of the speed of light 'c^2' in a proportionality of Displacement = ChargexMass/Energy.
This couples the electric Coulomb charge quantum to the magnetic monopole quantum e* as the inverse of the 10-dimensional superstring sourcesink energy E_{ps} to the 10-dimensional superstring sinksource energy E_{ss} as the 11-dimensional supermembrane $E_{ps}E_{ss}$.

{$G_ok=1$ for $G_o=4\pi\varepsilon_o$ and represents a conformal mapping of the Planck length onto the scale of the 'classical electron' in superposing the lower dimensional inertia coupled electric charge quantum 'e' onto a higher dimensional quantum gravitational-D-brane magnetopole coupled magnetic charge quantum 'e*' = $2R_e.c^2 = 1/hf_{ps} = 1/E_{Weyl\ wormhole}$ by the application of the mirror/T duality of the supermembrane $E_{ps}E_{ss}$ of heterotic string class HE(8x8)}.

But the FRB or Functional-Riemann-Bound in Quantum Relativity (and basic to the pentagonal string/brane symmetries) is defined in the renormalization of a wavefunction $B(n)=(2e/h\varphi).\exp(alpha.T(n))$, exactly about the roots X,Y, which are specified in the electron masses for A=1 in the above.

The unifying condition is the Euler Identity: $XY=X+Y = i^2 = -1 = \cos(\pi)+i\sin(\pi) = e^{i\pi}$

The charge radius for the proton and neutrinos in quantum relativity

[BeginQuote] A scientific tug-of-war is underway over the size of the proton. Scientists cannot agree on how big the subatomic particle is, but a new measurement has just issued a forceful yank in favor of a smaller proton.

By studying how electrons scatter off of protons, scientists with the PRad experiment at Jefferson Laboratory in Newport News, Va., sized up the proton's radius at a measly 0.83 femtometers, or millionths of a billionth of a meter. That is about 5 percent smaller than the currently accepted radius, about 0.88 femtometers. [EndofQuote]

https://www.sciencenews.org/article/new-measurement-bolsters-case-slightly-smaller-proton?tgt=more
https://en.wikipedia.org/wiki/Proton_radius_puzzle

It is the unitary interval between A=½ and A=1 which so determines the quantum nature for the quantum mechanics in the relativistic ß distribution.

In particular for A=½ and for $ß^2 = x = 0$, the Compton constant defines the required electron rest mass of electro stasis as $½m_ec^2 = e^2c^2/8\pi\varepsilon_oR_e\}$ for an effective electron size of R_e,
whilst for A=1 the $m_ec^2 = e^2c^2/4\pi\varepsilon_oR_e$ for a doubling of this radius to $2R_e$ for $ß^2 = x = X$.

A reduced classical electron size is equivalent to an increase 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 $(2.81794032\text{x}10^{-15})$.[1.00167136 m*] = $2.82265011\text{x}10^{-15}$ m* and differing from $R_e = 2.777777778\text{x}10^{-15}$ m* in a factor of (2.82265011/2.777777…) = 1.01615404.
A reduction of the classical electron radius from $R_e = 2.777777778\text{x}10^{-15}$ m* to $(2.777777778\text{x}10^{-15})$.[0.998331431 m] = $2.77314286\text{x}10^{-15}$ 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
$R_e.m_e = ke^2/c^2 = (2.77777778\text{x}10^{-15}).(9.29052716\text{x}10^{-31}) = 2.58070198\text{x}10^{-45}$ [mkg]* with
$R_e.m_e = ke^2/c^2 = (2.81794033\text{x}10^{-15}).(9.1093826\text{x}10^{-31}) = 2.56696966\text{x}10^{-45}$ [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 $Alpha|_{mod}$ = $60\pi e^2/h = 60\pi(1.6021119x10^{-19})^2/(6.62607004x10^{-34}) = 1/137.047072$}
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.

$$\frac{1}{\lambda} = R_\infty\left(\frac{1}{n_1^2} - \frac{1}{n_2^2}\right) = \frac{m_e e^4}{8\varepsilon_0^2 h^3 c}\left(\frac{1}{n_1^2} - \frac{1}{n_2^2}\right)$$

$$R_\infty = \frac{m_e e^4}{8\varepsilon_0^2 h^3 c} = 10\,973\,731.568\,508\,(65)\,\mathrm{m}^{-1},$$

Energy for quantization n: $E = -Ze^2/8\pi\varepsilon_oR = KE+PE = ½mv^2 - Ze^2/4\pi\varepsilon_oR$ for angular momentum $nh/2\pi= mvR$ with $mv^2/R = Ze^2/4\pi\varepsilon_oR^2$ for $v = Ze^2/2\varepsilon_onh$ and $R = n^2h^2\varepsilon_o/Ze^2\pi m = R_e/Alpha^2 = R_{Bohr1} = 5.217x10^{-11}$ m* for the minimum energy n=1 for $m=m_{effective}=m_e=9.29061x10^{-31}$ kg*
and atomic number Z=1 for hydrogen.

$E_n =hf_n = hc/\lambda_n = -Z^2e^4(\pi m_e)/(8\pi\varepsilon_o{}^2h^2n^2) = -Z^2e^4(\pi e^2/4\pi\varepsilon_oR_ec^2)/(8\pi\varepsilon_o{}^2h^2n^2) = -Z^2e^6/(32\pi R_e\varepsilon_o{}^3h^2n^2c^2)$ for $1/\lambda_n$
$= -Z^2e^6/(32\pi R_e\varepsilon_o{}^3h^3n^2c^3) = -Z^2.Alpha^3/4\pi n^2R_e$ for eigen state n and
Rydberg constant $R_{y\infty} = Alpha^3/4\pi R_e = Alpha^2.m_ec/2h = m_ee^4/8\varepsilon_o{}^2h^3c$

In the Feynman lecture the discrepancy for the electron mass in the electromagnetic mass multiplier of 4/3 is discussed.
Its solution resides in the unitary interval for A, as the arithmetic mean of: ½{½+1} = 3/4 as the present internal magnetic charge distribution of the electron, namely as a trisection of the colour charge in 3x⅓=1 negative fraction charge in the quantum geometry of the electron indicated below in this paper.

The classical size for the proton so is likewise approximated at the mean value of its own colour charge distribution, now consisting of a trisected quark-gluon-anti-neutrino kernel of 3x⅔=2 positive fraction charges, which are 'hugged' by a trisected 'Inner Mesonic Ring' (d-quark-KIR) as a contracted 'Outer Leptonic Ring' (s-quark-KOR) for the manifestation of the electron-muon tauon lepton family of the standard model.

For the electrostatic electron the ß distribution at A=½, the Compton constant gives $m_{ec}r_{ec} = m_eR_e$ for $ß^2 = 0$ and at A=1, the Compton constant gives $m_{ec}r_{ec} = ½m_e.2R_e$ for $ß^2 = X$ 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 $R_p = ½XR_e$ and where the factor X represents the symmetry equilibrium for a ß=(v/c} velocity ratio distribution for 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 $R_{proton} = 0.85838052x10^{15}$ m* as a reduced classical electron radius and for a speed for the self-interactive or quantum relativistic electron of $2.96026005x10^{-13}$ 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
$v_e = 1.50506548x10^{-18}$ 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 mapping of the atomic nucleus onto the thermodynamic universe of the hyperspheres

We consider the universe's thermodynamic expansion to proceed at an initializing time $t_{ps}=f_{ss}$ at lightspeed for a light path x=ct to describe the hypersphere radii as the volume of the inflaton made manifest by the instanton as a lower dimensional subspace and consisting of a summation of a single spacetime quantum with a quantized toroidal volume $2\pi^2r_{weyl}$ and where $r_{weyl}=r_{ps}$ is the characteristic wormhole radius for this basic building unit for a quantized universe (say in string parameters given in the Planck scale and its transformations).
At a time t_G, say so 18.85 minutes later, the count of space time quanta can be said to be $9.677x10^{102}$ for a universal 'total hypersphere radius' of about $r_G=3.391558005x10^{11}$ meters and for a G-Hypersphere volume of so $7.69x10^{35}$ cubic meters from $N\{2\pi^2.r_{ps}^3\}$ = Volume = $2\pi^2.R_{Hk}^3$.
{This radius is about 2.3 Astronomical Units (AU's) and about the distance of the Asteroid Belt from the star Sol in a typical (our) solar system.}

This modelling of a mapping of the quantum micro-scale onto the cosmological macro-scale can then be used to indicate the mapping of the wormhole scale onto the scale of the sun as a quasi-conformal scaling of the fermi scale of the classical electron radius onto a typical gravitational star system. $r_{weyl}/R_{sun}=R_e/r_E$ for $R_{sun}=r_{weyl}.r_E/R_e$=1,971,030 meters. This gives an 'inner' solar core of diameter about $3.94x10^5$ meters.

As the classical electron radius is quantized in the wormhole radius in the formulation $R_e=10^{10}r_{weyl}/360$, rendering a fine structure for Planck's Constant as a 'superstring parametric': $h=2\pi r_{weyl}/2R_e c^3$; the 'outer' solar scale becomes $R_{sun[o]}=360.R_{sun}=7.092\times10^8$ meters as the observed radius for the solar disk.

19 seconds later; a F-Hypersphere radius is about $r_F=3.451077503\times10^{11}$ meters for a F-count of so 1.02×10^{103} spacetime quanta for the thermodynamically expanding universe from the instanton.
We also define an E-Hypersphere radius at $r_E=3.435971077\times10^{14}$ meters and an E-count of so 10^{112} to circumscribe this 'solar system' in so 230 AU.
We so have 4 hypersphere volumes, based on the singularity-unit and magnified via spacetime quantization in the hyperspheres defined in counters G, F and E. We consider these counters as somehow fundamental to the universe's expansion, serving as boundary conditions in some manner. As counters, those googol-numbers can be said to be defined algorithmically and to be independent on mensuration physics of any kind.

{https://cosmosdawn.net/index.php/en...stanton-to-continuon-four-pillars-of-creation}

Should we consider the universe to follow some kind of architectural blueprint; then we might attempt to use our counters to be isomorphic (same form or shape) in a one-to-one mapping between the macro-cosmos and the micro-cosmos.
So we define a quantum geometry for the nucleus in the simplest atom, say Hydrogen. The hydrogenic nucleus is a single proton of quark-structure udu and to which we assign a quantum geometric template of Kernel-Inner Ring-Outer Ring (K-IR-OR), say in a simple model of concentricity.
We set the up-quarks (u) to become the 'smeared out core' in say a tripartition uuu so allowing a substructure for the down-quark (d) to be u+Inner Ring (IR).
A down-quark so is a unitary ring coupled to a kernel-quark. The proton's quark-content so can be rewritten and without any loss of any of the properties and generalities in unitary symmetry obtained from the Standard Model of particle physics and associated with the quantum conservation laws; as proton ⇒ udu ⇒ uuu+IR = KKK+IR. We may now label the Inner Ring as Mesonic and the Outer Ring as Leptonic.

The Outer Ring (OR) is so definitive for the strange quark in quantum geometric terms: s=u+OR.
A neutron's quark content so becomes neutron=dud=KIR.K.KIR with a 'hyperon resonance' in the lambda=sud=KOR.K.KIR and so allowing the neutron's beta decay to proceed in disassociation from a nucleus (where protons and neutrons bind in meson exchange); i.e. in the form of 'free neutrons'.
The neutron decays in the oscillation potential between the mesonic inner ring and the leptonic outer ring as the 'ground-energy' eigenstate.

There actually exist three uds-quark states which decay differently via strong, electromagnetic and weak decay rates in the uds ($Sigma^o$ Resonance); usd ($Sigma^o$) and the sud ($Lambda^o$) in increasing stability.

This quantum geometry then indicates the behaviour of the triple-uds decay from first principles, whereas the contemporary standard model does not, considering the u-d-s quark eigenstates to be quantum geometrically undifferentiated.

The nuclear interactions, both strong and weak are confined in a ' Magnetic Asymptotic Confinement Limit, coinciding with the Classical Electron Radius $R_e=ke^2/m_ec^2$ and in a scale of so 3 Fermi or $2.8x10^{-15}$ meters. At a distance further away from this scale, the nuclear interaction strength vanishes rapidly.
The wave nature of the nucleus is given in the Compton-Radius $R_{compton} = h/2\pi mc$ with m the mass of the nucleus, say a proton; the latter so having a scale reduced from R_e by some partitioning of the classical electron size.

As the Planck Oscillator $E_o=½hf_o$ of the Zero-Point-Energy or ZPE as Vortex-Potential-Energy or VPE defines its ground state at half its effective energy of $E_k=hf_k$, and as a conformal mapping from the string energy scale of the inflaton onto the qbb scale of the instanton in the $E_{weyl} = E_{ps}=/e^*=1/2R_ec^2|_{mod}$ gauge boson; we define a subatomic scale at half of R_e as $r_{mean} =½R_e$.

The wave-matter (after de Broglie generalizing wave speed v_{dB} from c in $R_{compton}c$) then relates the classical electron radius as the 'confinement limit' to the Compton scale in the electromagnetic fine structure constant in R_e=Alpha.$R_{compton}$.
The extension to the hydrogen-atom is obtained in the expression R_e=Alpha².R_{bohr1} for the first Bohr-Radius as the 'ground energy' of so 13.7 eV at a scale of so 10^{-10} meters (Angstroems).

These 'facts of measurements' of the standard models now allow our quantum geometric correspondences to assume cosmological significance in their isomorphic mapping. We denote the Outer Ring as the classical electron radius and introduce the Inner Ring as a mesonic scale contained within the geometry of the proton and all other elementary baryonic- and hadronic particles.
Firstly, we define a mean macro-mesonic radius as: $r_M=½(r_F+r_G) =3.421317754x10^{11}$ meters and set the macro-leptonic radius to $r_E=3.435971077x10^{14}$ meters.
Secondly, we map the macro-scale onto the micro-scale, say in the simple proportionality relation for the micro-mesonic scale $R_{mean} = R_e.r_M/r_E = 2.765931439x10^{-18}$ meters.
So reducing the apparent measured 'size' of a halving of R_e in a factor about 1000 gives the scale of the sub-nuclear mesonic interaction, say the strong interaction coupling by pions.

The Higgsian Scalar-Neutrino

The (anti)neutrinos are part of the electron mass in a decoupling process between the kernel and the rings. Neutrino mass is so not cosmologically significant and cannot be utilized in 'missing mass' models'.
We may define the kernel-scale as that of the singular spacetime-quantum unit itself, namely as the wormhole radius $r_{weyl} = r_{ps} =10^{-22}/2\pi$ meters.

Before the decoupling between kernel and rings, the kernel-energy can be said to be strongweak coupled or unified to encompass the gauge-gluon of the strong interaction and the gauge-weakon of the weak interaction defined in a coupling between the leptonic Outer Ring and the Kernel and bypassing the mesonic Inner Ring.

So for matter, a W-Minus (weakon) must consist of a coupled lepton part yet linking to the strong interaction via the kernel part. If now the colour-charge of the gluon transmutes into a 'neutrino-colour-charge'; then this decoupling will not only define the mechanics for the strongweak nuclear unification coupling; but also the energy transformation of the gauge-colour charge into the gauge-lepton charge.
There are precisely 8 gluonic transitive energy permutation eigenstates between a 'radiative-additive' Planck energy in W(hite)=E=hf and an 'inertial-subtractive'
Einstein energy in B(lack)=E=mc^2, which describe the baryonic- and hyperonic 'quark-sectors' in: mc^2=BBB, BBW, WBB, BWB, WBW, BWW, WWB and WWW=hf.
The permutations are cyclic and not linearly commutative. For mesons (quark-antiquark eigenstates), the permutations are BB, BW, WB and WW in the SU(2) and SU(3) Unitary Symmetries.

So generally, we may state, that the gluon is unified with a weakon before decoupling; this decoupling 'materializing' energy in the form of mass, namely the mass of the measured 'weak interaction-bosons' of the standard model (W^- for charged matter; W^+ for charged antimatter and Z^o for neutral mass-currents say).
Experiment shows, that a W^- decays into spin-aligned electron-antineutrino or muon-antineutrino or tauon-antineutrino pairings under the conservation laws for momentum and energy.
So, using our quantum geometry, we realize, that the weakly decoupled electron must represent the Outer Ring, and just as shown in the analysis of QED (Quantum Electro-Dynamics). Then it can be inferred, that the Electron's Anti-neutrino represents a transformed and materialized gluon via its colour charge, now decoupled from the kernel and in a way revisiting the transformation of a bosonic ancestry for the fermionic matter structures, discussed further on in the string class transformations of the inflaton era. There exists so a natural and generic supersymmetry in the quark-lepton hierarchy and no additional supersymmetric particles are necessary.
Then the Outer Ring contracts along its magneto axis defining its asymptotic confinement and in effect 'shrinking the electron' in its inertial and charge- properties to its experimentally measured 'point-particle-size'.
Here we define this process as a mapping between the electronic wavelength $2\pi R_e$ and the wormhole perimeter $\lambda_{weyl}=2\pi r_{weyl}$.

But in this process of the 'shrinking' classical electron radius towards the gluonic kernel; the mesonic ring will be encountered and it is there, that any mass inductions should occur to differentiate a massless lepton gauge-eigenstate from that manifested by the weakon precursors. {Note: Here the W^- inducing a lefthanded neutron to decay weakly into a lefthanded proton, a lefthanded electron and a righthanded antineutrino. Only lefthanded particles decay weakly in CP-parity-symmetry violation, effected by neutrino-gauge definitions from first principles}.

This then indicates a neutrino-oscillation potential at the Inner Ring-Boundary. Using our proportions and assigning any neutrino-masses m_ν as part of the electron mass m_e, gives the following proportionality as the mass eigenvalue of the Tau-(Anti)Neutrino as Higgsian Mass Induction in the Weak Nuclear Interaction at the Mesonic Inner Ring Boundary within the subatomic quantum geometry utilized as the dynamic interaction space:

$$\mathbf{m_{Higgs/Tauon} = m_e\lambda_{weyl}.r_E/(2\pi r_M R_e) = m_e\lambda_{weyl}.r_E/(2\pi r_M R_e) \sim 5.345878435^{-36}\ kg^*\ or\ 2.994971267\ eV^*} \text{..............}\mathbf{[Eq.13]}$$

So we have derived, from first principles, a (anti)neutrino mass eigenstate energy level of 3 eV as the appropriate energy level for any (anti)neutrino matter interaction within the subatomic dynamics of the nuclear interaction.

This confirms the Mainz, Germany Result (Neutrino 2000), as the upper limit for neutrino masses resulting from ordinary Beta-Decay and indicates the importance of the primordial beta decay for the cosmogenesis and the isomorphic scale mappings referred to in the above. The hypersphere intersection of the G- and F-count of the thermodynamic expansion of the mass-parametric universe so induces a neutrino-mass of 3 eV* at the $2.765931439\text{x}10^{-18}$ meter marker.

The more precise G-F differential in terms of eigenenergy is 0.052 eV as the mass-eigenvalue for the Higgs-(Anti)neutrino (which is scalar of 0-spin and constituent of the so-called Higgs Boson as the kernel-Eigenstate). This has been experimentally verified in the Super-Kamiokande (Japan) neutrino experiments published in 1998 and in subsequent neutrino experiments around the globe, say Sudbury, KamLAND, Dubna, MinibooNE and MINOS.

Recalling the Cosmic scale radii for the initial manifestation of the primordial 'Free Neutron (Beta-Minus) Decay', we rewrite the Neutrino-Mass-Induction formula:

$r_E = 3.435971077\text{x}10^{14}$ meters and an E-count of $(26\text{x}65^{61}) = 1.00\text{x}10^{112}$ spacetime quanta:
$m_{\nu Higgs\text{-}E} = m_{\nu electron} = m_e.r_{ps}\{r_E/r_E\}/R_e = 5.323079952\text{x}10^{-39}$ kg* or 0.00298219866 eV* as Weak Interaction Higgs Mass induction.

But in this limiting case the supermembrane modular duality of the instanton identity $E_{ps}.e^* = 1$ applied to the Compton constant will define the limiting neutrino mass for the electron as a modular neutrino mass per displacement quantum defined in the Compton constant and for a modulation displacement factor $\{R_e^2/r_{ps}\}$:

$$|\mathbf{m_{\nu Higgs\text{-}E} = m_{\nu electron}}|_{\mathbf{modular}} = \mathbf{m_e.r_{ps}\{R_e^2/r_{ps}\}/R_e = alpha.h/2\pi c = 2.580701988\text{x}10^{-45}}\ (kg/m)^* \text{..............}\mathbf{[Eq.14]}$$

r_F = 3.451077503x10^{11} meters for the F-count of (13x66^{56}) = 1.02x10^{103} spacetime quanta: $m_{\nu Higgs-F}$ = $m_{\nu muon}$=$m_e.r_{ps}\{r_E/r_F\}/R_e$ = 5.299779196x10^{-36} kg* or 2.969144661 eV* as Weak Interaction Higgs Mass induction.

r_G = 3.39155805x10^{11} meters for the G-count of (67x36^{65}) = 9.68x10^{102} spacetime quanta: $m_{\nu Higgs-G}$ = $m_{\nu tauon}$ = $m_e.r_{ps}\{r_E/r_G\}/R_e$ = 5.392786657x10^{-36} kg* or 3.021251097 eV* as Weak Interaction Higgs Mass Induction.

The mass difference for the Muon-Tauon-(Anti)Neutrino Oscillation, then defines the Mesonic Inner Ring Higgs Induction:..........[Eq.15]
$m_{\nu Higgs} = m_e.r_{ps}\{r_E/r_G - r_E/r_F\}/R_e$ = 9.3007461x10^{-38} kg* or 0.05210643614 eV* as the Basic Cosmic (Anti)Neutrino Mass.

This Higgs-Neutrino-Induction is 'twinned' meaning that this energy can be related to the energy of so termed 'slow- or thermal neutrons' in a coupled energy of so twice 0.0253 eV for a thermal equilibrium at so 20° Celsius and a rms-standard-speed of so 2200 m/s from the Maxwell statistical distributions for the kinematics.
The (anti)neutrino energy at the R_E nexus for $R_E = r_{ps}\sqrt[3]{(26x65^{61})}$ m* and for $m_{\nu Higgs-E} = m_{\nu electron} = \mu_o e^2c^2.r_{ps}/4\pi R_e^2c^2 = 30e^2\lambda_{ps}/2\pi cR_e^2$ or $\mu_o\{\text{Monopole GUT masses ec}\}^2 r_{ps}/4\pi R_e^2c^2$ = 2.982198661x10^{-3} eV* and for:

$$\mathbf{m_{\nu Electron}c^2 = m_\nu(\nu_{Tauon}{}^2)c^2 = m_\nu(\nu_{Muon}{}^2+\nu_{Higgs}{}^2)c^2 = \mu_o\{\text{Monopole GUT masses ec}\}^2 r_{ps}/4\pi R_e^2}$$
...........[Eq.16]

This can also be written as $m_{\nu Higgs-E}=m_{\nu electron}=m_{\nu Tauon}{}^2$ to define the 'squared' Higgs (Anti)Neutrino eigenstate from its templated form of the quantum geometry in the Unified Field of Quantum Relativity (UFoQR).
Subsequently, the Muon (Anti)Neutrino Higgs Induction mass becomes defined in the difference between the masses of the Tau-(Anti)Neutrino and the Higgs (Anti)Neutrino.

$m_{\nu Tauon} = B^4G^4R^4[0]+B^2G^2R^2[-½] = B^6G^6R^6[-½] = \sqrt{(m_{\nu electron})} = \sqrt{(0.002982)}$ = 0.0546... eV*
$m_{\nu Higgs} = B^4G^4R^4[0] = m_e\lambda_{ps}.r_E\{1/r_G-1/r_F\}/(2\pi R_e)$ ~ 9.301x10^{-38} kg* or 0.0521... eV*
$m_{\nu Muon} = B^2G^2R^2[-½] = \sqrt{(m_{\nu Tauon}{}^2 - m_{\nu Higgs}{}^2)} = \sqrt{(0.00298-0.00271)} = \sqrt{(0.00027)}$ = 0.0164... eV*
$m_{\nu Electron} = B^2G^2R^2[-½] = (m_{\nu Tauon})^2$= (0.054607...)^2 = 0.002982... eV*

This energy self-state for the Electron (Anti)Neutrino then is made manifest in the Higgs Mass Induction at the Mesonic Inner Ring or IR as the squared mass differential between two (anti)neutrino self-states as:

$(m_{\nu 3} + m_{\nu 2}).(m_{\nu 3} - m_{\nu 2}) = m_{\nu 3}^2 - m_{\nu 2}^2 = 0.002981...eV^{*2}$ to reflect the 'squared' energy self-state of the scalar Higgs (Anti)Neutrino as compared to the singlet energy eigen state of the base (anti)neutrinos for the 3 leptonic families of electron-positron and the muon-antimuon and the tauon-antitauon.
The Electron-(Anti)Neutrino is massless as base-neutrino weakon eigenstate and inducted at R_E at 0.00298 eV*.
The Muon-(Anti)Neutrino is also massless as base-neutrino weakon eigenstate and inducted at the Mesonic Ring F-Boundary at 2.969 eV* with an effective Higgsian mass induction of 0.0164 eV*.
All (anti)neutrinos gain mass energy however when they become decoupled from their host weakon; either a W^- for matter or a W^+ for antimatter. So as constituents of the weakon gauge for the weak interaction the electron- and muon (anti)neutrinos are their own antiparticles and so manifest their Majorana qualities in the weak interaction. Once emitted into the energy momentum spacetime however, the monopolar nature from their self-dual GUT/IIB monopole mass $[ec]_{uimd}$ or their energy $[ec^3=2.7x10^{16}\ GeV^*]_{unifiedinmodularduality}$ manifests in their masses. The premise of the older Standard Model for a massless (anti)neutrino so remains valid for them in respect to their Majorana-coupling their lepton partners as the weakon agents in their quantum geometric templates; but is modified for 'free' (anti)neutrinos as Dirac particles.

The Tauon-(Anti)Neutrino is not massless with inertial eigenstate inducted at the Mesonic Ring G-Boundary at 3.021 eV* and averaged at 3.00 eV* as √(0.05212+0.01642) = 0.0546 eV* as the square root value of the ground state of the Higgs inertia induction. The neutrino flavour mechanism, based on the Electron (Anti)Neutrino so becomes identical in the Weakon Tauon Electron-Neutrino oscillation to the Scalar Muon-Higgs-Neutrino oscillation.

The weakon kernel-eigenstates are 'squared' or doubled (2x2=2+2) in comparison with the gluonic-eigenstate (one can denote the colour charges as $(R^2G^2B^2)$[½] and as (RGB)[1] respectively say and with the [] bracket denoting gauge-spin and RGB meaning colours Red-Green-Blue).
The scalar Higgs-Anti(Neutrino) becomes then defined in: $(R^4G^4B^4)$[0] and the Tauon Anti(Neutrino) in $(R^6G^6B^6)$[½].
The twinned neutrino state so becomes apparent in a coupling of the scalar Higgs-Neutrino with a massless base neutrino in a $(R^6G^6B^6)$[0+½]) mass-induction template.

The Higgs-Neutrino is bosonic and so not subject to the Pauli Exclusion Principle; but quantized in the form of the FG-differential of the 0.0521 Higgs-Restmass Induction.
Subsequently all experimentally observed neutrino-oscillations should show a stepwise energy induction in units of the Higgs-neutrino mass of 0.0521 eV.
This was the case in the Super-Kamiokande experiments; and which was interpreted as a mass differential between the muonic and tauonic neutrino forms.

$m_{\nu Higgs} + m_{\nu electron} = m_{\nu Higgs} + (m_{\nu Tauon})^2$ for the 'squared' ground state of a massless base (anti)neutrino for a perturbation Higgsian (anti)neutrino in $(m_{\nu Tauon})^2 = (m_{\nu Higgs} + \Delta)^2 = m_{\nu Electron}$ for the quadratic $m_{\nu Higgs}^2 + 2m_{\nu Higgs}\Delta + \Delta^2 = 0.002982$ from $(m_{\nu Higgs} + \Delta) = \sqrt{(m_{\nu electron})}$ and for a $\Delta = \sqrt{(m_{\nu electron})} - m_{\nu Higgs} = m_{\nu Tauon} - m_{\nu Higgs} = 0.0546$ eV - 0.0521 eV = 0.0025 eV.

$m_{\nu Higgs} + \Delta = 0.0521 + 0.0025 = (m_{\nu Higgs}) + (m_{\nu electron}) - 0.00048 = m_{\nu tauon} = 0.0521+0.00298 - 0.00048 + ... = 0.0546$ eV* as a perturbation expression for the 'squared' scalar Higgs (Anti)Neutrino.

$(m_{\nu Muon} - m_{\nu Electron})\{(m_{\nu Muon} + m_{\nu Electron}) - (m_{\nu Muon} - m_{\nu Electron})\} = 2m_{\nu Electron}(m_{\nu Muon} - m_{\nu Electron})$ as the squared mass difference:

$m_{\nu Muon2} - m_{\nu Electron2} = 2m_{\nu Electron}(m_{\nu Muon} - m_{\nu Electron}) + (m_{\nu Muon} - m_{\nu Electron})_2$

and for $m_{\nu Muon}2 = m_{\nu Electron} - m_{\nu Higgs}^2 = (0.002982 - 0.00271 = 0.00027)$ for $\sqrt{(0.00027)} = m_{\nu Muon} = 0.01643 = 5.51\ m_{\nu Electron}$.

$\{m_{\nu Muon2} - m_{\nu Electron2}\} - m_{\nu Muon}2 + 2m_{\nu Muon}m_{\nu Electron} - m_{\nu Electron2} = 2m_{\nu Muon}m_{\nu Electron} - 2m_{\nu Electron2} = 2m_{\nu Electron}\{m_{\nu Muon} - m_{\nu Electron}\} = 2m\nu_{Electron}^2\{m_{\nu Muon}/m_{\nu Electron} - 1\} = 8.892\text{x}10^{-6}\{11.02\text{-}1\} = 8.910\text{x}10^{-5}$,

approximating the KamLAND 2005 neutrino mass induction value of $7.997...\text{x}10^{-5}$ eV^2 obtained for a ratio of $11m_{\nu Electron} = 2m_{\nu Muon}$.

For 3 (anti)neutrinos then, the cosmological summation lower and upper bounds for (anti)neutrino oscillations are:

$0 + m_{\nu electron\text{-}muon} + m_{\nu electron\text{-}tauon} + m_{\nu muon\text{-}tauon} = 3(0.002982) = 0.00895$ eV* or 0.00893 eV [SI] and 3(0.0030+0.0546) = 3(0.0576) = 0.1728 eV* or 0.1724 eV [SI] respectively.

Inclusion of the scalar Higgs (anti)neutrino as a fourth (anti)neutrino inertial self-state extends this upper boundary by 0.0521 eV* and 0.0520 eV to 0.2249 eV* or 0.2243 eV [SI].

$\sum m_\nu = m_{\nu Electron} + m_{\nu Muon} + m_{\nu Higgs} + m_{\nu Tauon} = 0.002982...+ 0.0164...+ 0.0521...+ 0.0546... = 0.1261$ eV* or 0.1258 eV.

In terms of the Higgs Mass Induction and so their inertial states, the Neutrinos are their own antiparticles and so Majorana defined; but in terms of their basic magneto charged nature within the Unified Filed of Quantum Relativity, the Neutrinos are different from their Antineutrino antiparticles in their Dirac definition of $R^2G^2B^2[+½]$ for the Antineutrinos and in $B^2G^2R^2[-½]$ for the Neutrinos.

{s}	=	1.000978394	{s*}	=	0.999022562	{s}
{m}	=	1.001671357	{m*}	=	0.998331431	{m}
{kg}	=	1.003753126	{kg*]	=	0.996260907	{kg}

{C}	=	1.002711702	{C*}	=	0.997295631	{C}
{J}	=	1.005143377	{J*}	=	0.994882942	{J}
{eV}	=	1.00246560	{eV*}	=	0.997540464	{eV}
{K}		0.99465337	{K*}	=	1.005375537	{K}

The Wave Matter of de Broglie: $\lambda_{deBroglie} = h/p$

View: https://youtu.be/-IfmgyXs7z8 View: https://youtu.be/tQSbms5MDvY

The Wave matter of de Broglie from the Energy-Momentum Relation is applied in a (a) nonrelativistic, a (b) relativistic and a (c) superluminal form in the matter wavelength: $\lambda_{deBroglie} = h/p = hc/pc$ for $(pc) = \sqrt{\{E^2 - E_o^2\}} = m_oc^2.\sqrt{\{[v/c]^2/(1-[v/c]^2)\}}$

(a) Example:
A pellet of 10g moves at 10 m/s for a de Broglie wavelength $v_{dB} = h/mv = h/0.1 = 6.7\text{x}10^{-33}$ m*
This matter wavelength requires diffraction interference pattern of the order of λ_{dB} to be observable and subject to measurement

(b) Example:
An electron, moving at 80% of light speed 'c' requires relativistic development
$E_o = m_oc^2$ with $E = mc^2 = m_oc^2/\sqrt{\{1-[v/c]^2\}}$, a 66.66% increase in the electron's energy describing the Kinetic Energy $E - E_o = \{m - m_o\}c^2$ for a relativistic momentum $p = m_oc.\sqrt{\{[0.8]^2/(1-[0.8]^2)\}} = (1.333..)\ m_oc = h/\lambda_{deBroglie}$ and for a relativistic de Broglie wavelength, 60% smaller, than for the non-relativistic electron in $\lambda_{deBroglie} = h/1.333..m_oc < h/0.8m_oc = \lambda_{deBroglie}$ ($1.83\text{x}10^{-12}$ m relativistic and $3.05\text{x}10^{-12}$ m* non-relativistic for an electron 'rest mass' of $9.11\text{x}10^{-31}$ kg* and measurable in diffraction interference patterns with apertures comparable to this wave matter scale).

(c) The de Broglie matter wave speed in its 'group integrated' form derives from the postulates of Special Relativity and is defined in the invariance of light speed 'c' as a classical upper boundary for the acceleration of any mass M. In its 'phase-individuated' form, the de Broglie matter wave is 'hyper accelerated' or tachyonic, the de Broglie wave speed being lower bounded by light speed 'c' v_{phase} = wavelength.frequency = $(h/mv_{group})(mc^2/h) = c^2/v_{group} > c$ for all $v_{group} < c$

m = Energy/c^2 = hf/c^2 = hc/$\lambda_{deBroglie}c^2$ = h/$\lambda_{deBroglie}$c = $m_{deBroglie}$ = [Action as Charge^2]$_{mod}$/c(Planck-Length Oscillation) = $[e^2]_{mod}/cl_{Planck}\sqrt{alpha}$ = $[e^2c^2/ce]_{mod}$ = $[ec]_{modular}$
as monopole mass of GUT-string IIB and as string displacement current mass equivalent for the classical electron displacement $2R_e = e^*/c^2 = [ec]_{modular}$ as Wormhole minimum spacetime configuration for the Big Bang Instanton of Big Bang wormhole energy quantum

$E_{ps}=hf_{ps}=m_{ps}c^2=kT_{ps}$ as a function of $e^*=1/E_{ps}$ of Heterotic superstring class HE 8x8 and relating the Classical Electron Diameter $\{2R_e\}$ as Monopole Mass $[ec]_{mod}$ in mass $M=E/c^2$ modular dual in Curvature Radius $r_{ps}=\lambda_{ps}/2\pi=2G_oM_c/c^2 \Rightarrow G_om_{ps}/c^2$ quantum gravitationally.

The factor $2G_o/c^2$ multiplied by the factor 4π becomes Einstein's Constant $\kappa = 8\pi G_o/c^2$ = $3.102776531\text{x}10^{-26}$ m/kg describing how spacetime curvature relates to the mass embedded in that spacetime in the theory of General Relativity coupled to the theory of Quantum Relativity.

The self-duality of the superstring IIB aka the Magnetic Monopole self-state in GUT Unification $2R_e/30[ec]_{mod} = 2R_ec^2/30[ec^3]_{mod} = e^*/30[ec^3]_{mod} \propto \kappa$ for a proportionality constant $\{\kappa^*\}=2R_e/30\kappa[ec]_{mod} = 2R_e.c^2/8\pi e = e^*/8\pi e = 1.2384...\text{x}10^{20}$ kg*/m* in string units for Star Charge in Star Coulomb C*/Electro Charge in Coulomb C unified.

The monopolar Grand Unification (SEWG ⇒ sEwG ⇒ gravitational decoupling SEW.G) has a Planck string energy reduced at the IIB string level of $e^*=[ec^3]_{modular}$ for
$m_{ps}c^2c/[ec]_{modular} = [c^3]_{modular} = 2.7\text{x}10^{25}$ eV* or $4.3362\text{x}10^6$ J* for a monopole mass $[ec]_{modular} = m_{monopole}$ = $4.818\text{x}10^{-11}$ kg*.

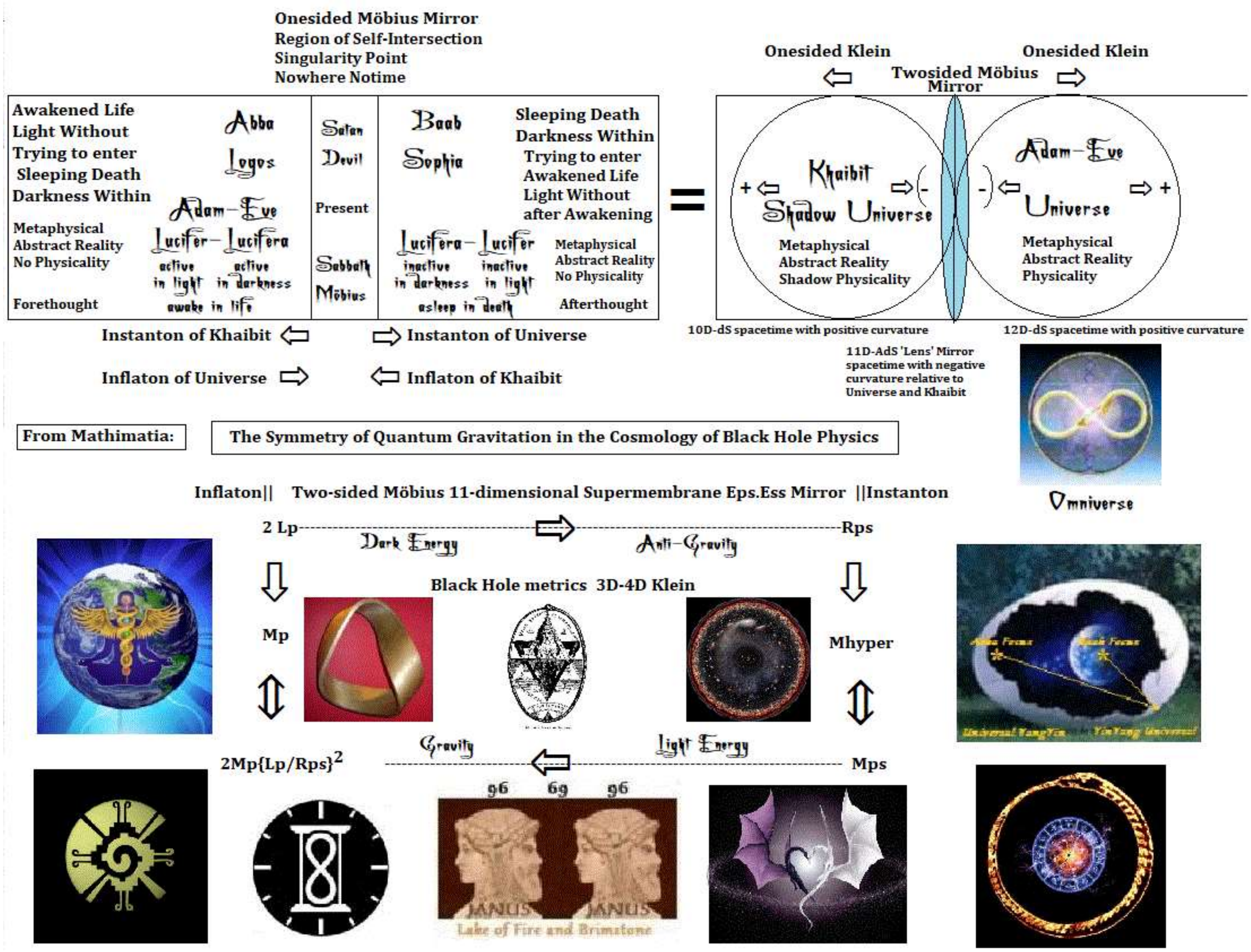
Mass $M = n.m_{ss} = \Sigma m_{ss} = n.\{h/2\pi r_{deBroglie}c\}$.$[E_{ss}.e^*]_{mod} = n.m_{ps}.[E_{ss}.\{9\text{x}10^{60}\}.2\pi^2R_{rmp}^3]_{mod}$ = $n.m_{ps}.[E_{ss}.\{2R_e.c^2\}]_{mod} = n.[E_{ps}.E_{ss}]_{mod}.[2R_e]_{mod}$ for $\lambda_{deBroglie}=\lambda_{ps}=h/m_{ps}c$ and $[E_{ps}.e^*]_{mod} = 1$
$\{2R_ec^2\} = 4G_oM_{Hyper}$ for the classical electron radius $R_e=ke^2/m_ec^2$ and describes its Hyper-Mass $M_{Hyper\text{-}electron} = R_ec^2/2G_o = ke^2/2G_om_e = 1.125\text{x}10^{12}$ kg*
for an effective electron mass of $m_e = ke^2/2G_o(1.125\text{x}10^{12}) = 9.290527148\text{x}10^{-31}$ kg* in string units and where $k = 1/4\pi\varepsilon_o = [G_o]_u = [30c]_u = 9\text{x}10^9$ $(Nm^2/C^2)^*$.

The curvature radius for the electron mass $m_e = r_{electron}c^2/2G_o$ then becomes $r_{electron} = 2G_om_e/c^2$ = $2.293957...\text{x}10^{-57}$ m* in string-membrane inflaton space as $1.44133588\text{x}10^{-34}$ r_{ps} in the wormhole instanton space.

$R_e/r_{inflaton\text{-}electron} = M_{Hyper\text{-}electron}/m_e = 1.2109108...\text{x}10^{42}$ = ½(EMI/GI) = ½$(e^2/G_o^2m_e^2)$ =½ $\{e/G_om_e\}^2$ = ½($2.421821677\text{x}10^{42}$) for the classical electron radius R_e halved from the classical electron diameter $2R_e$ from the definition for the modulated supermembrane coupled in $E_{ps}E_{ss}=h^2$ and $E_{ps}/E_{ss}=f_{ps}^2=1/f_{ss}^2$.

Mass $M = n.m_{ss} = \Sigma m_{ss} = n.\{m_{ps}\}$.$[E_{ss}.e^*]_{mod} = n.\{m_{ps}\}[\{hf_{ss}\}.2\pi^2R_{rmp}^3]_{mod} = n.[m_{ps}f_{ss}^2]_{mod} = n.[hf_{ss}/c^2]$ = $n.m_{ss}$

$R_{ps} = \lambda_{ps}/2\pi$ as the wormhole radius of the Instanton as a conformally transformed Planck-Length $L_p = \sqrt{\{G_o h/2\pi c^3\}}$ from the Inflaton.



The Schwarzschild metric for $2L_p = 2G_o M_p/c^2$ transforms a 3D Planck-length in the Planck-mass $M_p = \sqrt{\{hc/2\pi G_o\}}$ from the Planck-boson gravitational fine structure constant $1 = 2\pi G_o M_p^2/hc$. The Schwarzschild metric for the Weyl-wormhole radius R_{ps} then defines a hypermass M_{hyper} as the conformal mapping of the Planck-mass M_p as $M_{hyper} = ½\{R_{ps}/L_p\}M_p = ½\{R_{ps}/L_p\}^2.M_{ps}$ and where $M_{ps} = E_{ps}/c^2 = hf_{ps}/c^2 = kT_{ps}/c^2$ in fundamental expressions for the energy of Abba-E_{ps} as one part of the supermembrane $E_{ps}.E_{ss}$ in physical quantities of mass m, frequency f and temperature T.

c^2 and h and k are fundamental constants of nature obtained from the initializing algorithm of the Mathimatia and are labeled as the 'square of lightspeed c' and 'Planck's constant h' and 'Stefan-Boltzmann's constant k' respectively.

The complementary part of supermembrane $E_{ps}E_{ss}$ is Ess-Baab. Eps-Abba is renamed as 'Energy of the Primary Source-Sink' and Ess-Baab is renamed as 'Energy of the Secondary Sink-Source'. The primary source-sink and the primary sink-source are coupled under a mode of mirror-inversion duality with Eps describing a vibratory and high energy micro-quantum quantum entanglement with Ess as a winding and low energy macro-quantum energy.
It is this quantum entanglement, which allows Abba to become part of Universe in the encompassing energy quantum of physicalized consciousness, defined in the magnetopolar charge.

The combined effect of the applied Schwarzschild metric then defines a Compton Constant to characterize the conformal transformation as: Compton Constant $h/2\pi c = M_pL_p = M_{ps}R_{ps}$.

Quantum gravitation now manifests the mass differences between Planck-mass M_p and Weyl-mass M_{ps}.
The Black Hole physics had transformed M_p from the definition of L_p; but this transformation did not generate M_{ps} from R_{ps}, but rather hypermass M_{hyper}, differing from M_{ps} by a factor of $\frac{1}{2}\{R_{ps}/L_p\}^2$.

To conserve supersymmetry, Logos defined an Anti-Instanton as the Inflaton of Khaibit to define the conformal mapping of M_{ps} from Universe into Khaibit as $2M_p\{L_p/R_{ps}\}^2$.

The classical approach described in the Feynman lecture derives the momentum of a moving electron in deriving the volume element for electromagnetic momentum $p=m_{electromagnetic}.v.=m_{emr}.v$ with the component of the electron's motion v parallel gsinθ and a relativistic velocity $v_{rel}=v\gamma=v/\sqrt{1-[v/c]^2}$ modifying $p_{rel}=p\gamma$

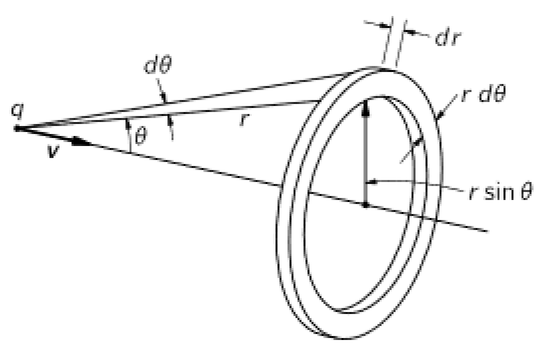
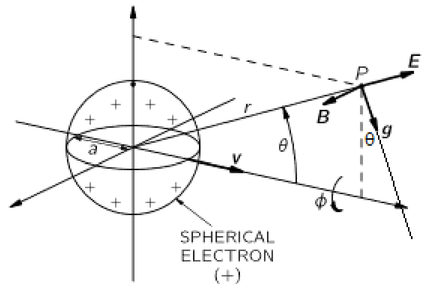


Fig. 28–2. The volume element $2\pi r^2 \sin\theta\, d\theta\, dr$ used for calculating the field momentum.



B perpendicular E and v

gsinθ in direction of v
gcosθ transverse direction of v

Fig. 28–1. The fields $\boldsymbol{E}$ and $\boldsymbol{B}$ and the momentum density $\boldsymbol{g}$ for a positive electron. For a negative electron, $\boldsymbol{E}$ and $\boldsymbol{B}$ are reversed but $\boldsymbol{g}$ is not.

For magnetic field $B = vxE/c^2 = v.E.\sin\theta/c^2$ the momentum density $\varepsilon_o ExB = \varepsilon_o v.E^2\sin\theta/c^2$ electric energy density $U_e=½\varepsilon_o E^2$ and $E=q/(4\pi\varepsilon_o r^2)$ and $dV = 2\pi r^2.\sin\theta.d\theta.dr$ for the spacetime interval from some minimum boundary a to ∞ and with $\int 1/r^2\, dr = |-1/r|[\infty,a] = 0^- + 1/a = 1/a$ for $a=R_e$ for the waved particle electron

$p = \int\varepsilon_o v(E\sin\theta/c)^2\, dV = p_{rel} = \{2\pi\varepsilon_o v\gamma/c^2\}\{q^2/16\pi^2\varepsilon_o{}^2\}\int r^{-2}.\{\sin^3\theta.d\theta\}.dr = \{v\gamma q^2/8\pi\varepsilon_o c^2\}\int r^{-2}.\{\sin^3\theta.d\theta\}.dr$
$= \{v\gamma q^2/8\pi.a.\varepsilon_o c^2\}\int\sin^3\theta.d\theta = \{v\gamma q^2/8\pi.a.\varepsilon_o c^2\}\int\{1-\cos^2\theta\}\sin\theta.d\theta = \{v\gamma q^2/8\pi.a.\varepsilon_o c^2\}|⅓\cos^3\theta - \cos\theta|[\pi,0]$
$= \{v\gamma q^2/8\pi.a.\varepsilon_o c^2\}\ |-⅓+1-⅓+1| = v\gamma q^2/6\pi.a.\varepsilon_o c^2 = \mu_o v\gamma e^2/6\pi.R_e$ **p_{rel}**
$= \mu_o v\gamma e^2/6\pi.R_e$ for $m_{emr} = \mu_o\gamma e^2/6\pi.R_e = \{4/3\}½m_e = ⅔m_e > ½m_e$

The electromagnetic mass must however be exactly U_e/c^2 by the postulates of Relativity and so the classical derivation must be modified in the particle nature of the electron in its associated quantum mechanical nature.

Using $m_{emr} = m_o = m_e/2A = \mu_o\gamma e^2/6\pi.R_e = \{4/3\}½m_e = ⅔m_e$ defines A=¾ in the $(v/c)^2$ distribution and for a velocity:

$B^2=\{v/c\}^2 = -⅚\pm\sqrt{(19/12)}$ for roots x=0.425 and y=-2.092; with $v_{electron} = 0.65189908\ c$ in $U_m = (½v^2)\mu_o e^2/4\pi R_e = ½m_e v^2$

$\{4/3\}.U_e/c^2 = \{4/3\}\gamma e^2/8\pi.\varepsilon_o R_e c^2 = \{4/3\}½m_e = \{4/3\}.U_m/c^2 = \{4/3\}.\mu_o\gamma e^2/8\pi.R_e = \{4/3\}\gamma ke^2/e^* = \{4/3\}\gamma ke^2.hf^* = (1-⅓)m_e$ for an apparent rest mass $⅔m_e$.
The corresponding energy level for this mass increase of $⅓m_e$ for a velocity of 0.745 c is 2.788×10^{-14} Joules* or 0.17350 MeV* (0.17307 MeV) for a dynamic mass m_e.

The classical electromagnetic mass m_{emr} becomes quantum mechanical in the string-brane sourcesink energy E*-Gauge photon quantum of the Quantum Big Bang Weylian wormhole. In particular setting the classical electron radius at $(3/2)R_e = \alpha h/(2\pi c.⅔m_e) = \alpha h/2\pi cm_e = 4.1666.\times10^{-15}$ m* (4.15971430×10^{-15} m) normalizes the {4/3} factor from the classical derivation of the electromagnetic mass for the electron in the mean value for the A=½ to A=1 interval for the $ß^2$ distribution.

$$\mathbf{E^* = E_{ps} = hf_{ps} = hc/\lambda_{ps} = m_{ps}c^2 = (m_e/2e).\sqrt{[2\pi G_o/\alpha hc]} = \{m_e/m_P\}/\{2e\sqrt{\alpha}\} = 1/2R_ec^2} = 1/e^* \text{.........}\mathbf{[Eq.17]}$$

Expressing the electromagnetic mass in a series perturbation expansion in decreasing the classical electron size so sets a minimum size for the electron at the Weyl boundary or 'Planck-Stoney Bounce' limit at R_e in $x/c^2 = \lambda_{ps}/2\pi$ for $x = r_{ps}c^2 = 2G_oM_{Hubble}$ = Wormhole Radius of the Instanton of the quantum gravitational Big Bang creation event.

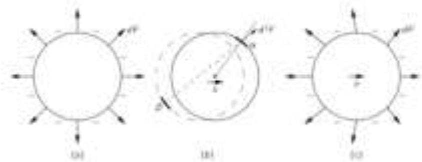


Fig. 28-3. The self-force on an accelerating electron is not zero because of the retardation. (By dF we mean the force on a surface element da; by d^2F we mean the force on the surface element da_α from the charge on the surface element da_β.)

The picture is something like this. We can think of the electron as a charged sphere. When it is at rest, each piece of charge repels electrically each other piece, but the forces all balance in pairs, so that there is no *net* force. [See Fig. 28-3(a).] However, when the electron is being accelerated, the forces will no longer be in balance because of the fact that the electromagnetic influences take time to go from one piece to another. For instance, the force on the piece α in Fig. 28-3(b) from a piece β on the opposite side depends on the position of β at an earlier time, as shown. Both the magnitude and direction of the force depend on the motion of the charge. If the charge is accelerating, the forces on various parts of the electron might be as shown in Fig. 28-3(c). When all these forces are added up, they don't cancel out. They would cancel for a uniform velocity, even though it looks at first glance as though the retardation would give an unbalanced force even for a uniform velocity. But it turns out that there is no net force unless the electron is being accelerated. With acceleration, if we look at the forces between the various parts of the electron, action and reaction are not exactly equal, and the electron exerts a force on *itself* that tries to hold back the acceleration. It holds itself back by its own bootstraps.

It is possible, but difficult, to calculate this self-reaction force; however, we don't want to go into such an elaborate calculation here. We will tell you what the result is for the special case of relatively uncomplicated motion in one dimension, say x. Then, the self-force can be written in a series. The first term in the series depends on the acceleration $\ddot{x}$, the next term is proportional to $\dddot{x}$, and so on.[1] The result is

$$F = \alpha \frac{e^2}{ac^2}\ddot{x} - \frac{2}{3}\frac{e^2}{c^3}\dddot{x} + \gamma \frac{e^2 a}{c^4}\ddddot{x} + \cdots, \qquad (28.9)$$

where α and γ are numerical coefficients of the order of 1. The coefficient α of the $\ddot{x}$ term depends on what charge distribution is assumed; if the charge is distributed uniformly on a sphere, then $\alpha = 2/3$. So there is a term, proportional to the acceleration, which varies inversely as the radius a of the electron and agrees exactly with the value we got in Eq. (28.4) for m_{elec}. If the charge distribution is chosen to be different, so that α is changed, the fraction 2/3 in Eq. (28.4) would be changed in the same way. The term in $\dddot{x}$ is independent of the assumed radius a, and also of the assumed distribution of the charge; its coefficient is *always* 2/3. The next term is proportional to the radius a, and its coefficient γ depends on the charge distribution. You will notice that if we let the electron radius a go to zero, the last term (and all higher terms) will go to zero; the second term remains constant, but the first term—the electromagnetic mass—goes to infinity. And we can see that the infinity arises because of the force of one part of the electron on another—because we have allowed what is perhaps a silly thing, the possibility of the "point" electron acting on itself.

Modular duality $E_{ps}= hf_{ps}=1/e^*$ = Energy primary sourcesink quantum as the Weyl wormhole energy then transforms the electron's self- energy in a decomposition or fine structure of the classical electron radius and as 'spacetime awareness' or 'physical consciousness'. Spacetime awareness |df/dt| acting on a volume of space in a holographic Weyl Bound conformally maps and integrates the quantum gravitational wormhole of wavelength $\lambda_{ps}=10^{-22}$ m* onto the classical electron radius as: $R_{wormhole}/R_{electron} = 360/(2\pi.10^{10})$.

This can be defined as a form of angular acceleration |alpha omega = αω| = $|df/dt|_e = e^*/V^* = \lambda_{ps}/hc.V^*$ acting on space time volumars or multi-dimensional branes in particle-wave interactions of elementary particles-wavicles. It is so the space occupied and containing dynamical interactions, which render the synthesis of classical physics with quantum mechanics possible; the underpinning nature for those interactions being based on the quantum geometry of the conformal transformations from and to the higher dimensional and closed-open Anti de Sitter (AdS) spacetimes intersecting the lower dimensional and open-closed de Sitter (dS) spacetimes in the mirror duality between two convex manifolds intersected in a ‘mirror-lens of concavity’ (see quantum gravity diagram above).

$m_{emr} = \mu_o\gamma e^2/6\pi.R_e = \{4/3\}.U_e/c^2 = \{4/3\}\gamma e^2/8\pi.\varepsilon_oR_e\,c^2 = \{4/3\}½m_e = \{4/3\}.U_m/c^2 = \{4/3\}.\mu_o\gamma e^2/8\pi.R_e = \{4/3\}\gamma ke^2/e^* = \{4/3\}\gamma ke^2.hf^*$

As the electromagnetic mass must however be exactly U_e/c^2 by the postulates of Relativity and so the classical derivation must be modified in the particle nature of the electron in its associated quantum mechanical nature.

A Self-Interaction for the electron in the jerk or time derivative of acceleration d^3x/dt^3 is naturally found in the definition of the classical size of the electron in the wormhole quantization.
The self-interaction of the electron then can be considered as a deformation of the size of the electron using both the classical scale of the particular and the quantum mechanical form in the nature of its intrinsic quantum spin in the form of an angular acceleration given as the time derivative of frequency df/dt.

The extension of Newton's Law in relativistic momentum and energy leads to $dp_{rel}/dt = d(m_o\gamma v)/dt = m_o d(\gamma v)/dt + \gamma v d(m_o)/dt = m_o d(\gamma v)/dt + \{\gamma vh/c^2\}df/dt = m_o\gamma^3.dv/dt + \{\gamma vh/c^2\}df/dt$.
It then is the dynamical interaction of the electron with spacetime itself, that changes the classical volume of the electron as a function of df/dt in the membrane space of $2R_ec^2$=Volume x Angular radially independent acceleration.

Using this electron self-interaction as a conformal mapping from the Quantum Big Bang 'singularity' from the electric charge in brane bulk space as a magnetic charge onto the classical spacetime of Minkowskian and from the Planck parameters onto the atomic-nuclear diameters in $2R_ec^2 = e^*$ from the Planck length conformally maps the Planck scale onto the classical electron scale as the classical electron radius and as defined in the alpha electromagnetic fine structure and the related mass-charge definition for the eigen energy of the electron in $m_ec^2=ke^2/R_e$.

The pre-Big Bang 'bounce' of many models in cosmology can be found in a direct link to the Planck-Stoney scale of the 'Grand-Unification-Theories'. In particular it can be shown, that the Square root of Alpha, the electromagnetic fine structure constant, multiplied by the Planck length results in a Stoney-transformation factor $L_P\sqrt{\alpha} = e/c^2$ in a unitary coupling between the quantum gravitational and electromagnetic fine structures.

$G_ok=1$ for $G_o=4\pi\varepsilon_o$ and representing a conformal mapping of the Planck length onto the scale of the 'classical electron' in superposing the lower dimensional inertia coupled electric charge quantum 'e' onto a higher dimensional quantum gravitational-D-brane magnetopole coupled magnetic charge quantum $'e^*' = 2R_e.c^2 = 1/hf_{ps} = 1/E_{Weyl\ wormhole}$ by the application of the mirror/T duality of the supermembrane $E_{ps}E_{ss}$ of heterotic string class HE(8x8).

Also in a model of quantum relativity (QR), there is a quantization of exactly 10^{10} wormhole 'singularity-bounce' radii defining the radian-trigonometric Pi ratio as $R_{wormhole}/R_{electron} = 360/2\pi.10^{10}$ or $10^{10} = \{360/2\pi\}\{R_e/r_{wormhole}\}$ as a characteristic number of microtubules in a conformal mapping from the classical electron space onto the 'consciousness' space of the neuron-cell intermediate between the Hubble scale of 10^{26} m and the Planck scale of 10^{-35} m as geometric mean of 10^{-4} to 10^{-5} meters.

It is so the geometry of the architecture of the microtubules and the nature of their construction utilizing the pentagonal quasi-crystalline pattern in its application for maximizing the compression of information in the Fibonacci geometrical pattern-sequencing. This then results in the conformal

mapping of this geometry as a quantum geometry and defining physical consciousness as a conformal mapping of the quantum of spacetime in the form of Weylian 'Quantum Big Bang' wormholes of the cosmogenesis.
{https://cosmosdawn.net/index.php/en...he-weyl-curvature-hypothesis-of-roger-penrose}

The 4/3 factor from the classically derived electromagnetic mass appears in the quantum geometry of the subatomic particles, namely in the different quark content for the positively charged proton and the electrically overall neutral neutron, both displaying an internal charge distribution, however.

For the Proton, one adds one (K-IR-Transition energy) and subtracts the electron-mass for the d-quark level and for the Neutron one doubles this to reflect the up-down-quark differential. An electron perturbation subtracts one 2-2/3=4/3 electron energy as the difference between 2 leptonic rings from the proton's 2 up-quarks and 2-1/3=5/3 electron energy from the neutron' singular up-quark to relate the trisected nucleonic quark geometric template. This is revisited below.

Proton m_p=u.d.u=K.KIR.K=(939.776+1.5013-0.5205-0.1735) MeV* = 940.5833 MeV* (938.270 MeV).
Neutron m_n=d.u.d=KIR.K.KIR=(939.776+3.0026-1.0410+0.1735) MeV* = 941.9111 MeV* (939.594 MeV).

This is the ground state from the Higgs-Restmass-Induction-Mechanism and reflects the quarkian geometry as being responsible for the inertial mass differential between the two elementary nucleons. All ground state elementary particle masses are computed from the Higgs Scale and then become subject to various fine structures.

But modular string duality defines the Inverse Energy of the wormhole as the quantum of physical consciousness in units of the product of the classical electron diameter and the proportionality between energy and mass in the Maxwell constant $c^2 = 1/\varepsilon_o□_o$ and the inverse of the product between electric permittivity $\varepsilon_o=1/120c\pi$ and magnetic permeability $\mu_o=120\pi/c$ for 'free space' impedance: Z_o= electric field strength E/magnetic field strength H = $\sqrt{(\mu_o/\varepsilon_o)}$ = $c\mu_o = 1/c\varepsilon_o = 120\pi$}.

Coulomb Electro Charge e = $L_P.\sqrt{\alpha}.c^2 \leftrightarrow 2R_e.c^2$ = e* (Star Coulomb Magneto Charge)

$e^* = 2R_ec^2 = 2ke^2/m_e = e^2/2\pi\varepsilon_om_e = \alpha hc/\pi m_e$ with Alpha-Variation $(1.6021119\text{x}10^{19}/1.60217662\text{x}10^{-19})^2$ = 0.99991921...for the calibration
$\{R_em_e\} = \mu_oe^2/4\pi = (2.8179403267\text{x}10^{-15}\text{ m})(9.10938356\text{x}10^{-31}\text{ kg}) = (2.818054177\text{x}10^{-15}\text{ m})(9.109015537\text{x}10^{-31}\text{ kg}) = (10^{-7})(1.60217662\text{x}10^{-19}\text{ C})^2$
$= [2.56696992\text{x}10^{-45}].[1.001671358][1.003753127].(0.99991921...)$ (mkg)*
$= [2.56696992\text{x}10^{-45}].[1.002711702]^2.[0.99991921...] = 2.580701985\text{x}10^{-45}$ {mkg}* = $(2.77777..\text{x}10^{-15}\text{ m*})(9.290527148\text{x}10^{-31}\text{ kg*}) = \mu_oe^2/4\pi$ for $e=1.606456344\text{x}10^{-19}$ C* for the

quantum mechanical electron and adjusted in the [SI/*] alpha variation [mkg/C^2] = Alpha Variation α_{var} in $\{R_e m_e.\alpha_{var}\}_{SI} = \{\alpha_{var}.\mu_o e^2/4\pi\}_{SI} = \{R_e m_e\}^* = \{\mu_o e^2/4\pi\}^*$.

Decreasing the electronic charge quantum from 1.60217662×10^{-19} C to $1.602111893\times10^{-19}$ C so calibrates the SI-unitary measurement system with the star based * unitary mensuration system in the alpha variation in a reduced classical electron radius of $R_e = 2.773142866\times10^{-15}$ m for an increased electron effective rest mass of $m_e = 9.255789006\times10^{-31}$ kg or
for $(R_e m_e) = (\mu_o e^2/4\pi) = 2.566762525\times10^{-45}$ mkg.

From Wikipedia: https://en.wikipedia.org/wiki/Electron
The electron has no known substructure.[1][75] and it is assumed to be a point particle with a point charge and no spatial extent.[9] In classical physics, the angular momentum and magnetic moment of an object depend upon its physical dimensions. Hence, the concept of a dimensionless electron possessing these properties contrasts to experimental observations in Penning traps which point to finite non-zero radius of the electron. A possible explanation of this paradoxical situation is given below in the "Virtual particles" subsection by taking into consideration the
FoldyWouthuysen transformation.

The issue of the radius of the electron is a challenging problem of the modern theoretical physics. The admission of the hypothesis of a finite radius of the electron is incompatible to the premises of the theory of relativity. On the other hand, a point-like electron (zero radius) generates serious mathematical difficulties due to the self-energy of the electron tending to infinity.[76] These aspects have been analyzed in detail by Dmitri Ivanenko and Arseny Sokolov.

Observation of a single electron in a Penning trap shows the upper limit of the particle's radius is 10^{-22} meters.[77] Also an upper bound of electron radius of 10^{-18} meters[78] can be derived using the uncertainty relation in energy.

There *is* also a physical constant called the "classical electron radius", with the much larger value of 2.8179×10^{-15} m, greater than the radius of the proton. However, the terminology comes from a simplistic calculation that ignores the effects of quantum mechanics; in reality, the so-called classical electron radius has little to do with the true fundamental structure of the electron.[79][note 5]

Note that the defined maximum scale for the electron in the Penning Trap is consistent with the defined size of the wormhole radius $r_{ps}=10^{-22}/2\pi$ meters as minimum spacetime configuration of the Instanton. The 'point particular' electron of Quantum Electrodynamics and its point-like particle fields, so crystallizes naturally from the theory of the string-membrane classes. The classical electron radius R_e has much to do with the quantum mechanical electron addressed by Richard Feynman in the linked lecture.

From the Feynman Lecture:
There is, however, one fundamental objection to this theory and to all the other theories we have described. All particles we know obey the laws of quantum mechanics, so a quantum-mechanical modification of electrodynamics has to be made. Light behaves like photons. It is not 100 percent like the Maxwell theory. So the electrodynamic theory has to be changed. We have already mentioned that it might be a waste of time to work so hard to straighten out the classical theory, because it could turn out that in quantum electrodynamics the difficulties will disappear or may be resolved in some other fashion. But the difficulties do not disappear in quantum electrodynamics. That is one of the reasons that people have spent so much effort trying to straighten out the classical difficulties, hoping that if they *could* straighten out the classical difficulty and *then* make the quantum modifications, everything would be straightened out. The Maxwell theory still has the difficulties after the quantum mechanics modifications are made.

The quantum effects do make some changes—the formula for the mass is modified, and Planck's constant $h/2\pi$ appears—but the answer still comes out infinite unless you cut off an integration somehow—just as we had to stop the classical integrals at $r=a$. And the answers depend on how you stop the integrals. We cannot, unfortunately, demonstrate for you here that the difficulties are really basically the same, because we have developed so little of the theory of quantum mechanics and even less of quantum electrodynamics. So you must just take our word that the quantized theory of Maxwell's electrodynamics gives an infinite mass for a point electron. It turns out, however, that nobody has ever succeeded in making a *self-consistent* quantum theory out of *any* of the modified theories. Born and Infeld's ideas have never been satisfactorily made into a quantum theory. The theories with the advanced and retarded waves of Dirac, or of Wheeler and Feynman, have never been made into a satisfactory quantum theory. The theory of Bopp has never been made into a satisfactory quantum theory. So today, there is no known solution to this problem. We do not know how to make a consistent theory—including the quantum mechanics—which does not produce an infinity for the self-energy of an electron, or any point charge. And at the same time, there is no satisfactory theory that describes a non-point charge. It is an unsolved problem.

In case you are deciding to rush off to make a theory in which the action of an electron on itself is completely removed, so that electromagnetic mass is no longer meaningful, and then to make a quantum theory of it, you should be warned that you are certain to be in trouble. There is definite experimental evidence of the existence of electromagnetic inertia—there is evidence that some of the mass of charged particles is electromagnetic in origin.

It used to be said in the older books that since Nature will obviously not present us with two particles—one neutral and the other charged, but otherwise the same—we will never be able to tell how much of the mass is electromagnetic and how much is mechanical. But it turns out that Nature *has* been kind enough to present us with just such objects, so that by comparing the observed mass of the charged one with the observed mass of the neutral one, we can tell whether there is any electromagnetic mass. For example, there are the neutrons and protons. They interact with tremendous forces—the nuclear forces—whose origin is unknown. However, as we have already described, the nuclear forces have one remarkable property. As far as they are concerned, the neutron and proton are exactly the same.

The *nuclear* forces between neutron and neutron, neutron and proton, and proton and proton are all identical as far as we can tell. Only the little electromagnetic forces are different; electrically the proton and neutron are as different as night and day. This is just what we wanted. There are two particles, identical from the point of view of the strong interactions, but different electrically. And they have a small difference in mass. The mass difference between the proton and the neutron—expressed as the difference in the rest-energy mc^2 in units of MeV—is about 1.3 MeV, which is about 2.6 times the electron mass. The classical theory would then predict a radius of about ½ to ⅓ the classical electron radius, or about 10^{-13} cm. Of course, one should really use the quantum theory, but by some strange accident, all the constants—2π's and $h/2\pi$'s, etc.—come out so that the quantum theory gives roughly the same radius as the classical theory.

The only trouble is that the *sign* is wrong! The neutron is *heavier* than the proton.

Nature has also given us several other pairs—or triplets—of particles which appear to be exactly the same except for their electrical charge. They interact with protons and neutrons, through the so-called "strong" interactions of the nuclear forces. In such interactions, the particles of a given kind—say the π-mesons—behave in every way like one object *except* for their electrical charge. In Table 28–1 we give a list of such particles, together with their measured masses. The charged π-mesons—positive or negative—have a mass of 136.9 MeV, but the neutral π^o-meson is 4.6 MeV lighter. We believe that this mass difference is electromagnetic; it would correspond to a particle radius of 3 to 4×10^{-14} cm. You will see from the table that the mass differences of the other particles are usually of the same general size.

Now the size of these particles can be determined by other methods, for instance by the diameters they appear to have in high-energy collisions. So the electromagnetic mass seems to be in general agreement with electromagnetic theory, if we stop our integrals of the field energy at the same radius obtained by these other methods. That is why we believe that the differences do represent electromagnetic mass.

Table 28–1 Particle Masses

Particle	Charge (electronic)	Mass (MeV)	Δm[1] (MeV)
n (neutron)	0	939.5	
p (proton)	+1	938.2	−1.3
π (π-meson)	0	135.0	
	±1	139.6	+4.6
K (K-meson)	0	497.8	
	±1	493.9	−3.9
Σ (sigma)	0	1191.5	
	+1	1189.4	−2.1
	−1	1196.0	+4.5

[1] Δm = (mass of charged) − (mass of neutral).

You are no doubt worried about the different signs of the mass differences in the table. It is easy to see why the charged ones should be heavier than the neutral ones. But what about those pairs like the proton and the neutron, where the measured mass comes out the other way? Well, it turns out that these particles are complicated, and the computation of the electromagnetic mass must be more elaborate for them. For instance, although the neutron has no *net* charge, it *does* have a charge distribution inside it—it is only the *net* charge that is zero. In fact, we believe that the neutron looks—at least sometimes—like a proton with a negative π-meson in a "cloud" around it, as shown in Fig. 28–5. Although the neutron is "neutral," because its total charge is zero, there are still electromagnetic energies (for example, it has a magnetic moment), so it is not easy to tell the sign of the electromagnetic mass difference without a detailed theory of the internal structure.

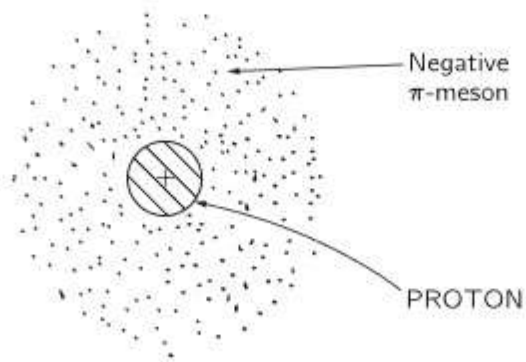
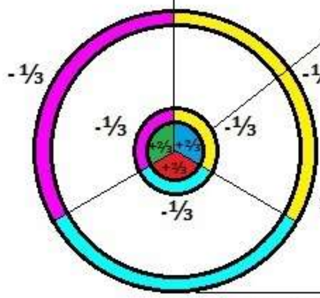


Fig. 28–5. A neutron may exist, at times, as a proton surrounded by a negative π-meson.

The negatively charged pion cloud of Feynman and Yukawa can be substituted by the inner negatively charged mesonic Inner Ring in the quantum geometry of the quarks based on colour charged or chromodynamic double charged kernels surrounded by an Inner Mesonic and an outer Leptonic Ring wave structure asymptotically confined by a magneto charged region known as the classical radius of the electron. The rings are oppositely charged to the kernel quarks. They however remain coupled in the kernel trisection say as the protons udu=K.KIR.K=K(K+IR)K or the neutron's dud=KIR.K.KIR=(IR+K)K(K+IR) except when they experience the electro-weak decays.

The Universal Quantum Geometric Matter-AntiMatter Template

Matter AntiNeutrino Kernel KKK	AntiMatter Neutrino Kernel $\overline{KKK}$
Matter Core KKK = CMY	AntiMatter Core $\overline{KKK}$ = CYM



-⅓ Mesonic Matter Inner Ring IR

Matter Template CyanMagentaYellow
CMY=MYC=YCM
$Red^2 Green^2 Blue^2$
RRGGBB=GGBBRR=BBRRGG

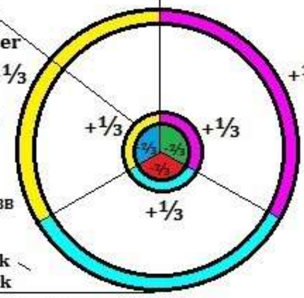
K=u-core quark
KIR=d-wave quark
KOR=s-wave quark

-⅓ Leptonic Matter Outer Ring OR

Mesonic AntiMatter Inner Ring $\overline{IR}$ +⅓

AntiMatter Template CyanYellowMagenta
CYM=YMC=MCY
$Red^2 Blue^2 Green^2$
RRBBGG=BBGGRR=GGRRBB

$\overline{K}=\bar{u}$-core antiquark
$\overline{KIR}=\bar{d}$-wave antiquark
$\overline{KOR}=\bar{s}$-wave antiquark



Leptonic AntiMatter Outer Ring $\overline{OR}$ +⅓

ElectroCharge 3(-⅓) = -1 for IR & OR
MagnetoCharge RGB = 0 for IR & OR

ElectroCharge 3(+⅔) = +2 for Kernel KKK
MagnetoCharge RRGGBB = 0 for Kernel KKK

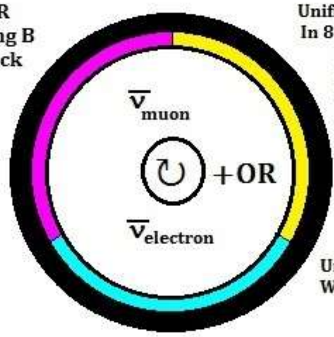
ElectroCharge 3(+⅓) = +1 for $\overline{IR}$ & $\overline{OR}$
MagnetoCharge BGR = 0 for $\overline{IR}$ & $\overline{OR}$

ElectroCharge 3(-⅔) = -2 for Kernel $\overline{KKK}$
MagnetoCharge BBGGRR = 0 for Kernel $\overline{KKK}$

MagnetoCharge = ColourCharge = GluonCharge

Matter OR
Outer Ring B
BBB=Black

W^-



Unified Kernel = Gluon for Strong Nuclear Interaction
In 8 KKK Permutations of the MagnetoCharge:

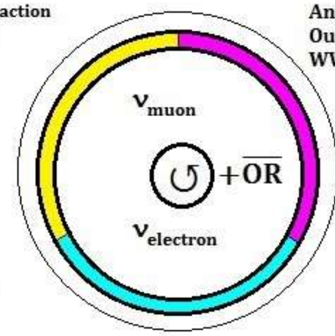
{BBB=Pure massive eigenstate in $E=mc^2$
BBW; BWB; WBB; BWW;WBW;WWB;
WWW=Pure radiative eigenstate in E=hf}
3-quark content: hyperons-baryons-nucleons

And in 4 $K\overline{K}$ Permutations:
{BB; BW; WB; WW}
quark-antiquark content: mesons

Unified Kernel = (Anti)Neutrino for
Weak Nuclear Interaction & 0 ElectroCharge

AntiMatter $\overline{OR}$
Outer Ring W
WWW=White

W^+



Matter Weakon W-minus
ElectroCharge -1 for OR
Muon μ^- or Electron e^-
MagnetoCharge = 0 for AntiNeutrino Core

[+] Clockwise Righthand | [-] Anticlockwise Lefthand
Quantum Spin

AntiMatter Weakon W-plus
ElectroCharge +1 for $\overline{OR}$
AntiMuon μ^+ or Positron e^+
MagnetoCharge = 0 for Neutrino Kernel

$$e^- + \bar{\nu}_{electron} = W^-[+1] = \mu^- + \bar{\nu}_{muon}$$

OR-Flip = $W^-[+1]$ + ↻ [-1]
GraviPhoton

Vortex-Potential-Energy
VPE = ZPE
OR-Flip
+ $\overline{OR}$-Flip
(Core +OR)VPE
YCM+YMC=(CM=B)YY(B=MC)
BYYB=GMMG=RCCR
YBBY=CRRC=MGGM
RGB+RBG=(GB=C)RR(C=BG)

$$e^+ + \nu_{electron} = W^+[-1] = \mu^+ + \nu_{muon}$$

$\overline{OR}$-Flip = $W^+[-1]$ + ↺ [+1]
GraviPhoton

Neutron ⇨ Proton + Electron + Electron AntiNeutrino

Basic Neutron Beta-Minus Decay: $n^o[-½] ⇨ p^+[-½] + e^-[-½] + \bar{\nu}_e[+½]$

d[-½]u[+½]d[-½](stable in nucleus)⇨ u[+½]d[-½]d[-½](free) ⇨u[+½]d[-½]d*[-½] (IR-OR Oscillation)
⇨u[+½]d[-½](u[-½].W^-[+1].GP[-1])⇨ u[-½]d[+½]u[-½]+e^-[-½]+$\bar{\nu}_e$ [+½]⇨ udu[-½]+electron-OR[-½]+ $\bar{\nu}_e$ [+½]

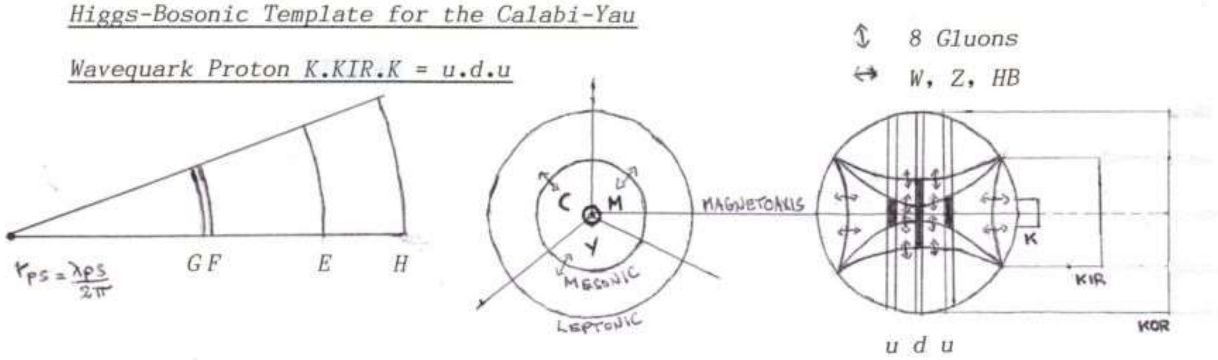
Muon ⇨ Electron + Electron AntiNeutrino + Muon Neutrino

Basic Muon Weak Decay: $\mu^-[-½] ⇨ e^-[-½] + \bar{\nu}_e[+½] + \nu_\mu[-½]$

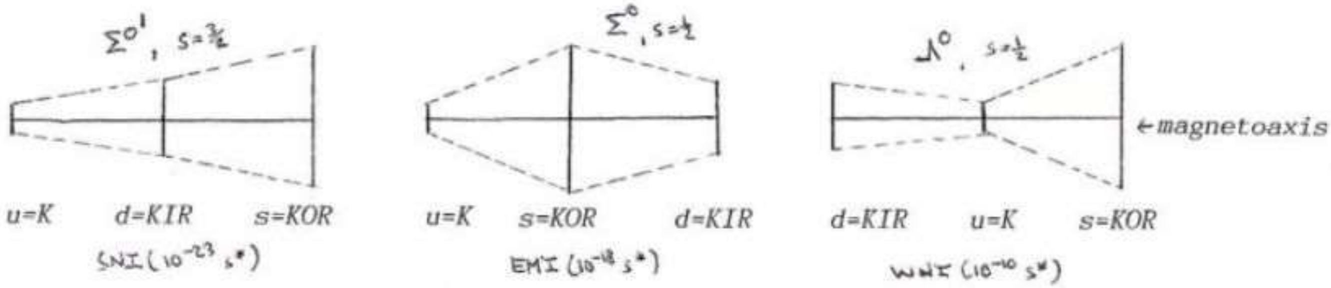
OR^- [-½] (free)⇨ OR^- [-½] (KKK-OR Oscillation) ⇨ (ν_μ.OR)$^-$[-½]).(W^-[+1].GP[-1]) ⇨ e^-[-½] + ν_e[+½] + ν_μ[-½]

Higgs-Bosonic Template for the Calabi-Yau

Wavequark Proton K.KIR.K = u.d.u



The importance of Kernel-Symmetry so is evidenced in the differentiation of the quarkian permutations and specifying for example the KKIRKOR quark state uds as a tripartite symmetry of u.d.s (least stability as SNI-decaying Sigma°' resonance) and u.s.d (EMI-stable Sigma° particle) and d.u.s (WNI-most stable Lambda° particle).



There actually exist three uds-quark states which decay differently via strong, electromagnetic and weak decay rates in the uds (Sigma° Resonance); usd (Sigma°) and the sud (Lambda°) in increasing stability.

This quantum geometry then indicates the behaviour of the triple-uds decay from first principles, whereas the contemporary standard model does not, considering the u-d-s quark eigenstates to be quantum geometrically undifferentiated.

The nuclear interactions, both strong and weak are confined in a 'Magnetic Asymptotic Confinement Limit' coinciding with the $R_e=ke^2/m_ec^2$ and in a scale of so 3 Fermi or 2.8×10^{-15} meters. At a distance further away from this scale, the nuclear interaction strength vanishes rapidly.

Subtracting the Ring-VPE (3L) gives the basic nucleonic K-State as 939.776 MeV*. This excludes the electronic perturbation of the IR-OR oscillation.
For the Proton, one adds one (K-IR-Transition energy) and subtracts the electron-mass for the d-quark level and for the Neutron one doubles this to reflect the up-down-quark differential. An electron perturbation subtracts one 2-2/3=4/3 electron energy as the difference between 2 leptonic rings from the proton's 2 up-quarks and 2-1/3=5/3 electron energy from the neutron' singular up-quark to relate the trisected nucleonic quark geometric template.
Proton m_p=u.d.u=K.KIR.K=(939.776+1.5013-0.5205-0.1735) MeV* = 940.5833 MeV* (938.270 MeV).
Neutron m_n=d.u.d=KIR.K.KIR=(939.776+3.0026-1.0410+0.1735) MeV* = 941.9111 MeV* (939.594 MeV).

This is the ground state from the Higgs-Restmass-Induction-Mechanism and reflects the quarkian geometry as being responsible for the inertial mass differential between the two elementary nucleons. All ground state elementary particle masses are computed from the Higgs Scale and then become subject to various fine structures.

{1} Matter interacts with antimatter-based Neutrinos in Majorana-Dirac Electron Capture

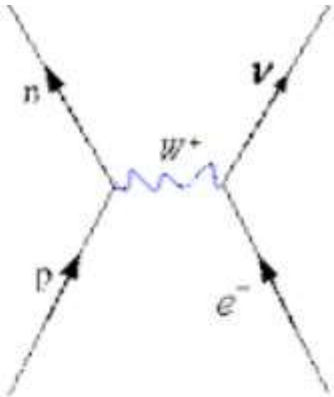
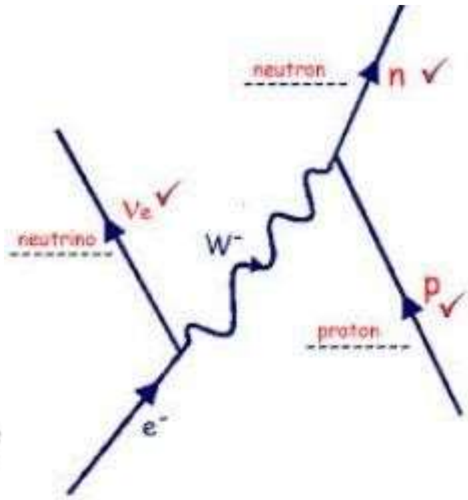
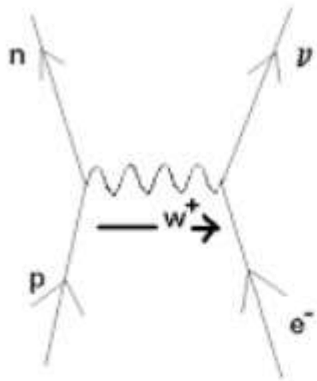


Fig. 1-6 Feynman diagram of Electron capture





Electron Capture

An Electron in the inner atomic nucleus is captured by a proton to create a neutron accompanied by an electron neutrino. This requires a u-quark of the proton to transform into a d-quark of the neutron. As the d-quark is a KIR quark of inner mesonic ring of electro charge [+2/3] coupled to the MIR of electro charge [-1], a W^- weakon must be engaged to couple to a left-handed proton via the Nonparity of the weak nuclear interaction. However in electron capture a left-handed electron neutrino is emitted, requiring the interaction of a W^+ weakon as the kernel gauge for any such right handed antimatter weak decay.

So should the interacting electron initiate electron capture then a W^- becomes the bosonic partner for the interaction; but if it is the interacting proton, then a W^+ should become the weak interaction agent to neutralize its positive electric charge with the negative electric charge of the interacting electron.

The interaction of matter and anti-matter in the form of the weak interaction bosons and their associated anti-neutrinos and neutrinos can however be shown to result from a basic kernel-ring interaction of the anti-neutrinos and neutrinos as both Majorana particles and as Dirac particles. Majorana particles are their own anti-particles allowing identification of right-handed antineutrinos as left-handed neutrinos in the base templated or massless self-state.

Dirac particles distinguish right handed anti-neutrinos from left handed neutrinos due their mass and inertia in their native oscillation potential.

For a left-handed proton u[-½]d[+½]u[-½] and a left-handed electron e^-[-½], the W^- consisting of a right-handed electron and a right-handed anti-neutrino initiates the KIR-Oscillation from the Anti-Neutrino-Gluon kernel of the up quark in coupling it to the OR part of the W^-. The colourless Graviphoton or Gγ rendering the 'virtuality' of the W^- as physically real in neutralizing the bosonic weakon spin, which 'flips' the right-handed anti-neutrino into a left-handed neutrino observed.
Proton p^+[-½] + Electron e^-[-½] ⇒ p^+[-½] + OR^-[-½]* + ({Electron e^-[+½] + Anti$\nu_{electron}$[+½]}$_{W-}$ + Graviphoton[-1])
⇒ d[+½]u[-½]{u[-½] + IR^-[0]}*{KIR-Oscillation $(OR-IR)^o$[-½]+W^-[+1]+GP[-1]} ⇒ d[+½]u[-½]d[-½] + {$(OR-IR)^o$[0] + Anti$\nu_{electron}$[+½]+GP[-1]}
⇒ n^o[-½] + $\nu_{electron}$[-½] with the KIR-Oscillation transferring the interacting left handed electron charge -1 without spin in the OR-IR-K for the IR-K up-down quark transformation {+2/3-1=-1/3} and neutralizing the weakon associated intrinsic right-handed electron spin as +½-½=0 for the remaining OR-IR transition.
The neutron is cyclically delinearized from spin self-state d[+½]u[-½]d[-½] into the triplet configuration YCM=CMY=MYC as d[-½]u[+½]d[-½].

A Magneto axis symmetric Proton K(KIR)K transforms into Magneto axis symmetric Neutron KIR(K)KIR as one of the proton's end Kernel up-quarks 'captures' the Weakonic VPE scalar OR^- Electron Outer Ring in the Unified Field of Quantum Relativity.
It is in fact a W^-, that interacts, but coupling to the left-handed electron instead of the left-handed proton, the latter requiring some coupling to the W^+ weakon in the quantum field to materialize the electron neutrino from the W^+ template in a direct fashion and not as the Majorana-Dirac 'flip' initiated by the W^- from before.
It is the W^+ intrinsic positron which is 'flipped' to 'free' the materializing neutrino from the W^+ weakon base state.
But as the resultant Outer Ring - Inner Ring remnant {$(OR-IR)^+$[0]} is positively charged and not charge neutral as was the case for the previous W^- weakon interaction; the W^+ weakon from the proton is suppressed in electron capture in favour of the W^- weakon from the electron.

Proton p^+[-½] + Electron e^-[-½] ⇒ p^+[-½] + IR^-[-½] + ({Positron e^+[-½] + $\nu_{electron}$[-½]}$_{W+}$ + Graviphoton[+1])
⇒ d[+½]u[-½]{u[-½] + IR^-[0]}*{KIR-Oscillation $(OR-IR)^o$[-½]+e^+[+½]+$\nu_{electron}$[-½]} ⇒ d[+½]u[-½]d[-½] + {$(OR-IR)^+$[0]} +$\nu_{electron}$[-½]
⇒ n^o[+½]+$\nu_{electron}$[-½] + {$(OR-IR)^+$[0]}

The W^- then supplies the required KIR for the up-quark to down-quark transmutation with the gauge spin neutralizer of the left handed Graviphoton [-1] flipping the right-handed electron antineutrino constituent of the W^- into its anti-particular form of a left-handed electron neutrino as a Majorana self-state transforming into a Dirac self-state.

Electron capture so displays the Majorana nature of the two base neutrinos of the electron positron and muon-antimuon definition in their massless gauge nature when engaged in the direct interaction or 'tapping' of the UFoQR in the Vortex-Potential-Energy or VPE/ZPE in $R^2G^2B^2[+½]+B^2G^2R^2[-½] = BY^2B[0]=GM^2G[0]=RC^2R[0]$ = VPE[0].
An Anti-Neutrino template $R^2G^2B^2[+½] = W^2[+½] = B^2G^2R^2[-½]$ as Neutrino template in E=hf radiative 'White'-eigen energy and being undifferentiated between the particle and anti-particular energy eigen state under the application of the spin symmetry of the 'flipping' 'white' Graviphoton.
The Dirac nature of the base neutrinos then can be said to apply to all (anti)neutrinos carrying mass in their oscillation potential and properties exhibited in their wave mechanical dynamics manifested in the Anti-Neutrino template $R^2G^2B^2[+½]$ being the anti-state for the Neutrino template $B^2G^2R^2[-½]$ and without or following the Graviphoton 'flip'.

CP violation in the weak nuclear interaction

The difference between matter and antimatter subsequently derives from the difference between the Outer Ring charge of the W^+ for antimatter and the W^- for matter and so becomes related to the nature of constituent neutrinos and anti-neutrinos in the Kernel-Ring oscillations respectively.
The described gluon-anti-neutrino-electron oscillation from Kernel to mesonic IR to leptonic OR so becomes an inherent supersymmetry between bosonic gluons and fermionic (anti)neutrinos manifesting in the weak interaction and its associated parity violations in Charge-Parity (CP) symmetry.
All quark-antiquark states engaging outer ring oscillations, such as the neutral kaon pairing d.sbar and dbar.s and bottom quark energy states such as b.sbar =(ud)bar.sbar = so will exhibit a difference between matter and antimatter.

For matter IR with antimatter ORbar, for the neutral kaon K^o oscillates from its kernel VPE K.Kbar or u.ubar a matter IR to an antimatter ORbar for the antimatter weakon: K^o = d.sbar = [K+IR].[Kbar+ORbar] = [K.Kbar][0]+[IR*ORbar][0] = [K.Kbar][0]+[IR*{ORbar+$\nu_{electron}$][-1]}$_{W^+}$ +Gγ[+1]

⇒ {u.ubar+d.dbar or u.dbar+ubar.d} + {strong weak anti-gluon-neutrino kernel-ring interaction suppressing any lepton decay products}[-½-½+1]}

⇒ $\{\pi^o+\pi^o$ or $\pi^++\pi^-\}$ ⇒ $K_{short}{}^o$ or

⇒ {ubar.d+e^+[½]+$\nu_{electron}$[-½]} ⇒ π^-[0] + e^+[½]+$\nu_{electron}$[-½] ⇒ $K_{long}{}^o$, if the W^+ manifests from its quantum geometric VPE structure in an ORbar-IR oscillation.

For antimatter IRbar with matter OR, for the neutral kaon K^obar oscillates from its kernel VPE K.Kbar or u.ubar an antimatter IRbar to a matter OR for the matter weakon:

K^o = dbar.s = [Kbar+IRbar].[K+OR] = [K.Kbar][0]+[IRbar*OR][0] = [K.Kbar][0]+[IRbar{OR+anti$\nu_{electron}$][+1]}$_{W^-}$ +Gγ[-1]

⇒ {u.ubar+d.dbar or u.dbar+ubar.d} + {strong weak gluon-anti-neutrino kernel-ring interaction suppressing any lepton decay products}[-½-½+1]}
⇒ {$\pi^o+\pi^o$ or $\pi^++\pi^-$} ⇒ $K_{short}{}^o$ or ⇒ {u.dbar+e[-½]+$\nu_{electron}$[+½]} ⇒ $K_{long}{}^o$, if the W^- manifests from its quantum geometric VPE structure in an IRbar-OR oscillation.

But an exchange of the inner and outer rings in their matter and antimatter nature is also possible resulting in the super positioning of the neutral kaon's wavefunctions and leading to CP violation in that mixing between matter and antimatter in characteristics defined in the weakon quantum geometry.
Here, the Graviphoton does not neutralize the interacting weakon spin, but spin induces the interacting mesonic inner ring in the IR-ORbar or IRbar-OR oscillation and delaying the strong weak kernel-ring interactions for the antigluon-neutrino or gluon-anti-neutrino kernel templates respectively.

K^o = d.sbar = [K+IR].[Kbar+ORbar] = [K.Kbar][0]+[IR*ORbar][0] = [K.Kbar][0]+[IR*[0]{ORbar+$\nu_{electron}$][-1]}$_{W^+}$ +Gγ[+1]
⇒ [u.ubar][0]+{IR*[+1]+ORbar[-1]+$\nu_{electron}$[0]} ⇒ [u.ubar][0]+[KIR.KIRbar][0] ⇒ {u.ubar+d.dbar} as a two-particle decay in anti-gluon-neutrino strong weak interaction and with the Graviphoton[+1] spin inducing the matter based Inner Ring to neutralize the opposite spin of the interacting W^+[-1] weakon.

K^o = dbar.s = [Kbar+IRbar].[K+OR] = [K.Kbar][0]+[IRbar*OR][0] = [K.Kbar][0]+[IRbar{OR+anti$\nu_{electron}$][+1]}$_{W^-}$ +Gγ[-1]
⇒ [u.ubar][0]+{IRbar*[-1]+OR[-1]+anti$\nu_{electron}$[0]} ⇒ [u.ubar][0]+[KIRbar.KIR][0] ⇒ {u.ubar+d.dbar} as a two particle decay in gluon-anti-neutrino strong weak interaction and with the Graviphoton[-1] spin inducing the antimatter based Inner Ring to neutralize the opposite spin of the interacting W^-[+1] weakon.

The difference in the antimatter to matter and matter to antimatter kernel-ring oscillation so results in the mixing of the wave functions to exemplify the CP violation in the neutral kaon as decaying in different fashion and decay rates as the $K_{short}{}^o$ = {d.sbar+dbar.s}/√2 and the $K_{long}{}^o$ = {d.sbar-dbar.s}/√2 in decay times differing in a factor of the light-matter interaction probability α in $t_{Ks}{}^o$=8.95x10^{-11} s* in a two particle decay {$\pi^o+\pi^o$ or $\pi^++\pi^-$ } and 5.18x10^{-8} s* in a three particle decay {$\pi^o+\pi^o+\pi^o$ or $\pi^o+\pi^++\pi^-$ or $\pi^++e^-+\nu_{electron}$ or $\pi^-+e^++\nu$ or similar pion-lepton combinations from the weakon templates} respectively.

This superposition so shows the $K_{short}{}^o$ to engage the W^- and the $K_{long}{}^o$ to utilize the W^+ in a distinct quantum geometric difference between the kernel-inner ring - outer ring oscillations between that of interacting matter weakons and that of interacting antimatter weakons.

The discovery by in 1964 of the $K_{long}{}^{o}$ also at times manifesting a two-particle decay proved the CP violation at the Brookhaven Alternating Gradient Synchrotron Laboratory by a collaboration led by James Cronin and Val Fitch of Princeton University.
As shown above, this CP violation becomes a consequence of wave-quarkian quantum geometry applied to quantum chromodynamics.

For the neutral B-mesons defined in a diquark structure (U=[uu] for c=U.ubar; b=[ud].ubar; t=[ds].U) detailed further on in this paper, the CP violation at a higher energy level becomes more pronounced and susceptible to the measurement of the manifesting energies.
Because the $K_{long}{}^{o}$ decay pattern also allows a two particle decay in the form of the mesonic ring part of the b-quark being spin induced by the Graviphoton, instead of the latter spin neutralizing the weakon spin; an excess of the matter based diquark b=ud.ubar decay patterns relative to the antimatter based anti-diquark bbar=ud.bar.u will be observed in the experimental evidence in the subtraction of the $K_{long}{}^{o}$ decay patterns becoming added to the decay patterns of the $K_{short}{}^{o}$.

Typical decay patterns for the B-mesons are:

B^- = b.ubar = [ud.ubar].ubar = [U+IR+Kbar].[Kbar] = [K+K] + [Kbar+Kbar]+{IR*-OR[+½]+antiν[+½]}$_{W^-}$ +Gγ[-1]
⇒ UUbar+OR[-½]+antiν[+½] ⇒ ucbar[0] + OR[-½] + antiν[+½] ⇒ D^o[0] + (e^-;μ^-)[-½] + antiν[+½]

B^+= bbar.u = [udbar.u].u = [Ubar+IRbar+K].[K] = [Kbar+Kbar] + [K+K] + {IRbar*-ORbar[-½]+ν[-½]}$_{W^+}$ +Gγ[+1]
⇒ UbarU+KIRbar*-ORbar[+½]+ν[-½] ⇒ ubarc[0] + ORbar[+½] + ν[-½] ⇒ D^o[0]+(e^+;μ^+)[+½] + ν[-½]

$B_d{}^o$ = b.dbar = [ud.ubar].dbar = [U+IR+Kbar].[KIRbar] = [U+Kbar+KIRbar] + {IR*-OR[+½]+antiν[+½]}$_{W^-}$ +Gγ[-1]
⇒ Uubar+KIRbar+OR[-½]+antiν[+½] ⇒ c.dbar + OR[-½]+antiν[+½] ⇒ D^+[0] + (e^-;μ^-)[-½]+antiν[+½]

$B_d{}^o$ = bbar.d = [udbar.u].d = [Ubar+IRbar+K].[KIR] = [Ubar+K+KIR]+{IRbar*-ORbar[-½]+ν[-½]}$_{W^+}$ +Gγ[-1]
⇒ Ubaru+KIR+OR[-½]+antiν[+½] ⇒ cbar.d + ORbar[+½] + ν[-½] ⇒ D^-[0] + (e^+;μ^+)[+½] + ν[-½]

$B_s{}^o$ = b.sbar = [ud.ubar].sbar = [U+IR+Kbar].[KORbar] = [U+Kbar+KORbar] + {IR*-OR[+½]+antiν[+½]}$_{W^-}$ +Gγ[-1]
⇒ Uubar+KORbar+OR[-½]+antiν[+½] ⇒ c.sbar + OR[-½]+antiν[+½] ⇒ $D_s{}^+$[0] + (e^-;μ^-)[-½]+antiν[+½]

B_s^o = bbar.s = [udbar.u].s = [Ubar+IRbar+K].[KOR] = [Ubar+K+KOR]+{IRbar*-ORbar[-½]+ν[-½]}$_{W^+}$ +Gγ[-1]

⇒ Ubaru+KOR+OR[-½]+antiν[+½] ⇒ cbar.s + ORbar[+½] + ν[-½] ⇒ D_s^-[0] + (e^+;μ^+)[+½] + ν[-½]

B_c^+= b.cbar = [ud.ubar].cbar = [U+IR+Kbar].[UbarK] = [UKbar+UbarK] + {IR*-OR[+½]+antiν[+½]}$_{W^-}$ +Gγ[-1]

⇒ Uubar+Ubaru+OR[-½]+antiν[+½] ⇒ c.cbar + OR[-½]+antiν[+½] ⇒ J/Ψ[0] + (e^-;μ^-)[-½]+antiν[+½]

B_c^- = bbar.c = [udbar.u].c = [Ubar+IRbar+K].[UKbar] = [UbarK+UKbar]+{IRbar*-ORbar[-½]+ν[-½]}$_{W^+}$ +Gγ[-1]

⇒ Ubaru+Uubar+ORbar[+½]+ν[-½] ⇒ cbar.c + ORbar[+½] + ν[-½] ⇒ J/Ψ[0] + (e^+;μ^+)[+½] + ν[-½]

For antimatter IR and matter OR, a possible decay mode is: B_s^o = bbar.s = [udbar.u].s = [Ubar+IRbar+K].[K+OR]

⇒ [Ubar+IRbar+K].K[0]+({OR+antiν][+1]}$_{W^-}$+Gγ[-1]) ⇒ [Ubar+IRbar+K].[K[0]+(OR[0]+antiν[0])

⇒ ([Kbar.Kbar]+K+IRbar)(K+OR) ⇒ [Kbar.K] +[KIRbar.KOR] + {strong weak kernel-ring gluon-anti-neutrino interaction suppressing any lepton decay products} ⇒ uubar + dbar.s ⇒ π^o + K^o

⇒ [Kbar.KOR]+[K.KIRbar] + {strong weak kernel-ring gluon-anti-neutrino interaction suppressing any lepton decay products} ⇒ ubar.s + udbar ⇒ K^- + π^+

⇒ ([K.K]+Kbar.Kbar)+IRbar*({OR+antiν][+1]}$_{W^-}$+Gγ[-1]) ⇒ {Kernel-VPE + Ring-VPE} ⇒ {uubar+ubaru}+{(e^+;μ^+)[+½} + (e^-;μ^-)[-½]}

For matter IR and antimatter OR, a possible decay mode is: B_s^obar = b.sbar = [ud.ubar].sbar = [U+IR+Kbar].[Kbar+ORbar]

⇒ [U+IR+Kbar].Kbar[0]+({ORbar+ν][-1]}$_{W^+}$+Gγ[+1]) ⇒ [U+IR+Kbar].[Kbar[0]+(ORbar[0]+ν[0]) ⇒ ([Kbar.Kbar]+Kbar+IR)(Kbar+ORbar)

⇒ [Kbar.K] +[KIR.KORbar] + {strongweak kernel-ring gluon-neutrino interaction suppressing any lepton decay products} ⇒ uubar + d.sbar ⇒ π^o + K^o

⇒ [K.KORbar]+[Kbar.KIR] + {strongweak kernel-ring gluon-neutrino interaction suppressing any lepton decay products} ⇒ u.sbar + ubar.d ⇒ K^+ + π^-

⇒ ([Kbar.Kbar]+K.K)]+IR*({ORbar+ν][-1]}$_{W^-}$+Gγ[+1]) ⇒ {Kernel-VPE + Ring-VPE} ⇒ {ubaru+uubar}+{(e^-;μ^-)[-½] + (e^+;μ^+)[+½]}

In both cases the creation of the neutral kaon K^o d.sbar-dbar.s quark content superposition repeats the CP violation in the manner indicated.

{2} Matter interacts with matter based Anti-Neutrinos via superposed VPE-Weakon Action

Protons transform into neutrons with antimatter positrons and where the interacting anti-neutrino as constituent part of the W^- weakon induces Pair-Production for weakon's electron in tapping the VPE to manifest a like spinning positron to neutralize the boson spin of the Graviphoton. The spin of the Graviphoton so cancels the spin of the Pair-Production VPE as well as the spin of the weakon boson in a superposition of the VPE and the weak interaction.

A up quark of the proton then changes into a down quark for the produced neutron in a double transition from the Outer Ring of the weakon's electron transiting to the Inner Ring and the original anti-neutrino transits from the Inner Ring onto the Gluon-Neutrino kernel K as the decay products of a free neutron. The right-handed spin quantum of the anti-neutrino cancels the left-handed quantum spin of the weakon's electron base which was flipped by the Graviphoton for the MIR oscillation between the up quark and the down quark transformation.
{Mass produced photons (by acceleration of inertia coupled electro charges), have no magneto charge and so form their own anti-particles; whilst gauge or 'virtual' photons carry cyclic and anticyclic colour charges as consequence of the matter-antimatter asymmetry}.

Proton p^+[-½] + Antiν$_{electron}$[+½] ⇒ p^+[-½] + {Antiν$_{electron}$[+½] + (Electron e^-[+½]}$_{W^-}$ + Positron e^+[+½]$_{VPE}{}^{o}{}_{[+1]}$ + Graviphoton[-1]
⇒ p^+[-½] + {Electron e^-[-½] + Antiν$_{electron}$[+½]} + Positron e^+[+½] ⇒ {p^+[-½]+IR^-[0]+K^o[-½+½]} + e^+[+½] ⇒ n^o[-½] + e^+[+½]

{3} Matter interacts with antimatter-based Neutrinos via Unified Weakon Action {OR+Antiν=W^-;ν+Anti-OR^+=W^+}

Neutrons transform into protons with muons, the latter decaying into electrons and anti-neutrinos and neutrinos, so reducing the elementary matter-neutrino interaction to basic neutron beta minus-decay with the leptonic coupling between the 'resonance electron' as a basic muon coupled to its neutrino. A neutron's down quark transforming into a up quark in disassociating the mesonic Inner Ring part of the down quark from its up-quark kernel part to become the leptonic Outer Ring part of the manifesting muon. The interacting muon neutrino couples with the antineutrino of the weakon template as its own anti particle transferring its mass to the muon and changing its self-state from mass defined Diracness to massless Majorananess in the process.

Neutron $n^o[-½] + ν_{muon}[-½] ⇒ n^o[-½] + ν_{muon}[-½]$ + ({Anti$ν_{muon}[+½]$ + (Muon $μ^-[+½]\}_{W^-}$ +GP[-1])

⇒ d[-½]u[+½]d[-½] + *{KIROR-Oscillation (OR-IR-K)[+½] +Anti$ν_{muon}[+½]$+$ν_{muon}[-½]$ + GP[1]}

⇒ d[-½]u[+½]u[-½] + $IR^-[0]$ + {$OR^-[+½]$+GP[-1]} +{$R^2G^2B^2[-½]$+$B^2G^2R^2[+½]$} ⇒ $p^+[-½]$ + μ[-½] + VPE[0]

⇒ $p^+[-½]$ + $μ^-[-½]$ +VPE[0] ⇒ $p^+[-½]$ + *{KIROR-Oscillation (OR-IR-K)[-½]}({$e^-[+½]$ + Anti$ν_{electron}[+½]\}_{W^-}$ + GP[-1])

⇒ $p^+[-½]$ + $ν_{muon}[-½]$ + $e^-[-½]$ + Anti$ν_{electron}[+½]$

In the muon beta decay, the KIROR oscillation transfers the spin of the interacting muon as the spin of its self-state neutrino and enabling the constituents of the matter weakon W^- to manifest with the right-handed electron part flipping to manifest the left-handed electron of the beta decay.

$mν_{Higgs}=m_eλ_W.r_E/(2πr_MR_e)\{1/r_G-1/r_F\}$ ~ $9.3x10^{-38}$ kg or 0.052 eV for a scalar blueprint Anti$ν_{Higgs}$ = $R^4G^4B^4[0]$ with anti-state $ν_{Higgs}$ = $B^4G^4R^4[0]$ and coupling as the Tauon (Anti) Neutrino as Anti$ν_{tauon}$ = $R^2G^2B^2[+½]$ + $R^4G^4B^4[0]$ = $R^6G^6B^6[+½]$ = Anti$ν_{electron}$ + Anti$ν_{Higgs}$ and $ν_{tauon}$ = $B^2G^2R^2[-½]$ + $B^4G^4R^4[0]$ = $B^6G^6R^6[-½]$ = $ν_{electron}$ + $ν_{Higgs}$

For a differential equation for Potential Energy: $∇^2∅ - \{μr\}^2 = 0$

$∇^2∅ - \{r/R_e\}^2 = 0 = (1/r).∂^2/∂r^2\{r∅\} - \{r/R_e\}^2.∅\ ∂^2/∂r^2\{r∅\}$

$= \{r/R_e\}^2.(r∅)$ for a solution

$r∅$ = constant.exp$[-r/R_e]$ for the Yukawa Potential with $μ = 1/R_e = 4πε_om_ec^2/e^2 = 4πm_e/μ_oe^2$

$∅$ = constant.(1/r).exp$[-r/R_e]$ ⇒ $m_ec^2 = (μ_oe^2c^2/4πR)$.exp$[-R/R_e]$ for R/R_e = exp$[-R/R_e]$

$f(R/R_e) = R/R_e$ - exp$[-R/R_e]$ = f(x) = x - exp[-x] = 0 with derivative $f'(R/R_e)$ = f'(x) = 1 + exp(-x) and $x_{k+1} = x_k$ - f(x)/f'(x) for a Newton-Raphson solution

x_o =½ for x_1 = ½ - (-0.10653066)/(1.6065307) = 0.56631100; x_2 = 0.56631100 - (-0.00130508243)/(1.56761552) = 0.56714353;

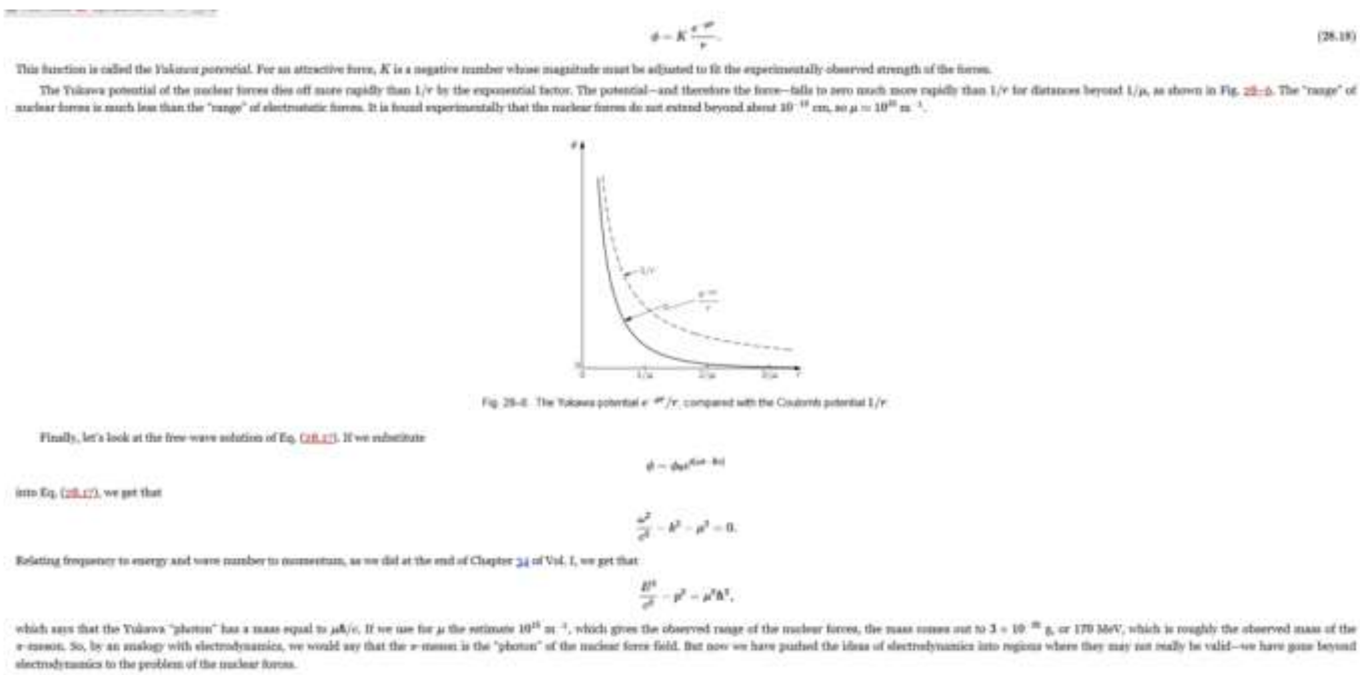
x_3 = 0.56714353 - (0.00000037547)/(1.56714316) = 0.56714330... for R = 0.5671433 R_e

For the potential energy of the electron with effective mass $m_e = μ_oe^2/4πR$, the Yukawa potential for the nucleus reduces the classical electron radius to 0.5671433 R_e, which approximates the radius of the proton as ½R_e but diverges from the proton's charge radius by the factor X approximately.

We have shown that the sought-after reduction of the classical radius of the electron occurs in the interval from A=½ to A=1 and where the Yukawa potential results in ½XR_e or= $0.85838x10^{-15}$ m* for the charge radius of the proton at A=1 as precisely half of the reduced monopolar quantum relativistic electron radius at $1.716761063x10^{-15}$ m*. The Yukawa potential applied to the classical electromagnetic electron in electro stasis so approximates the monopolar quantum relativistic electron in 0.5671433/0.618034 or 91.77%.

From the Feynman Lecture:

This function is called the *Yukawa potential*. For an attractive force, *K* is a negative number whose magnitude must be adjusted to fit the experimentally observed strength of the forces. The Yukawa potential of the nuclear forces dies off more rapidly than 1/r by the exponential factor. The potential—and therefore the force—falls to zero much more rapidly than 1/r for distances beyond 1/μ, as shown in Fig. 28–6. The "range" of nuclear forces is much less than the "range" of electrostatic forces. It is found experimentally that the nuclear forces do not extend beyond about 10^{-13} cm, so $\mu \approx 10^{15}\ m^{-1}$.



$$\phi = K\frac{e^{-\mu r}}{r}. \quad (28.18)$$

This function is called the *Yukawa potential*. For an attractive force, K is a negative number whose magnitude must be adjusted to fit the experimentally observed strength of the forces.

The Yukawa potential of the nuclear forces dies off more rapidly than $1/r$ by the exponential factor. The potential—and therefore the force—falls to zero much more rapidly than $1/r$ for distances beyond $1/\mu$, as shown in Fig. 28–6. The "range" of nuclear forces is much less than the "range" of electrostatic forces. It is found experimentally that the nuclear forces do not extend beyond about 10^{-13} cm, so $\mu \approx 10^{15}$ m^{-1}.

Fig. 28–6. The Yukawa potential $e^{-\mu r}/r$, compared with the Coulomb potential $1/r$.

Finally, let's look at the free-wave solution of Eq. (28.17). If we substitute

$$\phi = \phi_0 e^{i(\omega t - kz)}$$

into Eq. (28.17), we get that

$$\frac{\omega^2}{c^2} - k^2 - \mu^2 = 0.$$

Relating frequency to energy and wave number to momentum, as we did at the end of Chapter 34 of Vol. I, we get that

$$\frac{E^2}{c^2} - p^2 = \mu^2\hbar^2,$$

which says that the Yukawa "photon" has a mass equal to $\mu\hbar/c$. If we use for μ the estimate 10^{15} m^{-1}, which gives the observed range of the nuclear forces, the mass comes out to 3×10^{-25} g, or 170 MeV, which is roughly the observed mass of the π-meson. So, by an analogy with electrodynamics, we would say that the π-meson is the "photon" of the nuclear force field. But now we have pushed the ideas of electrodynamics into regions where they may not really be valid—we have gone beyond electrodynamics to the problem of the nuclear forces.

Fig. 28–6.The Yukawa potential e−μr/r, compared with the Coulomb potential 1/r.

The Unified Gauge Parameter Field of Quantum Relativity

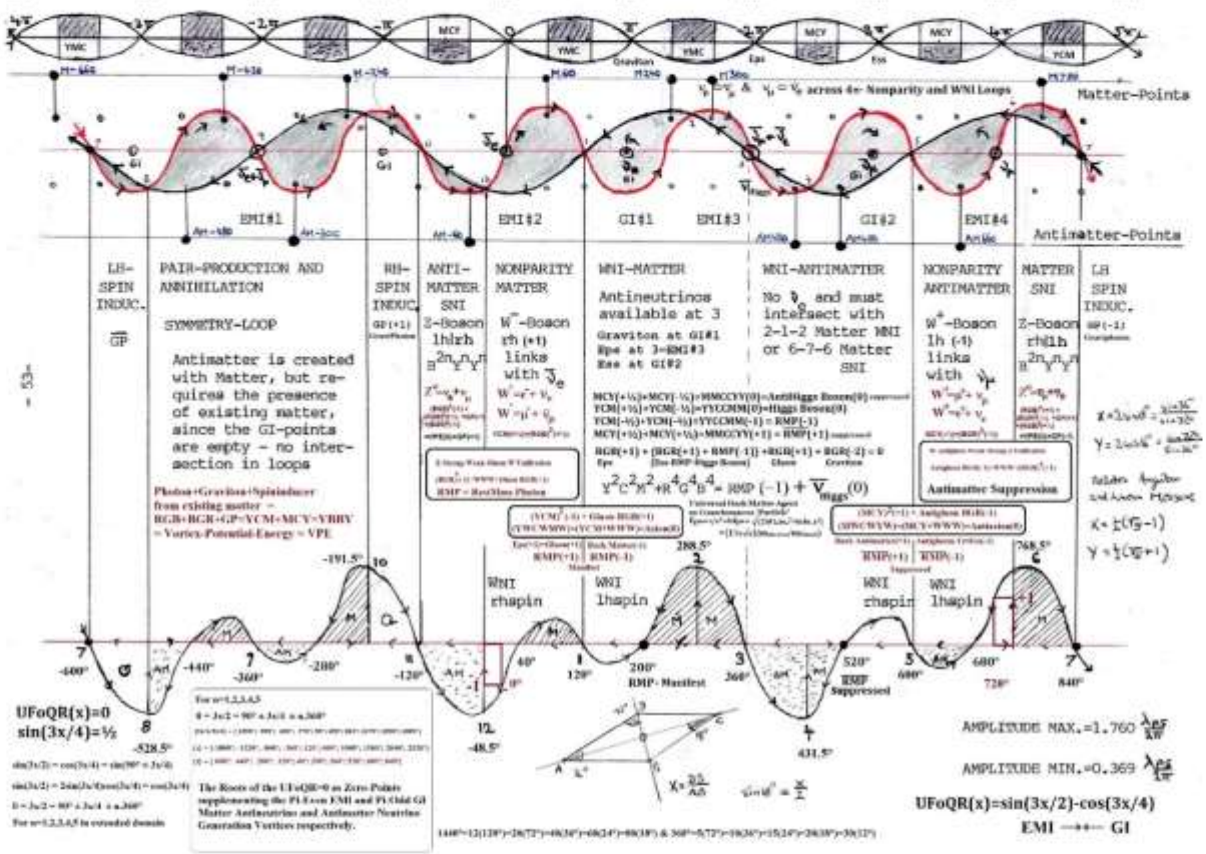
Primary-Secondary-Tertiary Colour Triplets of the Chromaticity Unities in the UFoQR 1-2-3-4-5-6-7-8-9-10-11-12-13
Anticolours for 8 Gluon Permutations in Energy gravitational $E=mc^2$ for B(lack) and Energy radiative E=hf for W(hite)

R+C and O+A and Y+B and L+I and G+M and T+P and C+R and A+O and B+Y and I+L and M+G and P+T and R+C

Gluon RGB=(RG)B=YB=CR=MG=YB=CR=MG=RGB
for: {BBB;BBW;BWB;BWW;WBB;WBW;WWB;WWW} hyperonic triplets and {BB;BW;WB;WW} mesonic doublets

R(ed)-O(range)-Y(ellow)-L(ime)-G(reen)-T(urquoise)-C(yan)-A(quamarine)-B(lue)-I(ndigo)-M(agenta)-P(urple)-R(ed)

The 12 Junction-Loops of the Unified Field Natural Current Field in Quantum Relativity Extent: $4\lambda_{ps}$ & Amplitude=$\lambda_{ps}/2\pi$



EM(M)I=ElectroMagnetic (Monopolic) Radiation Interaction = Unified Field of QR before spacetime creation (Inflation to Quantum Big Bang) without Gravitational Interaction GI
Metaphysical Abstraction of Mathimatia Supersymmetry by Logos Definition in Radiation-Antiradiation Symmetry

Möbian-Klein Twosided 11D-Mirror SelfIntersection : RGB(+1)+RGB(-1) → RRGGBB(0) → YCM(0)+YCM(0) → BBGGRR(0)→ MCY(0)+MCY(0) → BGR(-1)+BGR(+1) (0° … 180° … 360°=0°)

Eps=RGB(+1) at 0°--------------------Ess=RGB(-1) at 360°..............Eps=BGR(-1) at 180° Inflexion Ess=BGR(+1)
Ess=RGB(+1) at 0°--------------------Eps=RGB(+1) at 360°............Breaking of the metaphysical supersymmetry in quantum spin to allow the birth of the Graviton and matter-antimatter symmetry, suppressing however the matter-antimatter symmetry in the reformulation of antiradiation
[Encoded as the retracing of the 'steps of the creator' –Ezekiel.28.13-19; Isaiah.14.12-14]

Unified Field of QR in the 11D-Membrane Inflation, followed by a Quantum Big Bang of Relativistic Thermodynamic Cosmology
Physicalisation of the Metaphysical Precursor in an inherent Matter-Antimatter Asymmetry

Möbian-Klein Onesided 10D/12D-Mirror SelfIntersection as the Goldstone Boson Unification of all Interactions in the UFOQR:
RGB(+1)+BGR(+1)+RGB(+1)+BGR(-2)+YYCCMM(-1) = EMI Eps-Photon + WNI Ess-Antiphoton + SNI Gluon + Graviton + EMMR-RMP
→ MGGM(+2)+MGGM(-1)+YYCCMM(-1) = VPE(+2)+VPE(-1)+YYCCMM(-1) = VPE(+1)+YYCCMM(-1) = EMMR UFOQR Unification

The Ess-Anti-Photon(+1) is suppressed as Goldstone ambassador gauge in spin +1 by The SNI ambassador Gluon and is suppressed in colour charge BGR by the GI gauge ambassador Graviton. The birth of the Graviton demands a net spin of +1 of the Vortex-Potential Energy or VPE/ZPE to become neutralized by the fifth gauge ambassador of the RMP with spin -1 as the gauge ambassador and Goldstone Boson as the primal gauge ambassador for the consciousness energy interaction encompassing all particular constituents in the Unified Field of Quantum Relativity.

Council of Thuban, Saturday, August 15th, 2015

Besides conventional string class considerations, the graviton must have spin 2 as a consequence of quantum angular momentum conservation.
Before spacetime creation in the instanton of the quantum Big Bang, the transformation of the five string classes manifested in the inflaton using a prior supersymmetry between matter- and antimatter templates., represented in say sinx+sin(-x)=0 and where the positive region becomes a quantum geometric matter conformal mapping and the negative region becomes its conjugative for antimatter. As the linearization of the circle inflects at 180 degrees, matter and antimatter become defined in adjacent clockwise and anticlockwise semi cyclicities.
If now the arbitrary boundaries are defined in some unitary interval between 0 and 360 degrees or [-∞,0,+∞] or [-1,0,+1] or [0,½,1] or [-(X+1),-½,X]; then the left boundary dynamics of say righthandedness cancels the right boundary dynamic of left-handedness throughout the 2 semi cycles, say described in a Moebian connectivity and topology of surface non-orientability in a conformal mapping of a 2D surface onto a 11D supermembrane in a membrane-mirror space.
After the completion of a full cycle, the matter- and antimatter templates exist in the membrane space of the inflaton, say as a supersymmetry between the righthanded electromagnetic monopolar radiation (emmr) and its antistate in a lefthanded electromagnetic monopolar antiradiation. This supersymmetry between radiative self-states precedes any possible supersymmetry between the matter and antimatter blueprints, as the dynamic of the emmr eigenstate defines the former as a secondary manifestation of potential manifestation, once the instanton of spacetime creation supersedes that of the prior string-brane epoch.
To realize the matter-antimatter potential, the completion of the full emmr cycle breaks its own supersymmetry in the exchange of the right- and left boundary and initial conditions. The original righthanded (Weyl-gauge photon say of the left mirror) now situated at the right mirror extends the unitary interval towards the positive abscissa (aleph null enumerability) and inflects its anticlockwise parity into its original clockwise parity or chirality.
The original Weyl-antiphoton from the right mirror, now situated at the left mirror retraces the path of the Weyl-gauge photon however and so does not inflect and so creates the necessity to negate two clockwise quantum spins by a doubled anticlockwise spin angular momentum.

This demands the birth of quantum gravity and of its gauge agent of the graviton in the formation of a new universal wavefunction traversing in the opposite direction of the now twinned electromagnetic monopolar propagation of the original emmr supersymmetry.
A consequence of this 'changing of the fundamental supersymmetry' becomes the restriction of any matter-antimatter symmetry to become confined to the concept of pair production in the presence of existing matter or antimatter in Nonparity.
Defining matter to couple in a Goldstone gauge boson form to the original Weyl-photon (RGB) then forces the Weyl-antiphoton (anticyclic BGR) to suppress the antimatter (MCY anticyclic to matter YCM) template in lieu of a 'twinned' emergent blueprint known as the scalar 0-spin Higgs Boson ($Y^2C^2M^2$).

Imagine a Moebian strip without thickness und so restricted to be two dimensional. The perimeter of the quasi-inner ring so defines a self-intersection with its quasi-outer ring and depicts half of the total 2D-space of the Möbius strip for the inflection at 180 degrees. Then the Möbian strip breaks its own non-orientable nature and symmetry to create the 3rd dimension. The second parameter space can now become orientable (without the Möbian twist of 180 degrees) and the self-relativity of the first part becomes now 3-dimensional relative and allows a new mixing of the tripartite sectors of the quantum chromodynamics of the constituent Goldstone bosons. From this point in the cosmogony onwards an older non-manifested matter antimatter supersymmetry can eventuate in the observed pair-production, being otherwise suppressed by the earlier radiation-antiradiation supersymmetry described.

View: https://www.youtube.com/watch?v=sRTKSzAOBr4

The Inflaton and the Grand Unification Symmetry in a Transformation of Supermembranes

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

Quantum Gravitation Unification in a Coupling of the Supermembranes in Self dual Monopole Class IIB

SEWG ---- SEWg as string transformation from Planck brane to (Grand Unification/GUT) monopole brane.
{Capitalization of letters infers emphasis and decapitalization of letters implies suppression of respective fundamental interactions}.

String Boson	**Decoupling Time s***	**Wavelength ($\lambda=2\pi l$) m***	**Energy (hc/λ) J* & eV***	**Modular Wavelength m***	**Temp K***	**Significance**
0. Genesis-Boson Algorithmic	TIME=1/FREQUENCY $= \lambda_{ps}/R_H = \lambda_{ps}H_o/c$ $= n_{ps} = H_o t_{ps}$ 6.2591×10^{-49}	LIGHTPATH c.TIME 1.8777×10^{-40}	ENERGY= hR_{max}/λ_{ps} =k.TEMPERATURE =h.FREQUENCY =h/TIME=MASS.c2 1.065 PJ* or 6.629×10^{33} eV*	5.326×10^{39}	TEMPERATURE $= hR_{max}/k\lambda_{ps}$ 7.54481×10^{37}	Algorithmic Definiton

1. Planck-Boson I/SEWG⇒sEwG	$t_P=2\pi r_P/c$ $4.377x10^{-43}$	$L_P=2\pi r_P$ $1.313x10^{-34}$	1.523 GJ* or $9.482x10^{27}$ eV*	$7.617x10^{33}$	$1.079x10^{32}$	Outside Hubble Horizon Limit in Protoverse
2. Monopole-Boson IIB/sEwG⇒SEWg GI-GUT decoupling	$t_M=2\pi r_M/c$ $1.537x10^{-40}$	$4.6110x10^{-32}$	4.337 MJ* or $2.700x10^{25}$ eV*	$2.169x10^{31}$	$3.072x10^{29}$	Outside Hubble Horizon Limit in Protoverse
3. XLBoson HO32/SEW.G	$t_{XL}=2\pi r_{XL}/c$ $2.202x10^{-39}$	$6.605x10^{-31}$	302.817 kJ* or $1.885x10^{24}$ eV*	$1.514x10^{30}$	$2.145x10^{28}$	Outside Hubble Horizon Limit in Protoverse
4. Ecosmic-Boson IIA/SeW.G SNI decoupling	$t_{EC}=2\pi r_{EC}/c$ $6.618x10^{-34}$	$1.986x10^{-25}$	1.0073 J* or $6.270x10^{18}$ eV*	$5.035x10^{24}$	$7.135x10^{22}$	Galactic Supercluster Sarkar Scale $M_o=R_{Sarkar}c^2/2G_o$
5. False Higgs Vacuum (min to max)	$t_{dBmin}=G_oM_o/c^3n_{ps}$ $4.672x10^{-33}$ [min] to [max] $t_{dBmax}=\sqrt{\alpha}t_{ps}$ $2.847x10^{-32}$	$1.402x10^{-24}$ [min] to [max] $8.541x10^{-24}$	0.143 J* or $8.883x10^{17}$ eV* [min] to [max] 0.023 J* or $1.458x10^{17}$ eV*	$1.171x10^{23}$ [min] to [max] $7.133x10^{23}$	{$7.206x10^{37}$ [min] to [max] $1.857x10^{37}$ Algorithmic from Genesis Boson}	Galactic Supercluster Scale

6. Weyl-Boson HE64/S.EW.G Big Bang Instanton EMI decoupling	$t_{ps}=2\pi r_{ps}/c$ $3.333\text{x}10^{-31}$	$1.000\text{x}10^{-22}$	0.002 J* or $1.245\text{x}10^{16}$ eV*	$1.000\text{x}10^{22}$	{Temperature Gradient $T_{ps}/T(n_{ps})$ Genesis Boson $T(n_{ps})$ = $2.935\text{x}10^{36}$}	Galactic Halo (Group) Scale
7. $T(n)=T_{ps}$ Bosonic Condensate Unification	$t_{BU}=n_{BU}/H_o$ $1.897\text{x}10^{-9}$	$ct_{BU}/(1+H_ot_{BU})$ 0.5691 Protoverse Inflaton min to Instanton to Inflaton max	Bosonic Plasma h/t_{BU} $= \sum hf_{ps}$ $= \sum \boldsymbol{\lambda_{ps}}$	1.757 Protoverse	$T_{BU} = T_{ps}$ = $1.417\text{x}10^{20}$ $18.2[n+1]^2/n^3$ $n=H_ot_{BU}$	Unitary Modular Geometric Mean Scale
8. Higgs Chi-Boson/ Super Diquark Sbar=ss Vacuum Expectation Electroweak WNI decoupling	$t_{EW}=n_{EW}/H_o$ 0.00274~1/365	$4.167\text{x}10^{-18}$ Quantum Scale	$4.799\text{x}10^{-8}$ J* or 298.785 GeV*	$2.400\text{x}10^{17}$	$3.400\text{x}10^{15}$	Inner Mesonic Ring Quantum Scale

The X-Boson is modular dual to the L-Boson in the string class transformation from the Planck brane to the monopole brane to the X/L-brane to the Cosmic String brane to the Weyl brane. For the X-Boson, the coupling can be written as: : $\#.(m_{ps}/m_{Planck})f(G)$ and for the L-Boson it is written as: $\#^{54}.(m_{Planck}/m_{ps})f(S)$ to indicate the inherent modular duality.
As alpha=$\#^3$ specifies the emmr-matter-emr interaction probability; EMI/SNI=$\#^3/\#=\#^2$ breaks the unified symmetry via the WNI and defines #f(G) as a unitary mass.

A 'mixing angle' θ_{ps} is defined via constant X $\Rightarrow \{\aleph\}^3 \Rightarrow$ alpha α as X = $\varpi(n)$. sin θ_{ps} for a unitary force action $\varpi(n)$ acting on the inflaton acceleration cf_{ps} modulated from the inflaton source hyper-acceleration of the de Broglie matter wave for phase speed R_Hf_{ps} in $R_Hf_{ps}^2=1.43790791\text{x}10^{87}$ (m/s^2)* in the displacement light path for the nodal Hubble constant H_o = dn/dt = c/R_H defining the frequency ratio $n_{ps} = \lambda_{ps}/R_H = 2\pi r_{ps}/R_H = f_{ps}/H_o$ as the linearization of the wormhole from its closed Planck brane form as string class I into its transformation as open string class HE(8x8) then manifesting as the Compton-de Broglie wavelengths in the emr-matter-emmr interactions.

The Hubble law so modulates the inflaton as the instanton in a dimensionless cycle time parameter n in a time rate change constant as the nodal Hubble constant $H(n)|_{min} = H_o$ = 58.04 km/Mpc.s (extrapolated to 66.9 km/Mpc.s for a present $n_{present}$ =1.13271... cycle time coordinate) and in inverse proportion to its maximum as the wormhole frequency f_{ps}, becoming the maximum node for H(n) in the associated multiverse cosmology, which defines this multiverse as parallel in time space, but as holofractally nested in spacetime. It is then a quantum tunneling of the entire universe upon the completion of interwoven cycles defining the nodal oscillations in particular nodal 'walls of time' defined in the light path, which become the medium for this quantum tunneling of lower dimensional spacetime itself.

The inflaton angle θ_{ps} so is maximized at 90° at X = ϖ(n). sin θ_{ps} for θ_{ps} = 38.17270761° for a unitary force ϖ(n)=1 and for the X/L bosonic coupling for a GUT scale characterizing SEW.G for the decoupling of the gravitational interaction from the unified energy field described by the Standard Model.
Now the Planck string for a Planck time of $t_P=2\pi r_P/c = 4.377\text{x}10^{-43}$ is connected to the X/L string via the monopole string at the unified SEWG level in the self-duality of the GUT-monopole at $[ec.c^2]_{uimd} = 2.7\text{x}10^{16}$ GeV* and at a brane inflaton time of $t_M=2\pi r_M/c=1.537\text{x}10^{-40}$ s* and for which SEWG transformed into sEwG to indicate the unified nature between the long-range EMI and GI in a coupling of the electromagnetic and gravitational fine structures here termed alpha and g-alpha respectively.

The X/L boson time is $t_{XL}=2\pi r_{XL}/c=2.202\text{x}10^{-39}$ s* and string class HO(32) decouples gravity in replacing $f(G)/m_{Planck}$ by the monopole mass $\#^2/[ec]_{uimd}$ modular dual to $f(S)m_{Planck}$ to account for the SNI/EMI breaking of the native supersymmetry SEWG and to transform the Planck brane energy scale into the X/L brane energy scale.

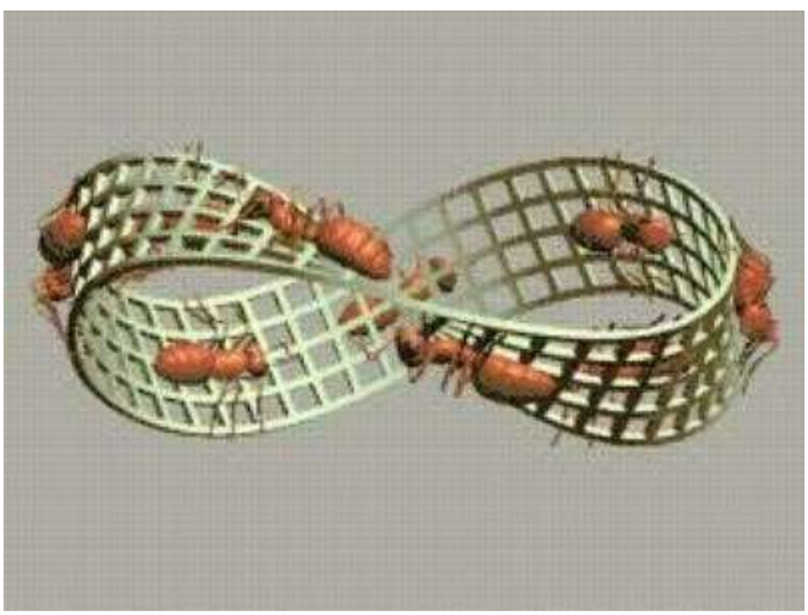
m_{XB} = alpha.$m_{ps}/[ec]_{uimd} = \#^3.m_{ps}/[ec]_{uimd} = 3.364554269\text{x}10^{-12}$ kg* = $1.884955575\text{x}10^{15}$ GeV* unifying SEW in the monopolar electron boson energy $m_{ec}|_{max} = \alpha m_{ps}$ m_{LB} = alpha^{18}.$[ec]u_{imd}/\#^2.m_{ps} =\#^{52}.[ec]u_{imd}/\#^2.m_{ps} = 1.982105788\text{x}10^{-28}$ kg* = 111.0453587 MeV* unifying EWG at the bosonic muon energy

The X-Boson mass and the L-Boson mass then transform into the string class IIA, as the coupling from the self-dual monopole class, here termed the ECosmic Boson to indicate its native characterization as primordial cosmic string ancestor for a spectrum of cosmic rays, tabulated following this discussion.
The ECosmic Boson manifests at an inflaton time of $t_{EC}=2\pi r_{EC}/c = 6.717\text{x}10^{-34}$ s* at an energy of 0.9927 J* or $6.180\text{x}10^9$ eV* and as a consequence of the universal wavefunction B(n) = {2e/hA}.exp{-Alpha.T(n)} and where T(n)=n(n+1) defines X and Y in the Euler identity for T(n)=1.

The electromagnetic interaction, which was emphasized in the decoupling of the gravitational interaction in the sEwG to form the X/L-Boson in SEW.G now becomes suppressed in SeW.G in the B(n) for $n=n_{ps}=6.259093473\text{x}10^{-49} \Rightarrow 0$ and T(0)=0 for $B(n_{ps})=2e/hA= 0.992729794$..in units of inverse energy that is as units of the magneto charge under modular string duality.
The constant $A=4.854663436\text{x}10^{14}$ Ampere* can be defined as a cosmic string magneto current and derives from particular algorithmic encodings underpinning the numerical values for the fundamental constants of nature.

The ECosmic boson then triggers a 'false vacuum' in a brane time interval from $t_{dBmin}=G_oM_o/c^3n_{ps} = 4.672\text{x}10^{-33}$ [min] to [max] $t_{dBmax}=\sqrt{\alpha}t_{ps} = 2.847...\ \text{x}10^{-32}$ defined in a non-kinematic temperature gradient of the cosmogenesis and related to the hyper acceleration gradient between the de Broglie inflaton wave phase speed $a_{dB} = R_Hf_{ps}^2$ and the boundary cosmological (dark energy) constant $\Lambda_{Einstein}(n_{ps}) = G_oM_o/\lambda_{ps}^2$ =with $2.\Lambda_{Einstein}(n_{ps})/a_{dB} = M_o/M_H=0.02803$.. descriptive for the baryonic matter content at the instanton as a proportional coupling between the 'mother black hole' defined in the Schwarzschild metric with an event horizon the size of the Hubble radius $R_H = 2G_oM_H/c^2$.

It can be said, that the universal wave function B(n) remains 'frozen' within this encompassing inflaton event horizon about the FRB (Functional Riemann Bound) at the x=-½ coordinate and between a cosmic uncertainty interval {X: -1,0} defining the Witten-M-space in this presentation; until it is observed and/or defined in accordance with the premises of quantum mechanics applied to the universe in total. In particular the 'unfreezing' of B(n) requires the linearization of the quantum geometric circularity of the Compton wavelength into its particularized quantum radius.



Quark-Lepton Unification in XL-Boson Class HO(32)
SEWg --- SEW.G

Following the creation of the 'false Higgs vacuum' as a potential spacetime quantum and as a prototypical holofractal of the brane volumar; the Planck string and now as an ECosmic string of increased spacial extent and of lower energy transforms into the Weyl-E_{ps} Boson of the quantum big bang event as the instanton.
This results in an integration or summation of E_{ps}-quanta evolving at the speed of light from the original Weylian wormhole as the 'creation singularity'.
This 'filling' of the inflaton M-space with lower dimensional instanton C-space represents however an attempt by the wormhole summation, which is expanding originally at the speed of light to become retarded by a force opposing the linear expansion and so decurving of the original wormhole definition. This effect of anti-curvature or the attempt to recircularized the linearization of the lower dimensional expanded membrane space by its higher dimensional contracting (or collapsing) membrane space is known as gravity in the macrocosmic cosmology of General Relativity but represents the integrated effect of quantum gravity as a summation of spacetime quanta as wormhole volumars inhabiting expanding space as boundary and initial condition for contracting spacetime.
The expanding qbb or the integration and multiplication of wormhole quanta now enables the X/L bosons to transform into a quark-lepton hierarchy at instanton time $t_{ps}=f_{ss}=1/f_{ps}=3.333.x10^{31}$ s*.

The Higgs vacuum is now rendered as physical in spacetime occupancy and the relative sizes of elementary particles is defined in the diameter of the electron and its parameters of energy and momentum. In particular $e^*=2R_ec^2=1/E_{ps}$ restricts the extent of the Compton constant in the mass and size of the electron and quantizing the quantization of monopolar energy in the volumar equivalent of the inversed source energy quantum of the Weyl-E_{ps} Boson conformally transformed from the Planck scale onto the Weyl wormhole scale in the superstring transformations.

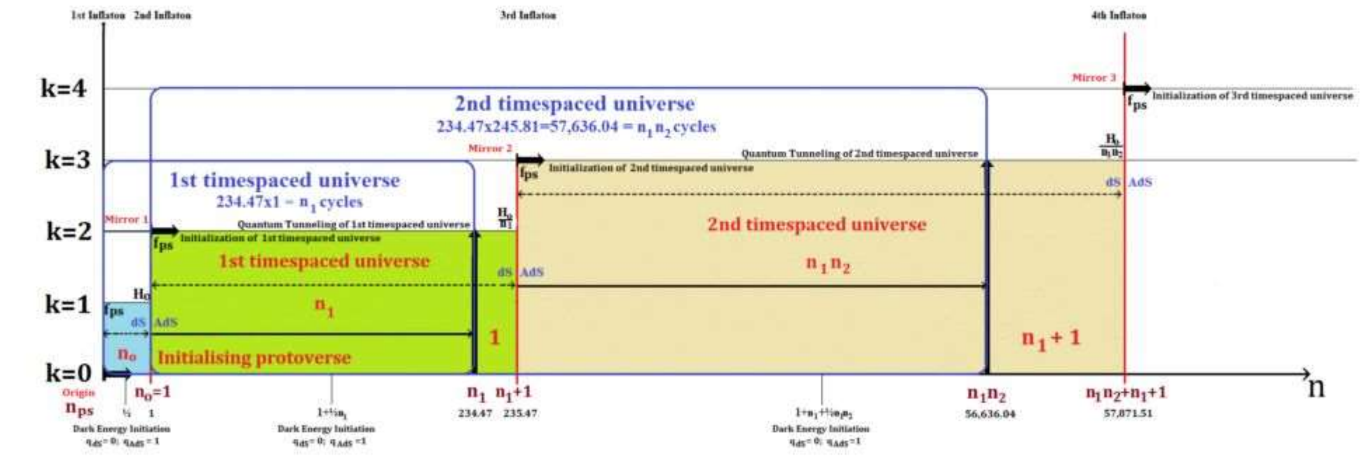
Magnetopolar charge e* as inversed energy quantum in its higher dimensional form assumes the characteristic of a region of space acted upon by the time rate change of frequency or df/dt. As said, this allows a definition of physical consciousness as the action of a quasi-angular acceleration as df/dt onto the dynamics of anything occupying any space, if this space represents a summation of E_{ps}- gauge photon quanta. The concept of physical consciousness so finds it resolution in the quantum geometry of super brane volumars.
The Higgs field of physical consciousness so applies action on spatially occupied dynamics, such as elementary particles or collections and conglomerations of particles, irrespective of those particles exhibiting inertial mass or gravitational mass and as a consequence of the photonic energy equivalence to mass in $E=hf=mc^2$.

The X-Boson of energy $1.885x10^{15}$ GeV* so transforms into a K-Boson of energy given by the transformed Planck boson into the K-Boson with $m_c=m_{Planck}.Alpha^9=ke\alpha^{8.5}$

$=(e/G_o)\alpha^{8.5}=9.924724514\times10^{-28}$ kg or 556.0220853... MeV* under Planck-Stoney unification for electric charge and mass.
The primordial K-Boson so becomes the ancestor for all nucleons and hyperons as a base kernel energy as a function of cycle time n in $m(n)=m_cY^n$.

For a invariance of the Gravitational parameter $GM=G_oX^n.MY^n$= constant , a mass evolution in the constancy of $XY = X+Y = e^{i\pi} = i^2 = -1$ ∀n can be applied to 'evolve' the mass of the K-Boson as a function of cycle time n from its initial self-state $n_{ps}=H_o/f_{ps}=\lambda_{ps}/R_H$ and to relate the history in time to a history of space in a timeless cosmogenesis.
This evolution of mass as a fundamental cosmological parameter relates to the 'missing' mass in the $M_o/M_H = 0.02803...$ ratio say as the Omega of the deceleration parameter in the Friedmann cosmology. Considering a time evolution of a rest mass seedling M_o towards a Black Hole closure mass M_H in the form of 'massless eternal Strominger branes' will crystallize the existence of a multiverse as a function of the wormhole radius r_{ps} expanding in higher dimensional brane spacetime until the Hubble radius R_H is reached in a time of about 4 trillion years. A formula to describe this is: $n\ln Y=\ln(R_H/r_{ps})$ or equivalently $n\ln Y=\ln(M_H/M_{curvature})$ for the quantum gravitational transformation of the Planck mass into the curvature mass of 6445.775... kg* as the minimum mass a Black Hole can have in the quantum relativistic cosmology.

When a Strominger eternal (there is no Hawking radiation) black hole has reached its macro state from its micro state, say after 234.47 cycles in a protoverse, then the entire old universe will quantum tunnel into a new universe which was born as a multiverse at the completion of the first cycle for n=1 and when a second inflaton holographically repeated the cosmogenesis parallel in time but not in space to ensure the eternal continuity for the first universe created as a protoverse. The quantum tunneling wall so is an interval of time defined in n_{ps} and not any boundary in space. (Details on this can be found in another paper called: "A Revision of the Friedmann Cosmology", available on request and
{https://cosmosdawn.net/index.php?lang=en }



$R_o = \frac{1}{2} R_H$ (dS) $\quad$ $R_1 = \frac{1}{2} n_1 R_H$ (dS) $\quad$ $R_2 = \frac{1}{2} n_1 n_2 R_H$ (dS)

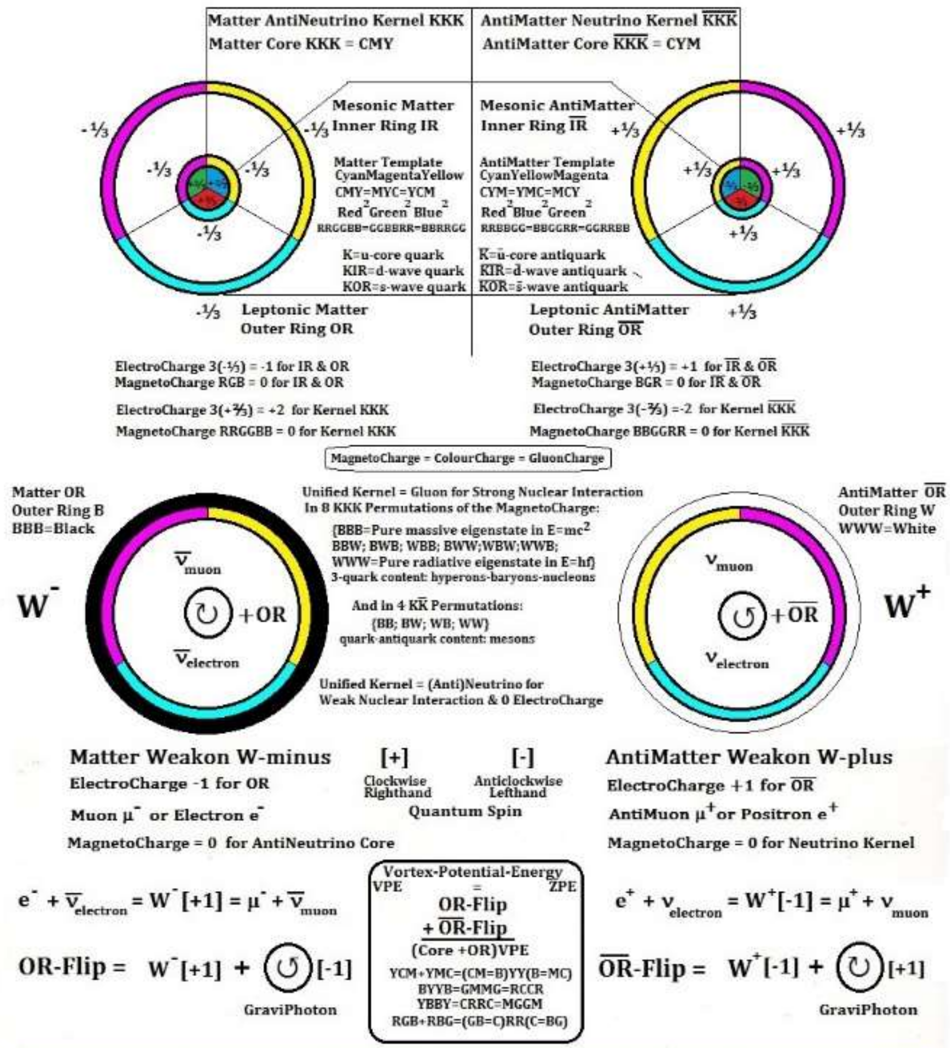
$R_o = R_H$ (AdS) $\quad$ $R_1 = n_1 R_H$ (AdS) $\quad$ $R_2 = n_1 n_2 R_H$ (AdS)

Hypermass m_H = 6,445.78 kg* $\quad$ Hypermass $M_H = 6.47 \times 10^{52}$ kg* $\quad$ Hypermass $M_H = 1.52 \times 10^{55}$ kg*

The upper bound for the kernel mass so becomes $m_c Y^{n}{}_{present}$ =1.71175285x10^{-27} kg* or 958.9912423... MeV* for $n_{present}$ set at 1.132711...
The K-Boson then assumes the form of a trisected subatomic core in distributing the K-superstring energy in three quantum geometric parts or sectors depictable in three 120-degree regions of a gluon field for the 8 gluon permutations between the SU(3) self-states:
$E=mc^2$: {BBB; BBW; WBB; BWB; WBW; BWW; WWB; WWW}:E=hf, for the hyperon SU(3) unitary quark or antiquark distribution and $E=mc^2$:{BB; BW; WB; WW}:E=hf for the mesonic quark-antiquark couplings for SU(2), with the (W)hite state implying complete emr-emmr dematerialization and the (B)lack state inferring complete materialization in the chromodynamics of the colour mixing and gluon charge exchanges.
The L-Boson then induces the outer leptonic OR ring structure as the ancestor of the muon fermion and the inner mesonic ring or IR becomes the oscillatory potential for the OR to reduce in size to approach the kernel K trisected in the gluon distribution.
The precursive X/L-Boson transforming into the quark-lepton hierarchy of fermions, so manifests a native supersymmetry or supergravity without any necessity for additional particles or string vibrations in unification physics.

It can then be said, that the meeting or intersection of the OR with the Kernel K occurs at the IR in the form of neutrinos and anti-neutrinos emitted by the kernel as the partners for the OR manifesting as three leptonic generations in electron, muon and tauon to define the weak interaction bosons in the weakons and the Z-Boson. The weakons so display the bosonic nature of the original X/L bosons but allow a partitioning of the boson integral spin momentum in a sharing between the fermionic kernel and the fermionic outer ring. The quantum geometry indicated then allows a decomposition of the weakons into leptonic generations and the Z-Boson to assume the weak interaction energy in the form of massless gluons becoming mass induced by the quantum geometric template of a scalar Higgs field as Majorana neutrinos. This can be illustrated in the quantum chromodynamics of the trisection of both kernel and rings as the mixing of colour charges as indicated.

The Universal Quantum Geometric Matter-AntiMatter Template



Neutron ⇒ Proton + Electron + Electron AntiNeutrino

Basic Neutron Beta-Minus Decay: $n^o[-½] \Rightarrow p^+[-½] + e^-[-½] + \overline{\nu}_e[+½]$

d[-½]u[+½]d[-½](stable in nucleus)⇒ u[+½]d[-½]d[-½](free) ⇒u[+½]d[-½]d*[-½] (IR-OR Oscillation)
⇒u[+½]d[-½](u[-½].W⁻[+1].GP[-1])⇒ u[-½]d[+½]u[-½]+e⁻[-½]+$\overline{\nu}_e$ [+½]⇒ udu[-½]+electron-OR[-½]+ $\overline{\nu}_e$ [+½]

Muon ⇒ Electron + Electron AntiNeutrino + Muon Neutrino

Basic Muon Weak Decay: $\mu^-[-½] \Rightarrow e^-[-½] + \overline{\nu}_e[+½] + \nu_\mu[-½]$

OR⁻ [-½] (free)⇒ OR⁻ [-½] (KKK-OR Oscillation) ⇒ (ν_μ.OR)⁻[-½]).(W⁻[+1].GP[-1]) ⇒ e⁻ [-½] + ν_e[+½] + ν_μ[-½]

Only lefthanded matter particles and only righthanded antimatter particles participate in the Weak Nuclear Interaction in a fundamental Nonparity between Matter and Antimatter and as a consequence of the magnetocharged gauge interaction particles suppressing any naturally occuring antimatter in a inflationary and 'Big Bang prior' radiation-antiradiation grand symmetry 'Goldstone Boson' superstring unification:
RGB/SourceSink Photon(+1)+{BGR/SinkSource Photon(+1)+RestMass Photon(-1)}+RGB/Gluon(+1) +BGR/Graviton(-2)=0 and in coupling to the templates for Matter YCM and Antimatter MCY.

The suppressed SinkSource Photon (Devil/AntiGod Particle) with the 'Dark Matter/Energy Particle' descriptive in the definition of Consciousness/Space Awareness transforms into a Scalar Higgs Gauge Boson to form a recreated Supersymmetry in the Unified Field of Quantum Relativity or UFoQR.
The Gauge Photon RGB(+1) can also be described in the high energy vibratory part Eps of the supermembrane EpsEss with the Gauge Photon BGR(+1) its low energy winded conjugative part Ess.

The Scalar Higgs AntiNeutrino $(RGB)^4[0] + (RGB)^2[+½]$ creates the Tau AntiNeutrino $\overline{\nu}_\tau$ [+½] in Leptonic Energy Resonance.
The Scalar Higgs Neutrino $(BGR)^4[0] + (BGR)^2[-½]$ creates the Tau Neutrino ν_τ [-½] in Anti-Leptonic Energy Resonance.

Subtracting the L-Boson mass from the K-Boson mass then sets particular energy intervals shown following in the diquark hierarchies found in the quantum geometry of Quantum Relativity. The energy interval for the KKK kernel then becomes (282.6487 MeV* - 319.6637 MeV*) and is defined as a Kernel-Ring-Cross-Coupling constant, where 111.045/3 = 37.015 gives the appropriate energy range for a particular quark energy level for a ground state GS:

$$\mathbf{GS = GS_{n-1} + 2g_{n-1} + ULM^{n-2} .\{ \tfrac{1}{3}e^-;\tfrac{2}{3}e^-\}}$$
= Iterative Kernel GS + Ring Perturbation

$$\text{Matrix } |VPE| = \begin{bmatrix} K_1 & K_2 \\ L_1 & L_2 \end{bmatrix} = \begin{bmatrix} a & b \\ c & d \end{bmatrix} \text{ for } Det|VPE| = ad - bc = 0 = K_1L_2 - K_2L_1 = (46.100)(1.501) - (14.113)(4.903) = g_{L1}(mu) - g_{L2}(md)$$

$$\text{Matrix } |md;mu| = \begin{bmatrix} L_1 & L_2 \\ L_1 & -L_2 \end{bmatrix} \begin{bmatrix} 1 \\ 1 \end{bmatrix} = \begin{bmatrix} L_1 + L_2 \\ L_1 - L_2 \end{bmatrix} \text{ for } Det|md;mu| = -2L_1L_2 \text{ with } |md;mu|^{-1} = \frac{-1}{2L_1L_2} \begin{bmatrix} -L_2 & -L_2 \\ -L_1 & L_1 \end{bmatrix} = \frac{-1}{2mdmu} \begin{bmatrix} -mu & -mu \\ -md & md \end{bmatrix}$$

Linear dependency given by Det|VPE| = 0 and $g_{L1}/g_{L2} = K_1/K_2 = L_1/L_2$ = ULM = 3.2665...
For k={1;2;3;...8;9;10}={2;1;(u,d);s;(cU);b;M;D;t;S}:
For 2 Groundstates GS with n≥2:

Kernel-Ring Mixing Constant: $K_X/R_L = m_cY^n/3m_{LB}$ = 958.991/(3x111.045) = 2.8786858
for $n_{present}$ =1.132711..[Eq.18]

Nucleonic Upper Limit: $m_cY^n{}_{present} = 1.71175285\times10^{-27}$ kg* = 958.9912423 MeV*

Unitary Coupling Force: $\varpi(n_{present})/\sqrt{\{Y^{npresent}\}} = \#f(G).cf_{ps}\{alpha_E/alpha\}$ =
$2\pi cG_om_{planck}m_{ps}m_em_c\sqrt{(Y^{npresent})}/eh^2$ = 1.33606051
$alpha_E = 2\pi G_om_cm_e/hc$ for $m_c\sqrt{(Y^n)}$; as ring masses $m_{e,\mu,\tau}$ are constant in kernel masses
$alpha_G = 2\pi G_om_c^2/hc$ for kernel mass m_c as m_cY^n

Graviton-GI mass: $\#f(G)=alpha.m_{planck}/[ec]_{uimd}$ transforms m_{ps} from m_{planck} in m_{XB}

Coupling angle: $\theta ps(n_{present}) = Arcsin(X/\varpi(n_{present}))$ = Arcsin(0.4625…) = 27.553674°

Upper Bound Multiplier = 1/Lower Bound Multiplier
ULM = 1/LBM = $90°/\theta_{ps}(n_{present})$ = 3.26663521

Using those definitions allows construction for the diquark hierarchies following.
We next reduce the atomic scaling to its intrinsic superstring dimension in deriving the Higgs Bosonic Restmass Induction, corresponding to the Dilaton of M-Theory.

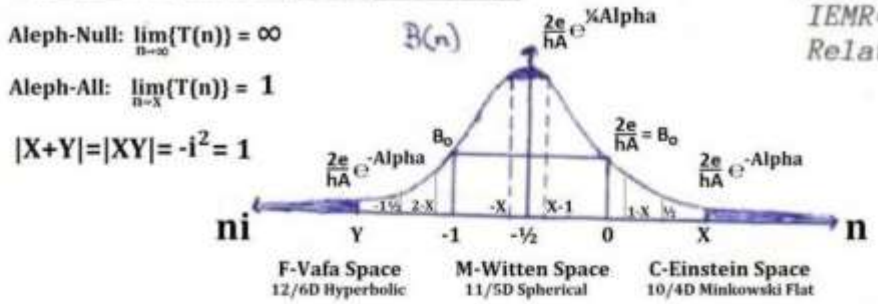
Renormalizing the wavefunction B(n) about the FRB = -½ as maximum ordinate gives a probability y^2dV for $y(0) = \sqrt{(\text{alpha}/2\pi)}$ for the renormalization.

Alpha/2π being the probability of finding the FRB fluctuation for the interval [-X,X-1] in volume element dV as the uncertainty fluctuation.

This volume element defines the dimensional intersection from C-Space into F-Space via M-Space in the topological mapping of the complex Riemann C_∞-Space about the Riemann pole of the FRB as the Calabi-Yau superstring space in 10 dimensions.

For $T^2(n) = 1 = X(X+1) = -i^2 = -XY$ in the Feynman-Path-Integral as alternative quantum mechanical formulation for the equations of Schrödinger, Dirac and Klein-Gordon by: $T(n)=n(n+1)=|-n|+...+|-3|+|-2|+|-1|+0+1+2+3+...+n$

$B(n) = 2e/hA.\exp[-Alpha.T(n)]$ *(Universal Cosmic Wavefunction or IEMR=Inverse-Energy-Magnetocharge-Relation for Superstring HE(8x8))*



The universe is 'frozen' in M-Space at the X-coordinate for which T(n)=1 and imaged in the Y-coordinate as imaginary time n_i as function B(n)

T(n)=n(n+1) defines the summation of particle histories (Feynman) and B(n) establishes the v/c ratio of Special Relativity as a Binomial Distribution about the roots of the $XY=i^2$ boundary condition in a complex Riemann Analysis of the Zeta Function about a 'Functional Riemann Bound' FRB=-½.

This probability then crystallizes in Juju's equation for the monopolar electron velocity:

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

$X = ½(\sqrt{5}-1) = 0.618033......$ and $Y = -(X+1) = -½(\sqrt{5}+1) = -1.618033...$

$-X(X-1) = 0.236067...$ in analogue to $X(X+1) = 1= T(n)$ and $XY = X+Y = -1 = i^2$ as the complex origin. But $0.236067...= X^3$, so defining the 'New Unity' as $\#^3$ = Alpha and the precursive unity as the Cube root of Alpha or as # in the symmetry $\#:\#^3$ = SNI:EMI = Strong Nuclear Interaction Strength {Electromagnetic Interaction Strength}.

The Strong-Interaction-Constant SIC = $\sqrt{\text{Alpha}} = \sqrt{e^2/2\varepsilon_o hc} = \sqrt{(60\pi e^2/h)}$ in standard and in string units, reduces the SNI fine structure constant # by a factor $\text{Alpha}^{1/6}$; that is in the sixth root of alpha and so relates the SIC at the post quantization level as # to the pre-quantum epoch as SIC = $\sqrt{\text{Alpha}} = \#^{3/2}$.

The SNI is therefore so 11.7 times weaker at the XL-Boson 'Grand-Unification-Time' SEW.G of heterotic superstring class HO(32), then at the $E_{ps}E_{ss}$ time instantaneity S.EW.G of the superstring of the Quantum Big Bang in heterotic class HE(8x8) {this is the string class of Visi in the group theories}.
This then is the Bosonic Gauge Heterosis Coupling between superstrings HO(32) and HE(8x8).
The coupling between superstrings IIA (ECosmic and manifesting the cosmic rays as superstring decay products) and IIB (Magnetic Monopole) derives directly from the B(n), with B(n=0) = J_o = 2e/hA = 0.9927298 1/J* or $6.2705\text{x}10^9$ GeV* and representative of the ECosmic string class and the super high energy resonances in the cosmic ray spectrum, bounded in the monopolar resonance limit of $2.7\text{x}10^{16}$ GeV*.

The Unity of the SNI transforms to [1-X] = X^2 and the EMI transforms as the Interaction of Invariance from X to X.
The Weak Nuclear Interaction or WNI as X^2 becomes [1+X] = 1/X and the Gravitational Interaction or GI transforms as X^3 transforms to [2+X] = $1/X^2$ by modular symmetry between X and Alpha and the encompassing Unification Unity: [1-X][X][1+X][2+X] = 1.
This Unification Polynomial $U(u) = u^4+2u^3-u^2-2u+1 = 0$ then has minimum roots (as quartic solutions) at the Phi = X and the Golden Mean Y = -(1+X).
This sets the coupling between SNI and EMI as X; the coupling between EMI and WNI becomes X^2 and the coupling between WNI and GI then is again X.
The general Force-Interaction-Ratio so is: SNI:EMI:WNI:GI = SEWG = $\#:\#^3:\#^{18}:\#^{54}$.

Typical decay rates for the nested fundamental interactions then follow the order in the light path lp = ct_k:
$t_{SNI} = R_e/c = 2.777...\text{x}10^{-15}$ m*/$3\text{x}10^8$ m*/s* = $0.925925...10^{-24}$ s* ~ Order (10^{-23} s*)
$t_{EMI} = t_{SNI}/\alpha = 10^{-23}$ s*/($7.30\text{x}10^{-3}$) = $1.37\text{x}10^{-21}$ s* ~ Order (10^{-21} s*)
$t_{WNI} = t_{SNI}/\alpha^6 = 10^{-23}$ s*/($1.51\text{x}10^{-13}$) = $6.62\text{x}10^{-11}$ s* ~ Order (10^{-10} s*)
$t_{GI} = t_{SNI}/\alpha^{18} = 10^{-23}$ s*/($3.44\text{x}10^{-39}$) = $2.91\text{x}10^{15}$ s* ~ Order (10^{15} s* ~ 92 million years characterizing the half-lives of trans uranium elements like Plutonium Pu-244 at $79\text{x}10^6$ y)

This is the generalization for the cubic transform: $x \rightarrow x^3$ with the Alpha-Unity squaring in the functionality of the WNI and defining G-Alpha as Alpha^{18} in the Planck-Mass transforming in string bosonic reduction to a basic fundamental nucleonic mass (proton and neutrons as up-down quark conglomerates and sufficient to construct a physical universe of measurement and observation):

$m_c = m_{planck}\,\text{Alpha}^9$ from the electromagnetic string unification with gravitation in the two dimensionless fine structures:

For Gravitational Mass Charge from higher D Magnetic Charge: $1 = 2\pi G_o.m_{planck}^2/hc$
For Electromagnetic Coulomb Charge as lower D Electric Charge: Alpha = $2\pi ke^2/hc$
Alpha as the universal master constant of creation, then becomes defined via the Riemann Analysis from $XY = i^2$ definition, reflecting in modulation in the statistical renormalization of the B(n) as the probability distributions in quantum wave mechanics, however.
U(u) has its maximum at u = -½ = FRB for U(-½) = 25/16 = $(5/4)^2$ for the B(n) supersymmetry.
A symmetry for B(n) is found for i^2.U(u)=0 for an FRB=½ indicating a cosmological relationship to the Riemann hypothesis with respect to the distribution of prime numbers and Riemann's zeta function.
The derivation of the HBRMI draws upon this definition process and sets the coupling angle as Arcsin(X/**ϖ**) for a Unitary 'Force' **ϖ** =(#f_G).cf_{ps}E-Alpha/Alpha and with the electron mass replacing the fundamental nucleon mass m_c in the definition of E-Alpha.

A disassociated GI unifies with the WNI in the L-Boson and is supersymmetric to an intrinsic unification between the SNI and the EMI as the X-Boson for the duality $f_G f_S = 1$ in modular definition of a characteristic GI-mass #f_G as the disassociated elementary gauge field interaction.
The transformation of the 5 superstring classes proceeds in utilizing the self-duality of superstring IIB as the first energy transformation of the Inflaton in the Planck string class I trans mutating into the monopole string class IIB.

Wikipedia reference:
F-theory is a branch of string theory developed by Cumrun Vafa.[1] The new vacua described by F-theory were discovered by Vafa and allowed string theorists to construct new realistic vacua — in the form of F-theory compactified on elliptically fibered Calabi–Yau four-folds. The letter "F" supposedly stands for "Father".[2]
F-theory is formally a 12-dimensional theory, but the only way to obtain an acceptable background is to compactify this theory on a two-torus. By doing so, one obtains type IIB superstring theory in 10 dimensions. The SL(2,Z) S-duality symmetry of the resulting type IIB string theory is manifest because it arises as the group of large diffeomorphisms of the two-dimensional torus

The transformation of the 5 superstring classes proceeds in utilizing the self-duality of superstring IIB as the first energy transformation of the Inflaton in the Planck string class I trans mutating into the monopole string class IIB and residing in the 2-toroidal bulk space of Vafa as our Riemann 3-dimensional surface describing the VPE-ZPE of the micro quantum of the qbb.
The E_{ps}-Weyl wormhole of topological closure so is holographically and conformally mapped onto the bulk space in 12 dimensions as a braned volumar evolving by mirror duality of the 11dimensional closed AdS membrane space of Witten's M-space as Vafa's F-space and mirroring the hyperbolic topology of 10-dimensional C-space as an open dS cosmology in an overall measured and observed Euclidean flatness of zero curvature.

Vafa's F-space so can be named the omniverse hosting multiple universes which are nested in parallel time space and defined in particular initial and boundary conditions valid and applicable for all universes as a multiversal parameter space.
The quantization of mass m so indicates the coupling of the Planck Law in the frequency parameter to the Einstein law in the mass parameter.
The postulated basis of M-Theory utilizes the coupling of two energy-momentum eigenstates in the form of the modular duality between so termed 'vibratory' (high energy and short wavelengths) and 'winding' (low energy and long wavelengths) self-states.
The 'vibratory' self-state is denoted in: $E_{ps}=E_{primary\ sourcesink} = hf_{ps} = m_{ps}c^2$ and the 'winding' and coupled self-state is denoted by: $E_{ss} = E_{secondary\ sinksource} = hf_{ss} = m_{ss}c^2$.
The F-Space Unitary symmetry condition becomes: $f_{ps}f_{ss} = r_{ps}r_{ss} = (\lambda_{ps}/2\pi)(2\pi\lambda_{ss}) = 1$
The coupling constants between the two eigenstates are so: $E_{ps}E_{ss} = h^2$ and $E_{ps}/E_{ss} = f_{ps}^2 = 1/f_{ss}^2$
The Supermembrane $E_{ps}E_{ss}$ then denotes the coupled superstrings in their 'vibratory' high energy and 'winded' low energy self-state within an encompassing super eigen state of quantum entanglement.
The coupling constant for the vibratory high energy describes a maximized frequency differential over time in $df/dt|_{max} = f_{ps}^2$ and the coupling constant for the winded low energy describes its minimized reciprocal in $df/dt|_{min} = f_{ss}^2$.
F-Theory also crystallizes the following string formulations from the $E_{ps}E_{ss}$ super brane parameters.

Electromagnetic Fine structure: $\alpha_e = 2\pi ke^2/hc = e^2/2\varepsilon_0 hc = \mu_o e^2c/2h = 60\pi e^2/h$ ....
(Planck-Stoney-QR units *)
Gravitational Fine structure (Electron): $\alpha_g = 2\pi G_o m_e^2/hc = \{m_e/m_{Planck}\}^2$
Gravitational Fine structure (Primordial Nucleon): $\alpha_n = 2\pi G_o m_c^2/hc$
Gravitational Fine structure (Planck Boson): $\alpha_{Planck} = 2\pi G_o m_{Planck}^2/hc$

$1/E_{ps} = e^* = 2R_ec^2 = \sqrt{\{4\alpha hce^2/2\pi G_o m_e^2\}} = 2e\sqrt{\alpha}[m_P/m_e] = 2e\sqrt{\{\alpha_e/\alpha_g\}} = \{2e^2/m_e\}\sqrt{(k/G_o)} = 2e^2/G_o m_e = e^2/2\pi\varepsilon_o m_e$ for $G_o = 1/k = 4\pi\varepsilon_o$
for a cosmological unification of fine structures in unitary coupling E*.e*=1 in $[Nm^2/kg^2]=[m^3s^{-2}/kg]=1/[Nm^2/C^2]=[C^2m^{-3}s^2/kg]$ for $[C^2]=[m^6/s^4]$
and $[C]=[m^3/s^2]$. $E_{ps} = 1/E_{ss} = 1/e^* = \sqrt{\{\alpha_g/\alpha_e\}}/2e = G_o m_e/2e^2$

Here e* is defined as the inverse of the sourcesink vibratory superstring energy quantum $E_{ps} = E^*$ and becomes a New Physical Measurement Unit is the Star Coulomb (C*) and as the physical measurement unit for 'Physical Consciousness'.
R_e is the 'classical electron radius' coupling the 'point electron' of Quantum- Electro-Dynamics (QED) to Quantum Field Theory (QFT) and given in the electric potential energy of Coulomb's Law in: $m_ec^2 = ke^2/R_e$; and for the electronic monopolar rest mass m_e.
Alpha α is the electromagnetic fine structure coupling constant $\alpha = 2\pi ke^2/hc$ for the electric charge quantum e, Planck's constant h and lightspeed constant c.
G_o is the Newtonian gravitational constant as applicable in the Planck-Mass $m_P = \sqrt{(hc/2\pi G_o)}$ and the invariance of the gravitational parameter $G(n)M(n)=G_oX^n.m_cY^n$.

As the Star Coulomb unit describes the inverse sourcesink string energy as an elementary energy transformation from the string parametrization into the realm of classical QFT and QED, this transformation allows the reassignment of the Star Coulomb (C*) as the measurement of physical space itself.
The following derivations lead to a simplified string formalism as boundary- and initial conditions in a de Sitter cosmology encompassing the classical Minkowskian-Friedmann spacetimes holographically and fractally in the Schwarzschild metrics.

The magnetic field intensity B is classically described in the Biot-Savart Law:
$B = \mu_o qv/4\pi r^2 = \mu_o i/4\pi r = \mu_o q\omega/4\pi r = \mu_o Nef/2r$
for a charge count q=Ne; angular velocity $\omega=v/r=2\pi f$; current i = dq/dt and the current element i.dl = dq.(dl/dt) = vdq.
The Maxwell constant then can be written as an (approximating) fine structure: $\mu_o\varepsilon_o = 1/c^2 = (120\pi/c)(1/120\pi c)$ to crystallize the 'free space impedance'
$Z_o = \sqrt{(\mu_o/\varepsilon_o)} = 120\pi \sim 377$ Ohm (Ω).

This vacuum resistance Z_o so defines a 'Unified Action Law' in a coupling of the electric permittivity component (ε_o) of inertial mass and the magnetic permeability component (μ_o) of gravitational mass in the Equivalence Principle of General Relativity.
A unified self-state of the pre-inertial (string- or brane) cosmology so is obtained from the fine structures for the electric- and gravitational interactions coupling a so defined electropolar mass to magnetopolar mass respectively.
The Planck-Mass is given from Unity $1 = 2\pi G m_P^2/hc$ and the Planck-Charge derives from Alpha=$2\pi ke^2/hc$ and where $k=1/4\pi\varepsilon_o$ in the electromagnetic fine structure describing the probability interaction between matter and light (as about 1/137).
The important aspect of alpha relates to the inertia coupling of Planck-Charge to Planck-Mass as all inertial masses are associated with Coulombic charges as inertial electropoles; whilst the stringed form of the Planck-Mass remains massless as gravitational mass. It is the acceleration of electropoles coupled to inertial mass, which produces electromagnetic radiation (EMR); whilst the analogy of accelerating magnetopoles coupled to gravitational mass and emitting electromagnetic monopolar radiation (EMMR) remains hitherto undefined in the standard models of both cosmology and particle physics.

But the coupling between electropoles and magnetopoles occurs as dimensional intersection, say between a flat Minkowskian spacetime in 4D and a curved de Sitter spacetime in 5D (and which becomes topologically extended in 6-dimensional Calabi-Yau tori and 7-dimensional Joyce manifolds in M-Theory).
The formal coupling results in the 'bounce' of the Planck-Length in the pre-Big Bang scenario, and which manifests in the de Broglie inflaton-instanton.
The Planck-Length $L_P = \sqrt{(hG/2\pi c^3)}$ 'oscillates' in its Planck-Energy $m_P = h/\lambda_P c = h/2\pi c L_P$ to give $\sqrt{\text{Alpha}}).L_P = e/c^2$ in the coupling of 'Stoney units' suppressing Planck's constant 'h' to the 'Planck units' suppressing charge quantum 'e'.

Subsequently, the Planck-Length is 'displaced' in a factor of about 11.7 = $1/\sqrt{\text{Alpha}} = \sqrt{(h/60\pi)}/e$ and using the Maxwellian fine structures and the unity condition kG=1 for a dimensionless string coupling $G_o = 4\pi\varepsilon_o$, describing the 'Action Law' for the Vacuum Impedance as Action=Charge^2, say via dimensional analysis:
$Z_o = \sqrt{([Js^2/C^2m]/[C^2/Jm])} = [Js]/[C^2]$ = [Action/Charge^2] in Ohms [$\Omega = V/I = Js/C^2$] and proportional to [h/e^2] as the 'higher dimensional source' for the manifesting superconductivity of the lower dimensions in the Quantum Hall Effect ($\sim e^2/h$), the conductance quantum ($2e^2/h$) and the Josephson frequencies ($\sim 2e/h$) in Ohms [Ω].

This derivation so indicates an electromagnetic cosmology based on string parameters as preceding the introduction of inertial mass (in the quantum Big Bang) and defines an intrinsic curvature within the higher dimensional (de Sitter) universe based on gravitational mass equivalents and their superconductive monopolar current flows.
A massless, but monopolar electromagnetic de Sitter universe would exhibit intrinsic curvature in gravitational mass equivalence in its property of closure under an encompassing static Schwarzschild metric and a Gravitational String-Constant $G_o = 1/k = 1/30c$ (as given in the Maxwellian fine structures in the string space).
In other words, the Big Bang manifested inertial parameters and the matter content for a subsequent Cosmo evolution in the transformation of gravitational 'curvature energy', here called gravita as precursor for inertia into inertial mass seedlings; both however describable in Black Hole physics and the Schwarzschild metrics.
The Gravitational Fine structure so derives in replacing the Planck-Mass m_P by a proto-nucleonic mass: $m_c = \sqrt{(hc/2\pi G_o)}$.f(alpha) = f(Alpha).$m_P$ and where f(Alpha) = Alpha^9.

The Gravitational fine structure, here named Omega, is further described in a five folded supersymmetry of the string hierarchies, the latter as indicated in the following below in excerpt. This pentagonal supersymmetry can be expressed in a number of ways, say in a one-to-one mapping of the Alpha fine structure constant as invariant X from the Euler Identity: X+Y = XY = $-1 = i^2 = \exp(i\pi)$.
One can write a Unification Polynomial: (1-X)(X)(1+X)(2+X) = 1 or $X^4+2X^3-X^2-2X+1 = 0$ to find the coupling ratios: f(S)¦f(E)¦f(W)¦f(G) = $\#¦\#^3¦\#^{18}¦\#^{54}$ from the proportionality $\#¦\#^3¦\{[(\#^3)^2]\}^3¦(\{[(\#^3)^2]\}^3)^3$ = Cube root(Alpha):Alpha:Cuberoot(Omega):Omega.

The Unification polynomial then sets the ratios in the inversion properties under modular duality: (1)[Strong short]¦(X)[Electromagnetic long]¦(X^2)[Weak short]¦(X^3)[Gravitational long] as $1¦X¦X^2¦X^3$ = (1-X)¦(X)¦(1+X)¦(2+X).

Unity 1 maps as (1-X) transforming as f(S) in the equality (1-X) = X^2; X maps as invariant of the function f(E) in the equality (X) = (X); X^2 maps as (1+X) transforming as f(W) in the equality (1+X) = 1/X; and X^3 maps as (2+X) transforming as f(G) in the equality (2+X) = $1/X^2$ = 1/(1-X).
The mathematical pentagonal supersymmetry from the above then indicates the physicalised T-duality of M-theory in the principle of mirror-symmetry and which manifests in the reflection properties of the heterotic string classes HO(32) and HE(64), described further in the following.

Defining f(S) = # = 1/f(G) and f(E) = $\#^2$.f(S) then describes a symmetry breaking between the 'strong S' f(S) interaction and the 'electromagnetic E' f(E) interaction under the unification couplings.
This couples under modular duality to f(S).f(G) = 1 = $\#^{55}$ in a factor $\#^{-53}$ = f(S)/f(G) = $\{f(S)\}^2$ of the 'broken' symmetry between the long range- and the shortrange interactions.
SEWG = 1 = Strong-Electromagnetic-Weak-Gravitational as the unified supersymmetric identity then decouples in the manifestation of string-classes in the de Broglie 'matter wave' epoch termed inflation and preceding the Big Bang, the latter manifesting at Weyl-Time as a string transformed Planck-Time as the heterotic HE(64) class.

As SEWG indicates the Planck-String (class I, which is both open ended and closed), the first transformation becomes the suppression of the nuclear interactions sEwG and describing the self-dual monopole (string class IIB, which is loop-closed in Dirichlet brane attachment across dimensions say Kaluza-Klein R^5 to Minkowskian R^4 or Membrane-Space R^{11} to String Space R^{10}).

The monopole class so 'unifies' E with G via the gravitational fine structure assuming not a Weylian fermionic nucleon, but the bosonic monopole from the $kG_o = 1$ initial-boundary condition $Gm_M^2 = ke^2$ for m_M = ke = 30[ec] = $m_P\sqrt{\text{Alpha}}$.
The Planck-Monopole coupling so becomes $m_P/m_M = m_P/30$[ec] = 1/√Alpha with f(S) = f(E)/$\#^2$ modulating
f(G) = $\#^2$/f(E)=1/# ↔ f(G){f(S)/f(G)} = # in the symmetry breaking f(S)/f(G) = 1/$\#^{53}$ between short (nuclear asymptotic) and long (inverse square).

The short-range coupling becomes f(S)/f(W) = #/$\#^{18}$ = 1/$\#^{17}$ = Cube root(Alpha)/Alpha^6 and the long-range coupling is Alpha/Omega = 1/Alpha^{17} = $\#^3/\#^{54}$ = 1/$\#^{51}$ = 1/$(\#^{17})^3$.

The strong nuclear interaction coupling parameter so becomes about 0.2 as the cube root of alpha and as measured in the standard model of particle physics in the form of an energy dependent 'running coupling constant' and which takes a value of α_Z = 0.1184 at the energy level of the Z^o weakon at about 92 GeV.
The monopole quasi-mass [ec] describes a monopolar source current ef from the unification identity $1/e^*f_{ps}$ = h = E^*/f_{ps} as a fine structure for Planck's constant h, manifesting for a displacement λ=c/f. This is of course the GUT unification energy of the Dirac Monopole at precisely [c^3] eV or 2.7×10^{16} GeV and the upper limit for the Cosmic Ray spectra as the physical manifestation for the string classes: {I, IIB, HO(32), IIA and HE(64) in order of modular duality transmutation}.

The transformation of the Monopole string into the XL-Boson string decouples Gravity from sEwG in sEw.G in the heterotic superstring class HO(32). As this heterotic class is modular dual to the other heterotic class, HE(64), it is here, that the proto nucleon mass is defined in the modular duality of the heterosis in: Omega = $\text{Alpha}^{18} = 2\pi G_o m_c^2/hc = (m_c/m_P)^2$.

The HO(32) string bifurcates into a quarkian X-part and a leptonic L-part, so rendering the bosonic scalar spin as fermionic half spin in the continuation of the 'breaking' of the supersymmetry of the Planckian unification. Its heterosis with the Weyl-string then decouples the strong interaction at Weyl-Time for a Weyl-Mass m_W, meaning at the time instanton of the end of inflation or the Big Bang in sEw.G becoming s.Ew.G.
The X-Boson then transforms into a fermionic proto nucleon triquark-component (of energy ~ 10^{-27} kg or 560 MeV) and the L-Boson transforms into the proto-muon (of energy about 111 MeV).

The last 'electroweak' decoupling then occurs at the Fermi-Expectation Energy about 1/365 seconds after the Big Bang at a temperature of about $3.4x10^{15}$ K and at a 'Higgs Boson' energy of about 298 GeV.

A Bosonic decoupling preceded the electroweak decoupling about 2 nanoseconds into the cosmogenesis at the Weyl-temperature of so $T_{Weyl} = T_{max} = E_{Weyl}/k = 1.4x10^{20}$ K as the maximum Black Hole temperature maximized in the Hawking MT modulus and the Hawking-Gibbons formulation: $M_{critical}T_{min} = ½M_{Planck}T_{Planck} = (hc/2\pi G_o)(c^2/2k) = hc^3/4\pi kG_o$ for $T_{min} = 1.4x10^{-29}$ K and Boltzmann constant k.

The Hawking Radiation formula results in the scaling of the Hawking MT modulus by the factor of the 'Unified Field' spanning a displacement scale of 8π radians or 1440° in the displacement of $4\lambda_{ps}$.

The XL-Boson mass is given in the quark-component: $m_X = \#^3 m_{Weyl}/[ec]|_{mod} = 1.9x10^{15}$ GeV modulated in (SNI/EMI=∛{Alpha}/[Alpha]), the intrinsic unified Strong-Electroweak Interaction-Strength for the Kernel part in the Quark-Lepton hierarchy.
The LX-Boson mass is given in the lepton-component: m_L = Omega.[ec]/$\#^2$ = ([Omega]x([ec])/(m_{ps}.∛(α^2) = $\#^{52}[ec/m_{Weyl}]$ ~ 111 MeV in functional operators f(G)xf(S) = 1 for the Ring part in the Quark-Lepton hierarchy.

In particular f(G)/m_{planck} ↔ $\#^2$/[ec] for #(m_{ps}/m_{planck})f(G) and the X-Boson and f(S).m_{planck} ↔ [ec]/$\#^2$ for $\#^{54}$[(m_{planck}/m_{ps})f(S) for the L-Boson.

The X-Boson's mass is: ([Alpha α]xm_{ps}/[ec]) modulated in (SNI/EMI=∛{Alpha}/[Alpha]), the intrinsic unified Strong-Electroweak Interaction-Strength and the L-Boson's mass in: ([Omega]x([ec])/(m_{ps}.∛(α^2).

When the heavy electron known as the muon was accidentally discovered in the late 1930s, Nobel physicist Isidor Isaac Rabi famously remarked, "Who ordered that?"

It is this lepton component which necessitates the existence of the muon (and the tauon and their neutrino partners as constituents of the weak interaction gauge bosons) as a 'heavy electron', as the quantum geometry defines the muon mass in a decoupling of the L_1 energy level given in a diquark hierarchy and based on a quantum geometry of the quantum relativity:

Ten DIQUARK quark-mass-levels crystallize, including a VPE-level for the K-IR transition and a VPE-level for the IR-OR transition:

Quark Level	**Kernel-Energy in MeV***	**K-Mean(x ½) in MeV***	**Ring-Energy in MeV***	**IR-OR.Mean.in.MeV***	**Ground state K-Mean-IR-OR-Mean**	**Comment**
VPE-Level [K-IR]	26.4924-29.9618	**g_{L2} = 14.11355**	2.8175 - 3.1865	L_2 = 1.5010 = mu	12.6126	K-IR VPE
VPE-Level [IR-OR]	86.5334-97.8657	**g_{L1} = 46.100**	9.2030 - 10.408	L_1 = 4.9028 = md	$GS_2=GS_{VPE}$= 41.198 $ms=2g_{L1}+L_1+L_2$ $=g_{L1}+g_{L2}+2L_{u,d}+L_1+L_2$ =98.645; 98.604 Δ_s = 0.041 = g_{L2} - g_{L1} + $2L_{u,d}$	IR-OR VPE Ground-OR electron level
Quark UP/DOWN-Level u=K; d=K+IR ubar=Kbar; dbar=Kbar+IRbar	282.6487-319.6637	**$g_{u,d}$ = 150.5781**	30.060 - 33.997	$L_{u,d}$ = 16.014	$GS_3=GS_{u,d}$= 134.5641 Pionium	K-KIR basis
Quark STRANGE-Level s=K+OR sbar=Kbar+ORbar	923.2302-1,044.13	**g_s = 491.8401**	98.187 - 111.045 muon energy	Ls = 52.308	$GS_4=GS_s$= 439.5321 Kaonium	KIR-KOR basis 1st (K)-OR-Muon level d↔s KIR↔KOR Resonance

Diquark CHARM-Level c=U.ubar=uu.ubar cbar=Ubar.u =(uu)bar.u	3,015.59 - 3,410.51	**g_{cU} = 1,606.53** **g_{cU}-L_{cU}-$g_{u,d}$ =mcU*= 1,285.09**	320.71 - 362.71	L_{cU} = 170.86	GS_5=GS_{cU}= 1,435.67 Charmonium Pole mass =GS_{cU}+0.L_{cU}= 1,435.67	**active singlet apparent**
Diquark BEAUTY-Level BOTTOM-Level b=(ud)bar =(ud).ubar bbar=(ud) =(ud)bar.u	9,849.99 - 11,139.93	**g_b = 5,247.48** **g_b-L_b-g_s =mb*= 4,197.56**	1,047.6 - 1,184.7	L_b = 558.08	GS_6=GS_b= 4,689.40 Bottonium Pole mass =GS_b+0.L_b +½(g_{L1}+g_{L2})= 4,719.51	**active doublet apparent**
Diquark MAGIC-Level M=(us)bar =(us).ubar Mbar=(us) =(us)bar.u	32,173.6 - 36,386.9	**g_M = 17,140.13**	3,421.7 - 3,869.8	L_M = 1,822.88 max Tauon energy	GS_7=GS_M= 15,317.25 Magiconium Pole mass =GS_M+½L_M +½(g_{L1}+g_{L2})+ ½(L_1+L_2)= 16,262.00	suppressed doublet-1 in 2nd K-OR-Tauon level M=us and M.Mbar=VPE in b.bbar resonance
Diquark DAINTY-Level D=(dd)bar =(ud).dbar Dbar=(dd) =(ud)bar.d	105,090-118,852	**g_D = 55,985.5**	11,177 - 12,640	L_D = 5,954.25	GS_8=GS_D= 50,031.25 Daintonium Pole mass =GS_D+0.L_D +(g_{L1}+g_{L2})= 50,091.46	suppressed triplet-1 in D=dd and D.Dbar=VPE in no IROR oscillation

Diquark TRUTH-Level TOP-Level t=(ds)bar =(ud).sbar tbar=ds =(ud)bar.s	343,261-388,214	**g_t = 182,869** **g_t-L_t+g_s =mt*= 163,912.6**	36,506-41,287	L_t = 19,448.25	GS_9=GS_t= 163,420.75 Toponium Pole mass =GS_t+½.L_t +(g_{L1}+g_{L2})+ ½(L_1+L_2)= 173,208.3	**active triplet apparent**
Diquark SUPER-Level S=(ss)bar =(us)sbar Sbar=(ss)=(us)bar.s	1,120,592-1,268,044	**g_S = 597,159.0**	119,243-134,858	L_S = 63,525.27	GS_{10}=GS_S= 533,633.73 Superonium Pole mass =GS_S+L_S +(g_{L1}+g_{L2})+ (L_1+L_2)= 597,225.6	suppressed triplet-2 in S=ss and S.Sbar=VPE in no ORIR oscillation

Quarkian Hierarchies in the Unified Field of Quantum Relativity

Operator $A\{u;d;s\} \Rightarrow \overline{c}$ $\qquad\qquad$ $c \Leftarrow$ Operator $B=A^{*}\{u^{*};d^{*};s^{*}\}$

$$\overset{[-\frac{2}{3}-\frac{2}{3}].[+\frac{2}{3}+\frac{2}{3}]}{\overline{uu}.uu = \overline{U}.U} \left\{\begin{matrix} u[+\frac{2}{3}] \\ d[-\frac{1}{3}] \\ s[-\frac{1}{3}] \end{matrix}\right. \qquad \left.\begin{matrix} [-\frac{2}{3}]dd=\overline{D} \\ [+\frac{1}{3}]ud=\overline{b} \\ [+\frac{1}{3}]us=\overline{M} \end{matrix}\right\} \overset{[+\frac{2}{3}+\frac{2}{3}].[-\frac{2}{3}-\frac{2}{3}]}{tS.\overline{St} = \overline{dsss}.sssd}$$

$$[-\tfrac{4}{3}].[+\tfrac{4}{3}] = [\,0\,] \qquad [\,0\,] \qquad [\,0\,] \qquad [\,0\,] = [+\tfrac{4}{3}].[-\tfrac{4}{3}]$$

$\overline{U}u = \overline{u}.\overline{u}u = \overline{c}$ $\qquad\qquad$ $St\overline{D} = \overline{sssd}.dd = c$

$\overline{U}d = \overline{u}.\overline{u}d = \overline{c} + IR$ $\qquad\qquad$ $St\overline{b} = \overline{sssd}.ud = c + \overline{IR}$

$\overline{U}s = \overline{u}.\overline{u}s = \overline{c} + OR$ $\qquad\qquad$ $St\overline{M} = \overline{sssd}.us = c + \overline{OR}$

$Uu = uuu = \Delta^{++}$ $\qquad\qquad$ $\overline{StD} = sssd.dd = 2\Delta^{++} + 3IR + 3OR$

$Ud = uuu + IR = \Delta^{+} = \Delta^{++} + IR$ $\qquad\qquad$ $\overline{Stb} = sssd.ud = 2\Delta^{++} + 2IR + 3OR$

$Us = uuu + OR = \Sigma^{*+} = \Delta^{++} + OR$ $\qquad\qquad$ $\overline{StM} = sssd.us = 2\Delta^{++} + 1IR + 4OR$

Matrix $|VPE| = \begin{bmatrix} K_1 & K_2 \\ L_1 & L_2 \end{bmatrix} = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$ for $Det|VPE| = ad - bc = 0 = K_1L_2 - K_2L_1 = (46.100)(1.501) - (14.113)(4.903) = g_{L1}(mu) - g_{L2}(md)$

Matrix $|md;mu| = \begin{bmatrix} L_1 & L_2 \\ L_1 & -L_2 \end{bmatrix}\begin{bmatrix} 1 \\ 1 \end{bmatrix} = \begin{bmatrix} L_1 + L_2 \\ L_1 - L_2 \end{bmatrix}$ for $Det|md;mu| = -2L_1L_2$ with $|md;mu|^{-1} = \frac{-1}{2L_1L_2}\begin{bmatrix} -L_2 & -L_2 \\ -L_1 & L_1 \end{bmatrix} = \frac{-1}{2mdmu}\begin{bmatrix} -mu & -mu \\ -md & md \end{bmatrix}$

Linear dependency given by $Det|VPE| = 0$ and $g_{L1}/g_{L2} = K_1/K_2 = L_1/L_2 = ULM = 3.2665...$

For k={1;2;3;...8;9;10}={2;1;(u,d);s;(cU);b;M;D;t;S}:

For 2 Groundstates GS with $n \geq 2$:

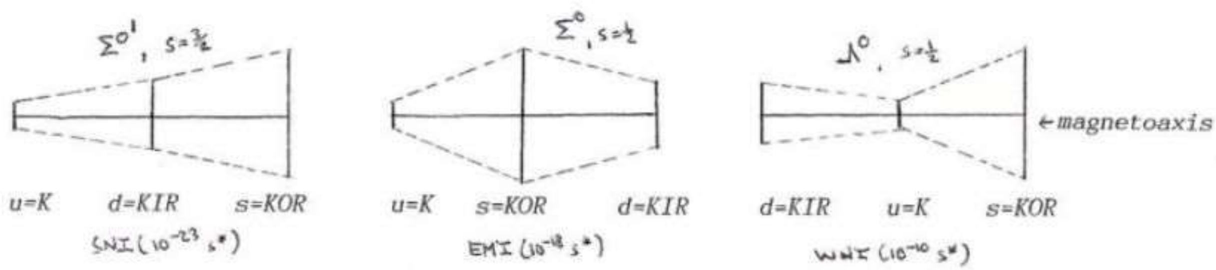
d*=s IR-OR Oscillation; i.e. neutron decay

$GS_n = GS_{n-1} + 2g_{n-1} + (ULM)^{n-2}.\{\tfrac{1}{3}e^-; \tfrac{2}{3}e^-\} - \Delta_s$ $\qquad$ $\{\Delta_s = g_{L2} - g_{L1} + 2L_{u,d}$ as the [u,d]-[s] strange quark perturbation$\}$

particle	most symmetric quantum geometry	basic.symbol.energy partitioning for groundstates g_k (+Δ)	energy values	energy * MeV*	energy SI MeV	particle name
p^+	u.d.u=KKIRK	m_K+[L_2]-[e^-]-⅓[e^-]	939.776+1.5013-0.5205-0.1735	940.5833	938.270	charged proton

n^o	d.u.d=KIRKKIR	m_K+2[L_2]-2[e^-]+⅓[e^-]- Δ_s	939.776+3.0026-1.0410+0.1735-0.041	941.8701	939.554	neutral neutron
$\mu^\pm$	OR* in 1st OR oscillation	m_L - L_1 - Δ n[L_s : 98.19-111.05]	111.04536-(4.9028+Δ)	106.143-Δ	105.6584	charged muon
$\tau^\pm$	OR** **in 2nd OR** oscillation	L_M - m_L+ 2g_s + L_s + L_{ud} + Δ	1822.88-111.05+0.9837+52.31+ 16.01+Δ =1712.81+68.32+Δ	1781.13+Δ	1776.86	charged tauon
π^o	u.ubar; d.dbar	$m_{gu,d}$ - $L_{u,d}$ + e^- + ⅓e^- + Δ	150.5781-16.014+0.6940+Δ	135.258+Δ	134.9776	neutral pion ground state
$\pi^\pm$	u.dbar; ubar.d	$m_{gu,d}$ - $L_{u,d}$ + L_1 + e^- + Δ π^o + L_1 - ⅓e^- + Δ	150.5781-16.014+4.9028+~e^- +Δ 135.258+4.9028-0.1735+Δ	139.987+Δ 139.987+Δ	139.5702	charged pion
λ^o	d.u.s	$m_n{}^o$+ $m_\pi{}^o$ + g_{L2} - L_1 + Δ	941.911+135.26+ 46.100-4.903+Δ	1118.37+Δ	1115.683	neutral lambda

The importance of Kernel-Symmetry so is evidenced in the differentiation of the quarkian permutations and specifying for example the KKIRKOR quark state uds as a tripartite symmetry of u.d.s (least stability as SNI-decaying Sigma°' resonance) and u.s.d (EMI-stable Sigma° particle) and d.u.s (WNI-most stable Lambda° particle).



1-10-19	AJS/ajs	ΑΙΣ/αισ	Aleph-א	Yod-י	Shin-ש	dud = n^0 d(-½)u(½)d(-½) QGS Neutron(0)	ud=b=K+KIR=KKIR dd=D=KIRKIR	udd=ddu=KKK+IRIR uD=bd=db=Du	udd=ddu=Δ^0 u(-½)d(-½)d(-½) SNI Delta(0)
2-11-20	BKT/bkt	ΒΚΤ/βκτ	Bet-ב	Kaf-כ	Tav-ת	udu = p^+ u(-½)d(½)u(-½) QGS Proton(+)	du=b=KIR+K=KIRK uu=U=KK	duu=uud=KKK+IR dU=bu=ub=dU	duu=uud=Δ^+ d(-½)u(-½)u(-½) SNI Delta(+)
3-12-21	CLU/clu	ΓΛΥ/γλυ	Gimel-ג	Lamed-ל	Tet-ט	usu = Σ^+ u(-½)s(½)u(-½) QGS Sigma(+)	su=m=KOR+K=KORK uu=U=KK	suu=uus=KKK+OR sU=mu=um=Us	suu=uus=Σ^+ s(-½)u(-½)u(-½) SNI Sigma(+)
4-13-22	DMV/dmv	ΔΜψ/δμψ	Dalet-ד	Mem-מ	Tsadi-צ	dsd = Σ^- d(-½)s(½)d(-½) QGS Sigma(-)	sd=t=KOR+KIR=KORKIR dd=D =KKIRIR	sdd=dds=KKK+IRIROR sD=td=dt=Ds	sdd=dds=Σ^- s(-½)d(-½)d(-½) SNI Sigma(-)
5-14-23	ENW/enw	ΕΝΩ/ενω	He-ה	Nun-נ	Ghayin-[illegible]	sus = Ξ^0 s(-½)u(½)s(-½) QGS Xi-Chi(0)	us=m=K+KOR=KKOR ss=S=KORKOR	uss=ssu=KKK+OROR uS=ms=sm=Su	uss=ssu=Ξ^0 u(-½)s(-½)s(-½) SNI Xi-Chi(0)
6-15-24	FOX/fox	ΦΟΧ-Ξ/φοχ-ξ	Vav-ו	Ayin-ע	Samekh-ס	sds = Ξ^- s(-½)d(½)s(-½) QGS Xi-Chi(-)	ds=t=KIR+KOR=KIRKOR ss=S=KORKOR	dss=ssd=KKK+IROROR dS=ts=st=Sd	dss=ssd=Ξ^- d(-½)s(-½)s(-½) SNI Xi-Chi(-)
7-16-25	GPY/gpy	Γ*ΠΥ*/γ*πυ*	Gimel*-ג*	Pe-פ	Tet*-ט*	uds=sdu=Σ^{0*} u(-½)d(-½)s(-½) SNI* Sigma*(0)	Uubar=K+K-VPE-$\overline{K}$ = c =u.ūu SNI-Decay (-½-1)	uuu=uU=Uu=KKK	uuu= Δ^{++} u(-½)u(-½)u(-½) SNI Delta(++)
8-17-26	HQZ/hqz	ΗΘΖ/ηθζ	Het-ח	Qof-ק	Zayin-ז	usd=dsu=Σ^0 u(-½)s(½)d(-½) EMI* Sigma(0)	Ddbar=KIR+KIR-VPE-$\overline{KIR}$ EMI-Decay (-½)	ddd=dD=Dd=KKK+IRIRIR	ddd= Δ^- d(-½)d(-½)d(-½) EMI Delta(-)
9-18-27	IRA*/ira*	Ι*ΡΑ*/ι*ρα*	Yod*-י*	Resh-ר	Aleph*-א*	dus=sud=Λ^0 d(-½)u(½)s(-½) QGS* Lambda(0)	Ssbar=KOR+KOR-VPE-$\overline{KOR}$ WNI-Decay (-½)	sss=sS=Ss=KKK+OROROR	sss = Ω^- s(-½)s(-½)s(-½) WNI Omega(-)

Mathimatia: 3x3x3 = 27 Permutations YCM for 18+9 elementary particles

Quantum Spin -½+½-½=-½ QGS = Quantum Geometric Symmetry -½-½-½=-½-1 Quantum Spin

Ten DIQUARK quark-mass-levels crystallize, including a VPE-level for the K-IR transition and a VPE-level for the IR-OR transition:

The K-Means define individual materializing families of elementary particles:

a (UP/DOWN-Mean) sets the (PION-FAMILY: π^o, π^+, π^-);

a (STRANGE-Mean) specifies the (KAON-FAMILY: K^o, K^+, K^-);

a (CHARM-Mean) defines the (J/PSI=J/Ψ-Charmonium-FAMILY);

a (BEAUTY-Mean) sets the (UPSILON=Y-Bottonium-FAMILY);

a (MAGIC-Mean) specifies the (EPSILON=E-FAMILY);

a (DAINTY-Mean) bases the (OMICRON-O-FAMILY);

a (TRUTH-Mean) sets the (KOPPA=K-Topomium-FAMILY) and

a (SUPER-Mean) defines the final quark state in the (HIGGS/CHI=H/X-FAMILY).

The VPE-Means are indicators for average effective quark masses found in particular interactions.

Kernel-K-mixing of the wavefunctions gives K(+) = 60.214 MeV* and K(-) = 31.986 MeV* and the IROR-Ring-Mixing gives (L(+) = 6.404 MeV* and

L(-) = 3.402 MeV*) for a (L-K-Mean of 1.5010 MeV*) and a (L-IROR-Mean of 4.9028 MeV*); the Electropole ([e-] = 0.52049 MeV* and 3x(0.17350 MeV* for $e^{\pm}/3$) as the effective electron mass and as determined from the electronic radius and the magneto charge in the UFoQR.

The rest masses for the elementary particles can now be constructed, using the basic nucleonic Restmass (m_c=$9.9247245 \times 10^{-28}$ kg*=(√(Omegaxm$_P$) for n_p as $1.71175286 \times 10^{-27}$ kg* or 958.99 MeV* and setting as the basic maximum

(UP/DOWN-K-mass=mass(KERNEL CORE)=3xmass(KKK)=3x319.6637 MeV*=958.991 MeV*).

Subtracting the (Ring VPE 3xL(+) =19.215 MeV*, one gets the basic nucleonic K-state for the atomic nucleus (made from protons and neutrons) in: {$m(n^0;p^+)$ = 939.776 MeV*}.
A best approximation for Newton's Gravitational constant 'Big G' hence depends on an accurate determination for the neutron's inertial mass, only fixed as the base nucleon minimum mass at the birth of the universe. A fluctuating Neutron mass would also result in deviations in 'G' independent upon the sensitivity of the measuring equipment. The inducted mass difference in the protonic-and neutronic rest masses, derives from the Higgs-Restmass-Scale and can be stated in a first approximation as the ground state.
A basic nucleon rest mass is m_c=√Omega.m$_P$ = $9.9247245 \times 10^{-28}$ kg* or 958.99 MeV*. (Here Omega is a gauge string factor coupling in the fundamental force interactions as: Cube root(Alpha):Alpha:Cuberoot(Omega):Omega and for Omega = G-alpha.)

KKK-Kernel mass = Up/Down-HiggsLevel=3x319.66 MeV*= 958.99 MeV*, using the Kernel-Ring and Family-Coupling Constants.
Subtracting the Ring-VPE (3L) gives the basic nucleonic K-State as 939.776 MeV*. This excludes the electronic perturbation of the IR-OR oscillation.

For the Proton, one adds one (K-IR-Transition energy) and subtracts the electron-mass for the dquark level and for the Neutron one doubles this to reflect the up-down-quark differential.
An electron perturbation subtracts one 2-2/3=4/3 electron energy as the difference between 2 leptonic rings from the proton's 2 up-quarks and 2-1/3=5/3 electron energy from the neutron' singular up-quark to relate the trisected nucleonic quark geometric template. The neutron's down-strange oscillation, enabling its beta decay into a left-handed proton, a left-handed electron and a right-handed antineutrino subtracts $\Delta_s = g_{L2} - g_{L1} + 2L_{u,d}$ = 0.041 MeV* as a d* = s quark differential.

Proton m_p=u.d.u=K.KIR.K=(939.776+1.5013-0.5205-0.1735) MeV* = 940.5833 MeV* (938.270 MeV).
Neutron m_n=d.u.d=KIR.K.KIR=(939.776+3.0026-1.0410+0.1735-0.041) MeV* = 941.8701 MeV* (939.554 MeV).

This is the ground state from the Higgs-Restmass-Induction-Mechanism and reflects the quarkian geometry as being responsible for the inertial mass differential between the two elementary nucleons. All ground state elementary particle masses are computed from the Higgs-Scale and

then become subject to various fine structures. Overall, the measured gravitational constant 'G' can be said to be decreasing over time.
The Higgs Boson HB is said of having been measured in the decay of W's, Z's and Tau Leptons, as well as the bottom- and top-quark systems described in the table and the text addressing K-KIR-KOR transitions. The K means core for kernel and the IR means Inner Ring and the OR mean Outer Ring. The Rings are derivatives from the L-Boson of the HO(32 string class) and the Kernels are the products of the decay of the X-Boson from the same brane source. So the Tau-decay relates to 'Rings' which are charmed and strange and bottomized and topped, say. They are higher energy manifestations of the basic nucleons of the proton and the neutrons and basic mesons and hyperons.

The energy resonances of the Z-boson (uncharged) represents an 'average' or statistical mean value of the 'Top-Quark' and the Upper-Limit for the Higgs Boson is a similar 'Super-Quark' 'average' and as the weak interaction unification energy.
A previous postulated energy for the Higgs Boson of so 110 GeV is the Omicron-resonance, as inferred from the table above.
Now the most fundamental way to generate the Higgs Boson as a 'weak interaction' gauge is through the coupling of two equal mass, but oppositely charged W-bosons (of whom the Z^o is the uncharged counterpart).

We have seen, that the W-mass is a summation of all the other quark-masses as kernel-means from the strangeness upwards to the truth-quark level.
So simply doubling the 80.622 GeV* and 80.424 GeV mass of the weak-interaction gauge boson must represent the basic form of the Higgs Boson and that is 161.244 GeV* or 160.847 GeV as a function of the electro-weak coupling and related as a 'charged current' weak interaction to a 'neutral current' interaction mediated by the Z^o boson of energy about 91 GeV* to sum for a 'Vacuum Expectation Value' of about 252 GeV*.

Higgs Boson Weakon WNI-Mass $M_{HBWZ} = \{W^- + W^+ + Z^o\}$ GeV* = {80.622 + 80.622 + 91.435} GeV* = 252.68 GeV*

{(14.11355+46.100)+(1.5010+4.9028)+(150.571+491.8401+1,606.53+5,247.48+17,140.13+55,985.5)+(182,869)+(597.159.0)}
= {60.2136}+{6.404}+{80,622.05}+{182,869}+{597,159} =
{66.6618}+{80,622.05}+{2x91,434.5}+{2x298,580} = 860,716.7 MeV*

Kernel-Inner Ring VPE = 0.04611 GeV*
Kernel-Outer Ring VPE = 0.01411 GeV*
Pion-(KIR-Quark d)-VPE = 0.1501 GeV*
Kaon-(KOR-Quark s=d*)-VPE = 0.4918 GeV*
Charm-(Diquark U=uu)-VPE = 1.60653 GeV*
Bottom-(Diquark b=ud)-VPE = 5.24748 GeV*

Magic-(Diquark m=us)-VPE = 17,140.13 GeV*
Dainty-(Diquark D=dd)-VPE = 55,985.5 GeV*
Top-(Diquark t=ds)-VPE = 182,869 GeV*
Super-(Diquark S=ss)-VPE = 597,159 GeV*

Quark q	Diquark Structure qq	Manifesto		Mean-Kernel-Mass GeV*	Mean-Ring-Mass GeV*	Higgs Boson Mass Integration
Kernel-Outer Ring VPE_1	K↔IR↔OR Kernel-Mesonic-Leptonic	KIR=d KOR=s		K_1 0.01411355	L_1 0.0015010	
Kernel-Inner Ring VPE_2	K↔IR Kernel-Mesonic	K=u		K_2 0.046100	L_2 0.0049028	$½(K_2-L_2)$ 0.0206
Pion-(KIR-Quark d)	Base KIR Quark	uq, dq		0.1505781	0.016014	∑(d) =0.1506
Kaon-(KOR-Quark s=d*)	Resonance KOR Quark	sq		0.49184	0.052308	∑(d+s) =0.6419
Charm-(Diquark U=uu)	Diquark Singlet Active	Uqbar c=Uubar		1.60653	0.17086	∑(d+s+U) =2.24843
Bottom-(Diquark b=ud)	Diquark Doublet Active	bqbar		5.24748	0.55808	∑(d+s+U+b) =7.4959
Magic-(Diquark m=us)	Diquark Doublet Suppressed			17.14013	1.82288	∑(d+s+U+b+m) =24.636
Dainty-(Diquark D=dd)	Diquark Triplet Suppressed			55.9855	5.95425	∑(d+s+U+b+m+D) =80.622 = M_W
Top-(Diquark t=ds)	Diquark Triplet Active	tqbar		182.869	19.44825	½{t} =91.4345 = M_Z
Super-(Diquark S=ss)	Diquark Triplet Suppressed			597.159	63.52527	½{S} =298.58 = HVE

$\sum(M_W^+ + M_W^- + M_Z^o) = 2M_{HB}^o$ = (80.622 + 80.622 + 91.4345) GeV* = 252.679 GeV*

For Universal Electro-Weak Unification:
$2M_{BHo}/Y_{npresent} = 2M_{BHo}e/c_2Y_{npresent}$ = 2.6150x10-25 kg* for $2\pi R_{HBo} = h/M_{HBo}c$ and R_{HBo} = 1.3525x10^{-18} m*
Restmass-Photon RMP is quantized in volumar $2\pi^2 R_{RMP}^3.f_{ps}^2|_{constant}$ = e* for R_{RMP}^o = 1.41188...x10^{-20} m*

HVE - $2M_{HB}^o$ = (298.58 - 252.679) GeV* = 45.901 GeV*

HVE - M_{HB}^o = (298.58 - 126.340) GeV* = 172.24 GeV* = Top-Quark Mass

Fermi Constant for Electro-Weak WNI Unification for universal alpha = $60\pi e^2/h$:
$F_o(\alpha) = \alpha\pi/\{\sqrt{2}.M_W^2.(1-M_W^2/M_Z^2)\}$ = 1.5338574x10^{-3}.α = 1.12067834x10^{-5} = 1/{298.72 GeV*)^2
for universal alpha = $60\pi e^2/h$

Fermi Constant for Electro-Weak WNI Unification for 'running' alpha = α':
$F_o(\alpha') = \alpha'\pi/\{\sqrt{2}.M_W^2.(1-M_W^2/M_Z^2)\}$ = 1.5338574x10^{-3}.α' = 1.166378x10^{-5} = 1/{292.81 GeV*)^2
for universal alpha = $60\pi e^2/h$

$F_o(\alpha)/F_o(\alpha') = \alpha/\alpha'$ = 0.9608186 = 1/1.0407792 for $\alpha < \alpha'$

Fermi-HVE(α) = 292.81 GeV* = (298.72 - 5.8894 - 0.0206) GeV* = Fermi-HVE(α') - ∑(b+s+d) - ½{K_2-L_2} = 292.81 GeV*
Fermi-HVE(α') = 298.72 GeV* = (298.58 + 0.14) GeV* = HEV + 6 ∑(b+s+d) + M_π for base VPE = uubar = M_π^o = ∑(d) - δ{K↔IR↔OR}
{$M_\pi = M_\pi^o + L_2 - ⅓m_e$ = 0.1399945 GeV* for M_π^o = 0.150578 - 0.01604 + (1+⅓)m_e = 0.150578 - 0.016014 + 0.000694 = 0.135258 GeV*}

<u>Weinberg Angle:</u>
$\cos\theta_W = M_W/M_Z$ = 80.622/91.4345 = 0.881746 = $g/\sqrt{(g^2+g'^2)}$
$\sin\theta_W = \sqrt{(1 - \cos^2\theta_W)} = \sqrt{0.222524}$ = 0.471725 = $g'/\sqrt{(g^2+g'^2)}$
$g'/g = \tan\theta_W = \sin\theta_W/\cos\theta_W$ = 0.53498967 for g'< g
2{ g'α/gα'} = 2{0.53498967/1.0407792} = 1.02805604 =
28.1463°/27.553674° = 1.02150806 + δ(0.006548)
for θ_W = arccos{0.88175} = 28.1463° = 27.553674° +
0.5926°

<u>Kernel-VPE-Mixing:</u>
K(+) = K+ + K- = 60.21355
K(-) = K+ - K- = 31.98645
L(+) = L+ + L- = 6.40128

$L(-) = L+ - L- = 3.4018$

$K_2 + L_2 = 0.0510$ GeV* for Kernel-Inner Ring VPE_2 K→IR for Gluonic Kernel to Mesonic Inner Ring
$K_1 + L_1 = 0.0156$ GeV* for Kernel-Outer Ring VPE_1 (K→)IR→OR for Mesonic Inner Ring to Leptonic Outer Ring
$K_2 - L_2 = 0.0412$ GeV* for Kernel-Inner Ring VPE_2 K→IR for Gluonic Kernel Base VPE K_1
$- L_1 = 0.0126$ GeV* for Kernel-Outer Ring VPE_1 (K→)IR→OR for (Gluonic Kernel)
$K_1 - L_1 = 0.0126$ GeV* for Kernel-Outer Ring VPE_1 (K→)IR→OR for (Gluonic Kernel)

<u>Modular ylem mass:</u>
$M|_{mod} = M_{chandra} = M_m = f_{ps}|_{mod}$ from monopolar displacement current:

$2\pi i/c = 2\pi e f_{ps}/c = 2\pi e/\lambda_{ps} = e/r_{ps} = e.r_{ss} = 2\pi e\lambda_{ss}$ for $2\pi i = [ec].r_{ss}$ as monopolar displacement current
$2\pi i = 2\pi\lambda_{ss}[ec] = 2\pi e[\lambda_{ss}c] = 2\pi e[f_{ps}\lambda_{ps}\lambda_{ss}] = 2\pi e f_{ps} = 2\pi ec/\lambda_{ps} \Leftrightarrow 2\pi ec/l_{planck}\sqrt{\alpha} = 2\pi ec^3/e$
$=2\pi[ec]c^2/e = 2\pi M|_{mod}c^2/e$
$i = ef_{ps} = M|_{mod}c^2/e$ for $e^2 f_{ps}|_{mod} = M|_{mod}c^2$ for $[h/c^2]f_{ps}|_{mod} = [E/f][m/E]f_{ps}|_{mod} = M|_{mod} = M_m$
by Action Law Action $h = e^2$ $Charge^2$

From Electro-Weak Unification parameters: {1eV = 1.0024656 eV*} with $T(n_{EW}=4.67\text{x}10^{-21}) = 3.40\text{x}10^{15}$ K*

$M_W^{\pm} = \Sigma_{Kernel\text{-}Mean} = m_{up\text{-}down}+m_{strange}+m_{charm}+m_{bottom}+m_{magic}+m_{dainty} =$
0.151+0.492+1.607+5.247+17.140+55.986 = 80.622 GeV* or 80.424 GeV

M_Z^o = 91.435 GeV* or 91.210 GeV

$M_{H\chi}$ = 298.580 GeV* or 297.846 GeV

$\sqrt{2}$.Fermi Constant $G = \sqrt{2}.G_F = \sqrt{2}\{\pi\alpha/(\sqrt{2}.M_W^2[1-M_W^2/M_Z^2])\} = (1/\text{Higgs-Vacuum-Expectation HVE})^2$
$= 1.5848\text{x}10^{-5}$ GeV^{-2}* for HVE=251.19 GeV* or 250.58 GeV

As the Charmonium quark state is defined by the coupling of a double-up-diquark U=uu to an anti-up-quark as c=U.u(bar) and so as a quark molecule as the quark singlet state of 3 interacting quarks; whilst the diquark doublet of bottom-magic {b=[ud].ubar and m=[us].ubar} and the diquark triplet of dainty-top-super {D=[dd].U and t=[ds].U and S=[ss].U} form double quarks; the Kernel-Mean of the Charmonium energy level is added to the HVE and the Difference-VPE levels for the K-IR - IR-OR transitions are subtracted for the quark-antiquark coupling.

$M_W^- + M_W^+ + M_Z^o = 252.68$ GeV* ≈ HVE + $m_{charm} - (m_{K(+)}+m_{K(-)}+m_{L(+)}+m_{L(-)})$
= (251.19 + 1.60653 - [0.0922+0.009806]) = 252.69 GeV* or 252.07 GeV

m_{charm} - ($m_{K(+)}$+$m_{K(-)}$+$m_{L(+)}$+$m_{L(-)}$) = 1.60653 - 0.102 = 1.5045 ≈ M_{W}^{-} + M_{W}^{+} + M_{Z}^{o} - HEV = 1.49 GeV*
HEV = $M_{H\chi}$ - m_D + m_{ud} + 2xm_{charm} + $m_{u,d}$ = 298.580 - 55.986 + 5.24748 + 3.21306 + 0.15058 = 251.205 GeV* ≈ HEV in Kernel -Inner Ring mixing

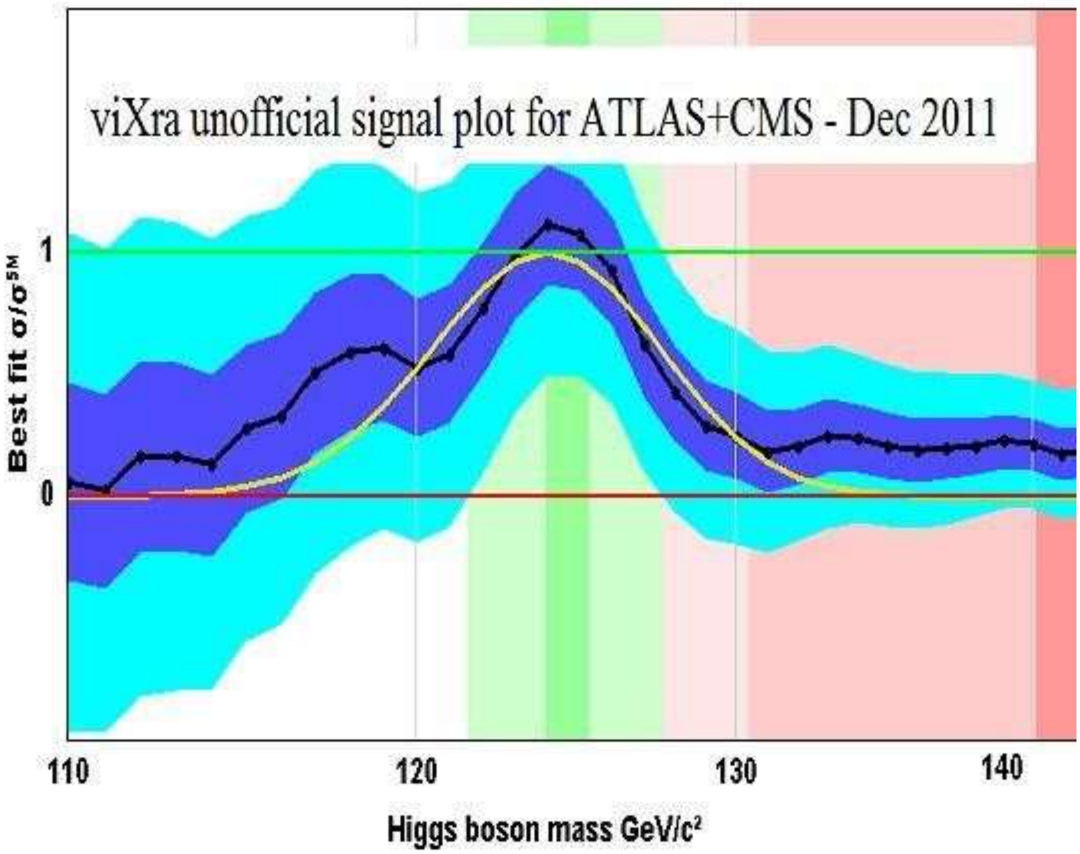
HEV = HB+anti-HB = 2x$M_{higgsboson}$ for a Higgs Boson mean of: ½{252.68} = 126.34 GeV* or 126.03 GeV SI.
$M_{higgs\ boson}$ = 2x{55.986+5.247+1.607+0.492+0.151+0.046+0.014} GeV* = 127.09 GeV* = 126.77 GeV SI
for an upper bound including the base quarks u,d,s.

Using the 3 Diquark energy levels U,D and S yield $M_{higgsboson}$ = 2x{55.986+5.247+1.607} GeV* = 125.68 GeV* and 125.37 GeV SI.
Subtracting the u,d means and the VPE mixing corrections gives:
125.68 - (g_{L2}+g_{L1}+$g_{u,d}$+L2+L1+$L_{u,d}$) = 125.68 - 0.23321 = 125.447 GeV* or 125.138 GeV SI for a measured mass of the Higgs Boson.

Quantum Relativity describes the creation of the Higgs Boson from even more fundamental templates of the so called 'gauges'. The Higgs Boson is massless but consists of two classical electron rings and a massless doubled neutrino kernel, and then emerges in the magneto charge induction as mass carrying Goldstone gauge boson.

The Higgs Boson resonance found by ATLAS and CMS is a diquark resonance.

The 'make-up' of the Higgs Boson can be highlighted in a discovery of a 160 GeV Higgs Boson energy and incorporating the lower energy between 92 GeV and to the upper dainty level at 130 GeV as part of the diquark triplet of the associated topomium energy level.
In particular, as the bottomium doublet minimum is at 5,247.48 MeV* and the topomium triplet minimum is at 55,985.5 MeV* in terms of their characteristic Kernel-Means, their doubled sum indicates a particle-decay excess at the recently publicized ~125 GeV energy level in 2x(5.24748+55.9855) GeV* = 122.466 GeV* (or 122.165 GeV SI).



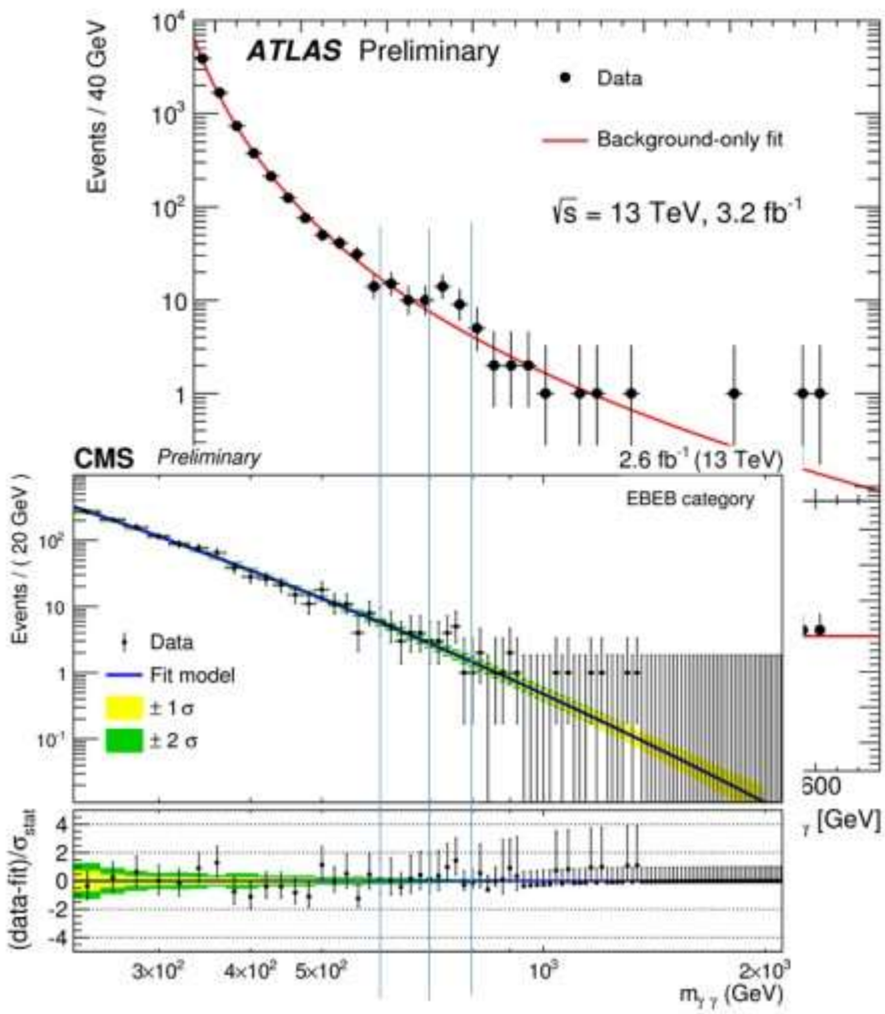
These are the two means from ATLAS {116-130 GeV as 123 GeV} and CMS {115-127 GeV as 121 GeV} respectively.
http://press.web.cern.ch/press/PressReleases/Releases2011/PR25.11E.html

Then extending the minimum energy levels, like as in the case to calculate the charged weakon gauge field agent energy in the charm and the VPE perturbations as per the table given, specifies the 125 GeV energy level in the Perturbation Integral/Summation:
2x{55.986+5.247+1.607+0.492+0.151+0.046+0.014} GeV* = 127.09 GeV*, which become about 126.77 GeV SI as an upper bound for this 'Higgs Boson' at the Dainty quark resonance level from the UFoQR (Unified Field of Quantum Relativity).
Using the 3 Diquark energy levels U,D and S yield 2x{55.986+5.247+1.607} GeV* = 125.68 GeV* and 125.37 GeV SI.
Some data/discovery about the Higgs Boson aka the 'God-Particle' states, that there seems to be a 'resonance-blip' at an energy of about 160 GeV and as just one of say 5 Higgs Bosons for a 'minimal supersymmetry'.
One, the lowest form of the Higgs Boson is said to be about 110 GeV in the Standard Model. There is also a convergence of the HB to an energy level of so 120 GeV from some other models.

But according to QR, the Higgs Boson, is that is not a particular particle, but relates to all particles in its 'scalar nature' as a rest mass inducer.
It is natural, that an extended form of the Higgs Boson can show a blip at the 160 GeV mark and due to its nature as a 'polarity' neutralizer (a scalar particle has no charge and no spin but can be made up of two opposite electric charges and say two opposing chirality of spin orientations.)

The Top-Super Diquark Resonance of CERN's 'Diphoton' - December 15th, 2015

As can be calculated from the table entries below; a (suppressed Top-Super Diquark Resonance is predicted as a (ds)UUbar(ss)=(ds).u.ubar.u.ubar.(ss) quark complex or diquark molecule averaged at (182.869+597.159)GeV=780.03 GeV.



https://profmattstrassler.com/2015/12/16/is-this-the-beginning-of-the-end-of-the-standard-model/

In the diquark triplet {dd; ds; ss}={Dainty; Top; Super} a Super-Superbar resonance at 1.1943 TeV can also be inferred with an 'IR-OR triplet suppressed' Super-Dainty resonance at 653.145 GeV*
and the Top-Dainty resonance at 238.855 GeV* by the Higgs Boson summation as indicated below.
Supersymmetric partners become unnecessary in the Standard Model, extended into the diquark hierarchies.

Next, we interpret this scalar (or sterile) Double-Higgs (anti)neutrino as a majoron and lose the distinction between antineutrino and neutrino eigenstates.
We can only do this in the case of the Z^o decay pattern, which engage the boson spin of the Z^o as a superposition of two antineutrinos for the matter case and the superposition of two neutrinos in the antimatter case from first principles.
So the Z^o is a Majorana particle, which merges the templates of two antineutrinos say and spin induces the Higgs-Antineutrino.
And where does this occur? It occurs at the Mesonic-Inner-Ring Boundary previously determined at the 2.776×10^{-18} meter marker.
This marker so specifies the Z^o Boson energy level explicitly as an upper boundary relative to the displacement scale set for the kernel at the wormhole radius $r_{ps}=\lambda_{ps}/2\pi$ and the classical electron radius as the limit for the nuclear interaction scale at 3 fermis in: $R_{compton}$Alpha.
So the particle masses of the standard model in QED and QCD become Compton-Masses, which are Higgs-mass-induced at the Mesonic-Inner-Ring (MIR) marker at $R_{MIR}=2.777...\times10^{-18}$ meters.
A reformulation of the rotational dynamics associated with the monopolar naturally superconductive current flow and the fractalization of the static Schwarzschild solution follows. in a reinterpretation of the Biot-Savart Law.

All inertial objects are massless as 'Strominger branes' or extremal boundary Black Hole equivalents and as such obey the static and basic Schwarzschild metric as gravita template for inertia.
This also crystallizes the Sarkar Black Hole boundary as the 100 Mpc limit ($R_{Sarkar} = (M_o/M_{critical}.R_{Hubble}) = 0.028.R_{Hubble}$~237 Million lightyears) for the cosmological principle, describing large scale homogeneity and isotropy, in the supercluster scale as the direct 'descendants' of Daughter Black Holes from the Universal Mother Black Hole describing the Hubble Horizon as the de Sitter envelope for the Friedmann cosmology (see linked website references on de Sitter cosmology) for the oscillatory universe bounded in the Hubble nodes as a standing waveform.

The Biot-Savart Law: $B = \mu_o qv/4\pi r^2 = \mu_o i/4\pi r = \mu_o Nef/2r = \mu_o Ne\omega/4\pi r$ for angular velocity $\omega=v/r$ transforms into $B = \text{constant}(e/c^3)g\times\omega$
in using $a_{centripetal} = v^2/r = r\omega^2$ for $g = GM/r^2 = (2GM/c^2)(c^2/2r^2) = (R_Sc^2/2R^2)$ for a Schwarzschild solution $R_S = 2GM/c^2$.
$B = \text{constant}(e\omega/rc)(v/c)^2 = \mu_o Ne\omega/4\pi r$ yields constant $= \mu_o Nc/4\pi = (120\pi N/4\pi) = 30N$ with $e = m_M/30c$ for $30N(e\omega/c^3)(GM/R^2) = 30N(m_M/30c)\omega(2GM/c^2)/(2cR^2) = NmM(\omega/2c^2R)(R_S/R) = \{M\}\omega/2c^2R$. Subsequently, $B = Mw/2c^2R = Nm_M(R_S/R)\{\omega/2c^2R\}$ to give a manifesting mass

M fine structured in $M = Nm_M(R_S/R)$ for $N = 2n$ in the superconductive 'Cooper-Pairings' for a charge count $q = Ne = 2ne$.

But any mass M has a Schwarzschild radius R_S for $N = (M/m_M)\{R/R_S\} = (M/m_M)\{Rc^2/2GM\} = \{Rc^2/2Gm_M\} = \{R/R_M\}$ for a monopolar Schwarzschild radius $R_M = 2Gm_M/c^2 = 2G(30ec)/c^2 = 60ec/30c^3 = 2e/c^2 = 2L_P\sqrt{Alpha} = 2OL_P$.
Any mass M is quantized in the Monopole mass $m_M = m_P\sqrt{Alpha}$ in its Schwarzschild metric and where the characterizing monopolar Schwarzschild radius represents the minimum metric displacement scale as the Oscillation of the Planck-Length in the form $2L_P\sqrt{Alpha} \sim L_P/5.85$.
This relates directly to the manifestation of the magnetopole in the lower dimensions, say in Minkowskian spacetime in the coupling of inertia to Coulombic charges, that is the electro pole and resulting in the creation of the mass-associated electromagnetic fields bounded in the cinvariance.

From the Planck-Length Oscillation or 'L_P-bounce': $OL_P = L_P\sqrt{Alpha} = e/c^2$ in the higher (collapsed or enfolded) string dimensions, the electro pole $e = OL_P.c^2$ maps the magnetopole $e^* = 2R_e.c^2$ as 'inverse source energy' $E_{Weyl} = hf_{Weyl}$ and as function of the classical electron radius $R_e = ke^2/m_ec^2 = R_{Compton}.Alpha = R_{Bohr1}.Alpha^2 = Alpha^3/4\pi R_{Rydberg} = 10^{10}\{2\pi r_{ps}/360\} = \{e^*/2e\}.OL_P$.

The resulting reflection-mirror space of the M-Membrane space (in 11D) so manifests the 'higher D' magneto charge 'e*' as inertial in the monopolar current [ec], that is the electropolar Coulomb charge 'e'.
This M-space becomes then mathematically formulated in the gauge symmetry of the algebraic Lie group E_8 and which generates the inertial parameters of the classical Big Bang in the Weylian limits and as the final Planck-String transformation.

The string-parametric Biot-Savart law then relates the angular momentum of any inertial object of mass M with angular velocity ω in self inducing a magnetic flux intensity given by $B = M\omega/2Rc^2$ and where the magnetic flux relates inversely to a displacement R from the center of rotation and as a leading term approximation for applicable perturbation series.
This descriptor of a string-based cosmology so relates the inherent pentagonal supersymmetry in the cosmogenesis to the definition of the Euler identity in its fine structure $X+Y = XY = i^2 = -1$, and a resulting quadratic with roots the Golden Mean and the Golden Ratio of the ancient omniscience of harmonics, inclusive of the five Platonic solids mapping the five superstring classes. Foundations and applications of superstring theory are also indicated and serve as reference for the above.

The quantization of mass m so indicates the coupling of the Planck Law in the frequency parameter to the Einstein law in the mass parameter.
The postulated basis of M-Theory utilizes the coupling of two energy-momentum eigenstates in the form of the modular duality between so termed 'vibratory' (high energy and short

wavelengths) and 'winding' (low energy and long wavelengths) self-states. The 'vibratory' self-state is denoted in:

$E_{ps} = E_{primary\ sourcesink} = hf_{ps} = m_{ps}c^2$ and the 'winding' and coupled self-state is denoted by: $E_{ss} = E_{secondary\ sinksource} = hf_{ss} = m_{ss}c^2$

The F-Space Unitary symmetry condition becomes: $f_{ps}.f_{ss} = r_{ps}.r_{ss} = (\lambda_{ps}/2\pi)(2\pi\lambda_{ss}) = 1$

The coupling constants between the two eigenstates are so: $E_{ps}E_{ss} = h^2$ and $E_{ps}/E_{ss} = f_{ps}^2 = 1/f_{ss}^2$

The Supermembrane $E_{ps}E_{ss}$ then denotes the coupled superstrings in their 'vibratory' high energy and 'winded' low energy self-states.

The coupling constant for the vibratory high energy describes a maximized frequency differential over time in $df/dt|_{max} = f_{ps}^2$ and the coupling constant for the winded low energy describes its minimized reciprocal in $df/dt|_{min} = f_{ss}^2$.

F-Theory also crystallizes the following string formulations from the $E_{ps}E_{ss}$ super brane parameters.

$1/E_{ps} = e^* = 2R_ec^2 = \sqrt{\{4\alpha hce^2/2\pi G_om_e^2\}} = 2e\sqrt{\alpha\{m_P/m_e\}} = 2ke^2/m_e = \alpha hc/\pi m_e$

Here e* is defined as the inverse of the sourcesink vibratory superstring energy quantum $E_{ps} = E^*$ and becomes a *New Physical Measurement Unit is the Star Coulomb (C*)* and as the physical measurement unit for 'Physical Consciousness'.

R_e is the 'classical electron radius' coupling the 'point electron' of Quantum- Electro-Dynamics (QED) to Quantum Field Theory (QFT) and given in the electric potential energy of Coulomb's Law in: $m_ec^2 = ke^2/R_e$; and for the electronic rest mass m_e.

Alpha α is the electromagnetic fine structure coupling constant $a = 2\pi ke^2/hc$ for the electric charge quantum e, Planck's constant h and lightspeed constant c.

G_o is the Newtonian gravitational constant as applicable in the Planck-Mass $m_P = \sqrt{(hc/2\pi G_o)}$. As the Star Coulomb unit describes the inverse sourcesink string energy as an elementary energy transformation from the string parametrization into the realm of classical QFT and QED, this transformation allows the reassignment of the Star Coulomb (C*) as the measurement of physical space itself.

Cosmic Ray Unification in XL-Boson Class IA
SEW.G --- SeW.G

An Elementary Cosmic Ray Spectrum

The elementary Cosmic Ray Spectrum derives from the transformation of the Planck-String-Boson at the birth of the universe.

The following tabulation relates those transformation in energy and the modular duality between the distance parameters of the macrocosm of classical spacetime geometry and the microcosm of the quantum realm.

String-Boson	**Wavelength (λ) m**	**Energy (hc/λ) J & eV**	**Modular Wavelength m**	**Significance**
1. Planck-Boson	1.2×10^{-34} m	1.6 GJ or 9.9×10^{27} eV	8.0×10^{33} m	Outside Hubble Horizon Limit
2. Monopole-Boson	4.6×10^{-32} m	4.3 MJ or 2.7×10^{25} eV	2.2×10^{31} m	Outside Hubble Horizon Limit
3. XL-Boson	6.6×10^{-31} m	303 kJ or 1.9×10^{24} eV	1.5×10^{30} m	Outside Hubble Horizon Limit
4. X-K-Boson transit (+)	8.8×10^{-28} m	227 J or 1.6×10^{21} eV	1.1×10^{27} m	$2\pi R_{Hubble11D}$
5. X-K-Boson transit (-)	1.0×10^{-27} m	201 J or 1.2×10^{21} eV	1.0×10^{27} m	$2\pi R_{HubbleHorizonLimit}$
6. CosmicRayToe	1.9×10^{-27} m	106 J or 6.6×10^{20} eV	5.3×10^{26} m	$2\pi R_{Hubble10D}$
7. CosmicRayAnkle	2.0×10^{-25} m	1.0 J or 6.2×10^{18} eV	5.0×10^{24} m	Galactic Supercluster Scale
8. CosmicRayKnee (+)	1.0×10^{-22} m	0.002 J or 1.24×10^{16} eV	1.0×10^{22} m	Galactic Halo(Group) Scale
9. CosmicRayKnee (-)	6.3×10^{-22} m	0.3 mJ or 2.0×10^{15} eV	1.6×10^{21} m	Galactic Disc(Halo) Scale
10.CosmicRay	1.4×10^{-20} m	0.002 mJ or 1.4×10^{13}eV	7.1×10^{19} m	Galactic Core Scale

Energies then become defined in standard physics, such as supernovae, neutron stars and related phenomena, engaging electron accelerations and synchrotron radiation.

7. represents the ECosmic-Boson aka superstring class IIA as a D-brane attached open string dual to the (self-dual) monopole string class IIB and where the D-Brane or Dirichlet-Coupling in both cases becomes the 'intermediary' heterotic (closed loop) superstring HO(32).
It is the HO(32) superstring, which as a bosonic full-quantum spin superstring bifurcates into the subsequently emerging quark-lepton families as the

K-L-Boson split into bosonic proto-dinucleons (m_c's) as George Gamow's primordial neutron matter or ylem in his proposed cosmology descriptive of the QBB.

A 1949 composite picture with Robert Herman on the left, Ralph Alpher on the right, and George Gamow in the centre, as the genie coming out of the bottle of "Ylem," the initial cosmic mixture of protons, neutrons, and electrons from which the elements supposedly were formed

The stability of stars is a function of the equilibrium condition, which balances the inward pull of gravity with the outward pressure of the thermodynamic energy or enthalpy of the star (H=PV+U). The Jeans Mass M_J and the Jeans Length R_J a used to describe the stability conditions for collapsing molecular hydrogen clouds to form stars say, are well known in the scientific data base, say in formulations such as:

$M_J=3kTR/2Gm$ for a Jeans Length of $R_J=\sqrt{\{15kT/(4\pi\rho Gm)\}}=R_J=\sqrt{(kT/Gnm^2)}$.

Now the Ideal Gas Law of basic thermodynamics states that the internal pressure P and Volume of such an ideal gas are given by PV=nRT=NkT for n moles of substance being the Number N of molecules (say) divided by Avogadro's Constant L in n=N/L .

Since the Ideal Gas Constant R divided by Avogadro's Constant L and defines Boltzmann's Constant k=R/L. Now the statistical analysis of kinetic energy KE of particles in motion in a gas (say) gives a root-mean-square velocity (rms) and the familiar $2.KE=mv^2$(rms) from the distribution of individual velocities v in such a system.

It is found that PV=(2/3)N.KE as a total system described by the v(rms). Now set the KE equal to the Gravitational PE=GMm/R for a spherical gas cloud and you get the Jeans Mass. (3/2N).(NkT)=GMm/R with m the mass of a nucleon or Hydrogen atom and $M=M_J=3kTR/2Gm$ as stated.

The Jeans' Length is the critical radius of a cloud (typically a cloud of interstellar dust) where thermal energy, which causes the cloud to expand, is counter acted by gravity, which causes the cloud to collapse. It is named after the British astronomer Sir James Jeans, who first derived the quantity; where k is Boltzmann Constant, T is the temperature of the cloud, r is the radius of the cloud, μ is the mass per particle in the cloud, G is the Gravitational Constant and ρ is the cloud's mass density (i.e. the cloud's mass divided by the cloud's volume).

Now following the Big Bang, there were of course no gas clouds in the early expanding universe and the Jeans formulations are not applicable to the mass seedling M_o; in the manner of the Jeans formulations as given.

However, the universe's dynamics is in the form of the expansion parameter of GR and so the $R(n)=R_{max}(n/(n+1))$ scale factor of Quantum Relativity.
So we can certainly analyze this expansion in the form of the Jeans Radius of the first protostars, which so obey the equilibrium conditions and equations of state of the much later gas clouds, for which the Jeans formulations then apply on a say molecular level.
This analysis so defines the ylemic neutron stars as 'Gamov proto-stars' and the first stars in the cosmogenesis and the universe.

Let the thermal internal energy or ITE=H be the outward pressure in equilibrium with the gravitational potential energy of GPE=Ω. The nuclear density in terms of the super brane parameters is $\rho_{critical}=m_c/V_{critical}$ with m_c a base-nucleon mass for an 'ylemic neutron'.

$V_{critical}= 4\pi R_e^3/3$ or the volume for the ylemic neutron as given by the classical electron radius $R_e=10^{10}\lambda_{wormhole}/360=e^*/2c^2$ and related to the ground state (Dirac Sea) Fermi energy $E_{fermi} = ½mv^2$ and the Fermi velocity $v_{fermi} = h/2\pi m\sqrt[3]{(3\pi^2N/V)}$ for a N-particle Fermi-Dirac system of volume V by the Compton constant $m_{ec}r_{ec}=\alpha h/2\pi c=m_eR_e$.
A spherical space defined by the classical maximized electron radius R_e then would be partitioned in:
$N = 4\pi R_e^3/6\pi^2r_{ps}^3 = 2R_e^3/3\pi r_{ps}^3 = (2/3\pi)(2\pi.10^{10}/360)^3 = \pi^2.10^{30}/8{,}748{,}000 = 1.1282...x10^{24}$ wormhole radii of the quantum mechanical electron approximated by the minimized 'point particular' electron as the N/V ground state in the Fermi energy.

The electron's Fermi velocity then becomes $v_{fermi} = h/2\pi m_e\sqrt[3]{(3\pi^4.10^{30}/8{,}748{,}000)} = 36{,}781.195...$ m*/s* or 0.0001226. c for this ground state for a Fermi energy of $6.28437422x10^{-22}$ J* ~ $[2\pi.\lambda_{wormhole}]_{unified}$ J* or 0.0039119...eV* and 0.00093 eV* above the mass of the electron (anti)neutrino at 0.002982 eV*.

H=(molarity)kT for molar volume as $N=(R/R_e)^3$ for $dH=3kTR^2/R_e^3$. $\Omega(R)=$
$-\int G_oMdm/R = -\{3G_om_c^2/(R_e^3)^2\}\int R^4dR = -3G_om_c^2R^5/R_e^6$ for
$dm/dR=d(\rho V)/dR=4\pi\rho R^2$ and for $\rho=3m_c/4\pi R_e^3$

For equilibrium, the requirement is that $dH=d\Omega$ in the minimum condition $dH+d\Omega=0$.
This gives $dH+d\Omega=3kTR^2/R_e^3 - 16G_o\pi^2\rho^2R^4/3=0$ and the ylemic radius in 'Gamow's Ylem' law:

$$\mathbf{R_{ylem}=\sqrt{\{kTRe^3/G_omc^2\}}}\text{............}\mathbf{[Eq.19]}$$

as the Jeans-Length precursor or progenitor for subsequent stellar and galactic generation.

The ylemic (Jeans) radii are all independent of the mass of the star as a function of its nuclear generated temperature. Applied to the proto-stars of the vortex neutron matter or ylem, the radii are all neutron star radii and define a specific range of radii for the gravitational collapse of the electron degenerate matter.

This spans from the 'First Three Minutes' scenario of Steven Weinberg to the cosmogenesis to 1.1 million seconds (or about 13 days) and encompasses the standard beta decay of the neutron (underpinning radioactivity). The upper limit defines a trillion-degree temperature and a radius of over 40 km; the trivial Schwarzschild solution gives a typical ylem radius of so 7.4 kilometers and the lower limit defines the 'mysterious' planetesimal limit as 1.8 km.

For long a cosmological conundrum, it could not be modelled just how the molecular and electromagnetic forces applicable to conglomerate matter distributions (say gaseous hydrogen as cosmic dust) on the quantum scale of molecules could become strong enough to form say 1 km mass concentrations, required for 'ordinary' gravity to assume control.

The ylem radii's lower limit is defined in this cosmology then show, that it is the ylemic temperature of the 1.2 billion degrees K, which perform the trick under the Ylem-Jeans formulation, and which then is applied to the normal collapse of hydrogenic atoms in summation.

The Ylem then manifests the massless Higgs Bosonic precursor as a scalar 'Neutron-Boson' (10), which then becomes mass inductive under utility of the Equivalence Principle of General Relativity, relating gravitational mass to inertial mass.
It is supersymmetric double neutrons which bifurcate into the observed mass content in the universe and not a decoupling matter-antimatter symmetry.
The primordial neutron beta-decay so manifests the nucleon-lepton distinction in the decoupling of the strong weak nuclear interaction, mediated by the electromagnetic alpha-interaction hitherto unified with the omega-gravitational interaction. This primordial ylem radioactivity manifests the bosonic string class IIB as a monopolar mass current as a D-brane interaction in modular duality to the transformation of the self-dual magnetic monopole to the bi-dual electromagnetic cosmic rays at the ECosmic energy level.

The monopole class is chiral (self-dual) and the Ecosmic class is nonchiral (bi-dual); from this derives the Nonparity of the spacial symmetry aka the CP-Violation of the weak nuclear interaction, related to neutrino flux as monopolar superconductive current flows.
As the heterotic classes are all 'closed looped', the elementary particles of the standard models emerge from the HE(64) class coupled to the HO(32) class in the inflationary string epoch.

8. depicts the Weyl-Boson of the Big Bang Planck-singularity of the Weyl-Geodesic of relativistic spacetime as the final 'octonionized' string class HE(8x8).

9. modulates the experimentally well measured 'knee' energy for Cosmic Rays as the distribution flux of high-energy protons as the primary particle in the 2π-factor. The wormhole radius is 10^{-22} m/2π for a Halo-(Dark Matter)-Radius of $2\pi x 10^{22}$ meters.

10. is the massless ancestor of the Higgs-template and defined through the Weyl-String-Eigenenergy $E^* = kT^* = hf^* = m^*c^2 = 1/e^* = 1/2R_e c^2$.
The scale of (10) emerges from the holographic principle as $2\pi^2 R^{*3}.f^{*2} = e^*$ for $R^*=h/(2\pi m'c)=1.41188..x10^{-20}$ m for a Compton Energy of $E' = m'c^2 = 2.2545..x10^{-6}$ J or 14.03 TeV, which serendipitously is the maximum energy regime for which the LHC is presently designed.

The Experimental Evidence for the Superstrings is observed indeed every day in the laboratories of the astrophysics around the globe.

Conclusion:

As David Tong in his lecture at the Royal Institute proposed; the extension of the quantum field theory and the standard model of particle physics can proceed in revisiting the nature of the classical electron.
The electron field of QFT as a universal wavefunction becomes naturally embedded in the spacetime matrix of General Relativity, should the large scale curved classical geometry of GR be applied to QFT as a quantum geometry.
A quantum geometry derived from the transformation of five superstring classes manifesting their characteristic energy scales in the Inflaton preceding the Quantum Big Bang cosmology of the instanton naturally renders the spacetime parameters of the Inflaton as quantum gravitational in the application of a higher dimensional modular duality.
It is then a mirror duality inherent in the spacetime potential created in the Inflaton epoch, which enables the thermodynamic Planck-Einstein cosmology of the QBB to utilize itself in the volume of spacetime it dynamically occupies and in holographically and conformally coupling the microcosm of the quantum relativity to the macrocosm of general relativity as the curvature of spacetimes.

The electron field of QFT so allows the curvature of spacetime in a geometric sense to interact with a Higgs field of inertia in a dual nature of the energy quanta defining this inertia as mass and electromagnetic quanta.

The curvature of spacetime therefore becomes an effect of the linearization of primordial wormhole parameters defined in the Inflaton epoch and the physics of 11-dimensional supermembrane manifolds and is evidenced and observable in the relationship between de Broglie matter waves and the Compton wavelengths to relate the wave-particle duality of the quantum mechanics on all scales to the original boundary conditions of displacement scales.
In particular a Planck-Stoney 'bounce' relating the minimum energy of the Zero-Point Planck Oscillator to a coupling between electropolar charge e and magnetopolar charge e* at the Planck energy and as a minimum displacement parameter, becomes the precursor for all subsequent quantum fluctuations, which are however not based on a virtuality of the matter-antimatter coupling, but are found in an inherent gauge physics of originally massless Goldstone bosons, giving rise to the fundamental interactions.
Quantum geometric gravity then allows the unfolding of a wormhole event horizon to manifest as mass in transforming the waved de Broglie matter into particularised matter as a 'decurving' of the Compton wavelength into a Compton radius, the elementary building unit for this process being the electron of QFT.

The foundation of QFT and the Standard Model so are encapsulated in the parameters of the electron in its mass and its charge as derivatives and effects of its nature exhibited in the Inflaton, now rendered observable and measurable in the continuation of the cosmological history of the instanton.
Examination and analysis of the electron's origins, so crystallizes its monopolar origin of quantum relativistic self-interaction as its own initial condition and when the qbb created its boundary mass or inertia as the mass of the Weyl-E_{ps} wormhole as a transformed Planck boson defined at the start of the inflaton and the string epoch.
As this initial electron mass is inherently defined in the Compton constant, setting the proportionality between mass and displacement from the Planck scale to the electron scale; the nature of the electron is related to the manifestation of energy and momentum on all other scales allowed by the natural boundary conditions defined by the instanton-inflaton parameters.

The electron is not a point particle but has a size upper and lower bounded by its Weyl-E_{ps} limit from above and its classical diameter from below. It is minimum size, being that of the wormhole of creation, so can be associated with the limits for physical measurement and the success of QFT remains valid in this case, but without any need for infinite regressions or divergences from the mathematical viewpoint.
Its classical size directly relates to its monopolar self-interaction and has been known for long as the 'missing' energy of the electron in its self-interaction and its mass as of being of a purely electromagnetic origin in electro stasis, that is its rest mass at zero velocity and the absence of any external magnetic field.
The internal charge distribution of the electron so becomes a direct effect of its volume occupied as a minimized string-brane volumar in the inflaton quantum fluctuation of the Planck-Stoney bounce relating displacement to charge via the electromagnetic fine structure constant. This charge-displacement coupling then enables the birth of a space-inherent form of angular acceleration or the time rate change of frequency coupled to any volumar to define the diameter of the electron with the ratio of energy over time as the quantum of magnetopolar charge.

Modular mirror and T-duality then renders the magnetopolar charge quantum e* as the precise inversion of the wormhole energy E*=hf*
This paper has shown, that the electron is a magnetic monopole as a direct derivative of the decay of the magnetic monopole boson also known as the supermembrane or self-dual superstring class IIB. The electron so possesses an internal magnetopolar field descriptive of its self-interaction, with its self-energy so as form of angular acceleration as the square of frequency, maximized in its upper bound of its cosmogenesis.
Applying the modular string duality, it has been shown, that the electron has both a minimum rest mass, independent from its effective mass and a maximum mass as per its creation.

At the core of physical consciousness lies quantum consciousness; but there it is called self interaction of a particle or dynamical system in motion relative to its charge distribution. We have shown, 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.

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Quantum Fields: The Real Building Blocks of the Universe
Published on Feb 15, 2017
According to our best theories of physics, the fundamental building blocks of matter are not particles, but continuous fluid-like substances known as 'quantum fields'. David Tong explains what we know about these fields, and how they fit into our understanding of the Universe.
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