THE WAVE & PARTICLE DUALITY- PHOTON
AND ELEMENTARY-PARTICLES ORIGINATION

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Abstract

**Distance** is the Quantum of E-Geometry , while **Material-point** is the Quantum in **Physics** and in **Material-Geometry** which is the composition of Opposites and are the Elements in **Chemistry and Physics** . As in **Algebra** Zero ,0 , is the **Master-key** number for all Positive and Negative numbers , because their sum and multiplication is zero , and the same on coordinate-system ± axes pass from zero The Rolling of Positive $$\Theta$$ , constituent on the Negative $$\Box$$ , constituent , creates the Neutral Material Point which Equilibrium . **Spin** $$\mathbf{B}$$ , is Its Angular momentum and the **First-Discrete-Energy-monad** which occupies **Discrete-Value and Direction** , in contradiction to the Point which is nothing , **Dimensionless** and **without any Direction** , Point-caves are the Energy-Magnets .

**Space is Quantized as Energy-Caves** under the effect of Gravitational-force $$\mathbf{G}$$ , and **Energy is Quantized as Frequency** in Energy-Caves following Kepler’s First-law of equal areas in equal intervals . **Quaternion** $$[(+)(-)]$$ is a **Quantum-Mould** for Space $$[(+)(-)]$$ and Energy= motion = Force x Displacement as $$[(\cup\cup \cup \cup) or \leftrightarrow]$$ = **Standing Box** $$\mathbf{B}_0$$ = An Material Point which carries the Principal Stress $$\sigma$$ between Positions A (+) , B (-) , and $$\sigma$$ , is the **Centripetal-acceleration** of minimum Energy becoming from the in-Storage AB acceleration and which is equal to the **Gravity g** .

**From Quaternion** Quantum-Mould $$[r + \mathbf{v}] \frac{1}{w} = e^{-(1/2+2 kn).w}$$ is created the **min-Space = cave** $$r = 1.07.10^{-7} \text{ m}$$ and the **min-Energy = v = w = r = 2\pi f$$ . The frequency $$f_m = 2.839844 \times 10^{10} \text{ H}$$ .

Gravitational-force $$\mathbf{G}$$ effecting on light velocity $$\mathbf{c}$$ creates Electron-charge $$\mathbf{q}$$ and Electron $$\mathbf{e}$$ , while acting on Planck’s-cave the Gravity $$\mathbf{g} \equiv \pm \sigma$$ , as $$\mathbf{G} = g k \mathbf{k} = \mathbf{k} \mathbf{g} = \mathbf{k} \sigma = g \mathbf{g} \mathbf{k}$$ , and $$\mathbf{c}$$ effecting on the min-Planck-cave in $$\mathbf{L}_p$$ formulates Hydrogen-cave $$\mathbf{H}$$ with its electron $$\mathbf{H}_e$$ . **Constant G** is effecting on Gravity $$\mathbf{g}$$ and in turn $$\mathbf{g}$$ , effects on Electron $$\mathbf{e}$$ of **Hydrogen-cave** .**Originates Nutation-motion** in Precession as Resonance-frequency $$f_N = f_R = \text{ Energy}$$ , and is stored in the [Nucleus-Electron] **Orbit** , as the $$\mathbf{w}_L$$ Larmor – frequency giving Photos everywhere . Moreover

[A]. The **Link** between $$\mathbf{G}$$ and all above is the Duality-Photon [**Particle &Wave**] which as Particle is an Confinied $$f_N$$ , in a Stationary-Wave-Storage , and as Wave an Propagating Electromagnetic-Wave.

[B]. Atom is a cave containing a **Heap of masses and Charges** .This configuration forms a **Harmonic Oscillator** which creates an **Electromagnetic Wave** , the **Quantum of Energy and Space** , which are the **Natural-frequency of Atom f_1** , and the **Storage of Magnetic-field B_L**.

[C]. The **United Coulomb-Newton-Law** for **Interactions** , is the Extreme case of any two Touched Charges in Field E ,as $$k\{q_1, q_2\} = g \ E$$ , producing the Nutation of Orbit-Electrons . Elementary Particles Become from Permutations of the three Elements , $$\oplus$$ , $$\ominus$$ , $$\bigcirc$$ , in Sub-Space , and Interact in STPL Voltage-Points P , D , with Forces the Wave-Constructive and Destructive-Interference **Placed** $$\oplus$$ Space and $$\ominus$$ Anti-Space , at the Two nodes of the Standing-waves-Wavelength.

**Keywords** : The Duality Photon , Atoms-Nutation-motion , Origination of Cosmic Particles.
CONTENT

: ABSTRACT
A.. : GENERAL.
B.. : THE TOTAL WORK DUE TO MOTIONS
   1b.. : The Beyond Planck’s – Scale Energy
   2b.. : The In Planck’s – Scale Energy.
C.. : THE ENERGY-CAVES AND E-GEOMETRY
   1c.. : The Golden Ratio Pattern Φ, Physical Properties.
   2c.. : The STPL Pattern of Particles-Interactions.
   3c.. : The Forces, Stresses, velocities and Spin Relation
D.. : THE PHOTONS
   1d.. : The Duality of Isochronous Photons
   2d.. : The Origination of Stresses σ
   3d.. : The Origination of Light velocity c and Photon
   4d.. : The Origination of Gravity g from c.
   5d.. : The Origination of Electron, e, and e-Charge.
   6d.. : The Origination of Hydrogen cave H, e.
E.. : THE ORIGIN OF SPIN AND ENERGY
   1e.. : The Dynamic Structure of Atom.
   2e.. : The Atoms Physical Properties and Orbits
   3e.. : The Euler-Analysis of Motion in Orbits.
   4e.. : The Precession and Nutation of Electron.
   5e.. : The Spin ,and Magnetic-moment-Analogous.
   6e.. : The Atom’s Precession.
   7e.. : The Focus and the Signal in Orbits.
F.. : THE NEW ATOMS –STRUCTURE.
   1f.. : The Dynamic Structure of Atom in cave Lp
   2f.. : The Elements in Atom-cave, Masses, Charges.
   3f.. : The , n, Protons, Neutrons, Electrons in Atoms
   4f.. : The Elements in Proton-Neutral-cave-Masses-Charges
   5f.. : The New Electromagnetic-Structure of Atom.
G.. : THE GRAVITATION CONSTANT G
   1g.. : The Gravitation Constant G and the Photon.
   2g.. : The Electron and Photon Charges.
   3g.. : The Material-Geometry and The Physics in Chemistry
   4g.. : The Elements needed for Black-Holes in caves.
   5g.. : Applications.
   6g.. : The Atoms Bonding
   7g.. : The Greatest Energy-Pressure-Level
   8g.. : The Size of Cosmic Particles
   9g.. : The Interactions and Decays of Cosmic Particles
   10g.. : AN NEW Interaction-Decay Method
   11g.. : The Periodic motion in all Displacements
          A CRITIC ON FUNDAMENTAL - FORCES
H.. : REFERENCES
[N] : Articles IN - GOOGLE → Georgallides Markos

Particle & Wave Duality Photon , and Cosmic-Particles Origination.
A. GENERAL

1...The Objective Reality is composed of two elements, that of Distance. The Space ds, and that of Motion, or else called Energy, and it is the content of all sciences [32].

2... Euclidean-Geometry describes the Space only but Not the Energy, motion [48].

3...The Solution of all the Unsolved Problems [50] opened the way to Material-Geometry [54] which Incorporates the Motion In-Space (⊕↔⊙), [61].

The Space exists in Energy-Caves as Energy-Quantum-Quantities [39] while Motion or Energy exist inCaves as a Confined-Stationary-wave which is either Static or an Moving Energy-Storage or an Energy-Box [68]. The Two Opposites (+), (-) exist in Nature and are found everywhere from → Zero-Point (0) ≡ [+] or (+A) + (-A) = 0 in E-Geometry and → [0] ≡ [⊕↔⊙] = 0 ds. while Motion or Energy exist in The Space ≡ ds, nodes distance, the movement exist as Vibration [52].

4...The PrimaryMaterial-Point is composed of Infinite-Material-Points in the Two-Aperon which consist a Huge Magnet with Infinite Parallel-lines, where the Θ constituent moves as for Newton-Gravitational-constant G-force Periodically to ⊝ constituent [82-86].

5... Gravitational-Force G, Acting in the Beyond-Planck - Cave, and on the light Velocity Vector ̅c, creates Electron-Charge ̅q₁ Electron = \( \frac{G}{c^2} \) and the Material-Points ̅q₂ Photon = \( \frac{G}{\sqrt{2}f} \), while by effecting on the Whole-Planck-Cave ̅L_p = e^{i(-\frac{5\pi}{2})}, creates the Pointy-Gravity Force as this is the Ocean of Spins ̅g, and which Oriented-Spines, Originate Gravity g and Electron ̅e [72]. L-Velocity ̅c Acting on a-cave, ̅r = \( \frac{h}{cz_e} \) ≠ ̅L_p originates Hydrogen-cave.

6...The Rotation of the Two Elements, (⊕∪⊙), Up or Down in the Material-Point-circles originates the Spins, ̅r = ± \( \frac{1}{2} \), ± 1, ± \( \frac{1}{2} \), for All-Particles Fermions or Bosons which become from above Three-States of motions, just by Adding the Spins [36]. Linear Motion [⊕↔⊙] of Breakage [±̅c, s²_m] in cave { M-Point = d s_m = e^{i(\frac{Nπ}{2})}b = 10^{-N} = ±∞ m} as → ̅v = ̅w ̅r = 2πr. f = σ Φ, in the Great and Small circles of Glue-Bond rotation creates the Three-States of frequencies f ±1/2 = \( \frac{1+\sqrt{5}}{8\pi r} \), f ±1 = \( \frac{1+\sqrt{5}}{4\pi} \), f ±1/2 = \( \frac{1+\sqrt{5}}{2\pi} \), and energy E = h f_m.

Because Angular-Momentum ̅F = \( \frac{2L}{w} = \frac{2L}{2πf} = \frac{[2L]}{2π} \cdot [\frac{1}{f}] \cdot \frac{1}{f_m} \) = SPIN [70]

7...When the Unit-Quantum-Energy in Planck-length is equal to the Stress of Gravity g, and enters the minimum-cave a as the Critical-Unit in orbit, then is measured frequency f_p which is giving the Least-Unit-Energy-cave and that is of Hydrogen-Cave \( H \), [81], as equations, ̅r = \( \frac{h}{cz_e} \), g.a \( 3 \). f²_p = 1 and E = h f_p = 13.6 eV.

8...When the Unit-Quantum-Energy k in Planck-length is equal to the Stress of Gravity g and frequency f_g becomes from Hydrogen Least-Unit-Energy = πg, then Reaction = mass is that of the Electron Cave \( e \), as, 4π²²_e.m_e = k = π g and m_e = g / [4π²²_e], [82].

Particle & Wave Duality Photon, and Cosmic-Particles Origination.
9. **The Rotation** around the ⊕ constituent, of the Confined-Electron ⊗ constituent in the Potential-Energy of Hydrogen-cave, which consists a configuration of masses $m_p$ and of Charges $q_e$. **Originates**, the Uniform-Magnetic-field $\vec{B}_L$ of Atom, the Spin of Atom connected with that of Electron-Spin, and **Forms** an Harmonic Oscillator with a Natural Frequency $f_N$ with the less Damping-factor by Increasing of Potential Energy in loop due to Nutation-motion. Since Electron is continually-oscillating with the Nutation-frequency $f_N$, so **Produces** an oscillating magnetic-field $\vec{B}_N$, which in turn is the source of an oscillating Electric-field $\vec{E}_N$, which implies the Regeneration each other and which is a Propagating Electromagnetic - Wave where $\vec{E}_N = \vec{B}_N \cdot c$. and a Phase difference $\varphi = \frac{B}{\varphi}$). [86]

10... **This Resonance - frequency** $f_R$ is Independent of the Electron’s speed and radius so allows Bonding between Atom-caves which contain a Formation of Heaps of Masses and of Charges. In a Proper- Stationary-Magnet on which the Rotation-motion becomes as linear Oscillation is succeeded a clear Magnetic-Resonance-Imaging [The MRI, MEDIA], [86].

11... **Constant force** $G$ is effecting on **Gravity** $g$, and in turn $g$ is acting on Electron $\vec{e}$ in the Hydrogen-cave, Originates the Nutation-motion in Precession as **Cyclotron-Resonance** - frequency $f_R = \frac{4}{\sqrt{4\pi^2m_ee^2}}$ of cave , and the produced-Energy $\equiv$ motion is stored in the Orbit as a New Uniform-Magnetic-field $\vec{B}_F = \left[\frac{2\pi M}{Q_T}\right]f_R$ independent of velocity and cave, which becomes the Bond between the Atoms to be Molecules, i.e. Bonds are the Magnetic lines of the Uniform-field. [80]

12. **During Nutation** of Electron-SPIN, and because of the Eternal-Varying-Velocity motion in Orbit Precesses, the Produced-Work of $[\oplus = Proton, \ominus = Electron]$ is Conserved in the Nucleus-Orbit-Magnet, as the Nucleus-Magnetic-Moment, which is influenced by Any External-Magnetic-field. The continually Conserved Energy becomes the frequency $f_N = f_R$ and is **Resonated to the Electron-Spin**, OR to Any Set External-Magnetic-Field-moment. [N] Articles IN - GOOGLE $\rightarrow$ by Georgallides Markos.

13. **The Priors:** Article [87] is the completion of [72-80] and [80-86] of the Physical interpretation of the Two constants of nature, that of Newton’s Gravitational constant $G$, and light velocity $\vec{c}$, with Derivatives the Photon-Charge $q_{\text{Photon}}$ in Material Point cave $r$, Gravity Constant $g$, and Planck constant $L_P$, with a Rigorous Geometrical and Mechanical logic. It was shown [33-39] that from $<The\ Balancing\ of\ Space,\ Anti-Space\ in\ a\ Rotating\ Sub-Space\ Common\ circle>$ Un-clashed Fragments through center, O, consist the Medium-Field Material-Fragment $\rightarrow [\pm s^2] = [\text{MFMF}] \equiv The\ Chaos$, as base for all motions, and Gravity as force $[\vec{V}i]$, while the clashed with the constant velocity, $\vec{c}$, consist the Dark matter $[\pm \vec{c}.s^2]$ and the Dark energy $[c.\vec{V}i]$, **Declaring that** $\rightarrow$ Antimatter-Galaxies and Antimatter-Asteroids can exist only as Dark-matter or and Dark-Energy but NOT as Antimatter light, ($\sim \vec{c}$), alone, or from $\rightarrow$ velocity- Breakages, $[\pm \sqrt{s} = \pm (\text{wr})^2]$ and $[\vec{V}i = 2\text{(wr)}^2]$, where then become the Waves $\{On\ distance\ ds = |AA| is\ the\ Work\ embedded\ in\ monads\ and\ it\ is\ what\ is\ vibrated\}$ and the Material-Points with their Vibrating equations of motion. Vibration is the motion in Waves and is transported as Electromagnetic-Radiation. For Photon-Material-Point exists the

**Duality** of an Energy-Storage $S \equiv ([\oplus \rightarrow r \rightarrow \ominus]) + Motion M = \vec{v} \rightarrow \text{Vector}$ as [87].

From vibration in Material-Points become, [55]

Particle & Wave Duality Photon, and Cosmic-Particles Origination.
A → Particles, with Inherent Vibration occupying distance \( r = ds = |AA_G| \),

B → Gravity-Field-Energy without Vibration, the only Stationary-Rotating Photon-Spinning-Material-points.

C → Dark-matter-Energy constituents as below,

A. \([±\psi.s^2]\) → Fermions, Quarks and Leptons, and \([±\psi,\psi]\) → Bosons,

B. \([±s^2]\) → [MFMF] Neutral Field \( \equiv \) The Equilibrium Energy - Chaos, with the Negative-Energy binder Field \( [\psi] \) \( \rightarrow \) The Gravity force \( G_f \)

C. \([±\psi.s^2]\) → Dark-matter, and the binder Gravity-force \( [\psi], [\psi,\psi] \) \( \rightarrow \) The Expanding Dark Energy, Positive-Energy, which both are moving with light velocity \( c \), causing the Universe to grow.

From above in, A, and C, case \( \rightarrow \) Energy as velocity \( \nu \), and \( \tilde{c} \), exists in the 

Quantized, Discrete monads, \( ±\psi.s^2 \) and \( ±\psi.s^2 \).

B, case is the Transportation of Energy, from Chaos to Stationary Material points.

Dark Energy \( DE \equiv [\psi,\psi] \) \( \cong \) Acting, \( is \) Positive-Energy, on the Five Constituents →

\[
\{ [\psi,\psi,(-s^2),(s^2),(+cs^2),(-cs^2)] \} \rightarrow \text{Produces}
\]

\([±s^2] \) \( \rightarrow \) MFMF Field \([±\psi.s^2]\) \( \rightarrow \) DM-DE Field of, Dark matter and Anti-matter

\([±\psi.s^2]\) \( \rightarrow \) Fermions \( [\psi] \) \( \rightarrow \) \( G_f \) \( \equiv \) Gravity-Force in DM-DE Stationary Field.

\([\psi,\psi]\) \( \rightarrow \) Bosons, \([\psi,\psi]\) \( \equiv \) DE → Dark Energy \( c \) \( \times (c) \) \( [\psi] \)

\( \rightarrow \) Gravity Force \( DE \equiv [\psi,\psi] = \tilde{c} [\psi] = \) The Travelling-Energy-cave, \( c \),

with the velocity-vector, \( c \),

In all above issue Kepler-laws, denoting that Macrocosm and Microcosm

Obey Newton’s Laws of motion in all Scales, as this was in prior proofed [56]. In [68] is shown that Motion may be Linear or Rotational for any displacement \( r \), so exists a Constant - Work \( k \), during these motions of velocities \( \nu \), and since Energy is vectors then

\( k = \nu x \nu. \tilde{r} = v^2. \tilde{r}. \tilde{n} = v^2. r = \) (wr)², \( r = \) \( \frac{2\pi n}{T} \), \( r = \) \( \frac{4\pi^2 r^2}{T^2} = 4\pi^2 r^2 = 4\pi^2 r^2 f_p \) \( r \) i.e.

Above constant work \( k \), is composed of the Two velocity vectors \( \tilde{\nu} \) which are, One for the Space-motion-monad \( r \), and one for the Energy-motion-monad \( 4\pi^2 r^2 f_p \equiv [2\pi f.r]^2 = [wr]^2 \equiv v^2 \).

For Photon during Motion in [MFMF] \( \equiv \) Chaos, collides with other Photons by means of Cross - Product and Produces a constant Work which is stored \( into \) the Only-Four Energy - Geometrical - Shapes, of the motion which shapes are the Conic – sections.

The Interior motion is kept in its Wavelength-Tank \( 2r = n\lambda \), as well as the Outer-Line motion as an Propagating Electromagnetic-Wave, which carries the Energy-conveyor, i.e. The stored energy in the loop → \( W_l = v^2 \left[ \frac{h}{2\pi} \right] = 4\pi^2 r^2 f_p = k \), where as Wave is

Frequency \( [f_p = (E^2 + H^2) = n \frac{(1+\sqrt{5})\sigma}{4\pi} = 2n \frac{B}{\pi r^2}] \) and Particle as velocity \( [\tilde{\nu} = \tilde{c} = \frac{f}{\Phi}] \)

and dependent on velocity \( \nu \), and Planck’s constant \( h \), or on loop \( r \), and as frequency \( f_p \), which is the Wave. It is proved that this minimum wave - constant \( k = \pi g \).

For The Duality-Photon → \{ \( \tilde{c} \left[ \tilde{f}_n \right] + \tilde{c} \cdot f_n \} \) ← is proved that ,

1. Energy-Storage \( \equiv \left[ \leftarrow \rightarrow \right] \equiv \text{Particle} \left[ \tilde{\nu} \left[ \tilde{f}_n \right] \right] \rightarrow \tilde{\nu} = \tilde{c} = \frac{f}{\Phi} \) →

And is a Stationary Standing - Wave \( \rightarrow \) \{ \( S \equiv \text{EM-R} \equiv \left[ f_1 = n, f_2, f_3, f_4, f_5 = w^2 \right] \} \).

2. Energy-Motion \( M = \left[ \tilde{\nu} - \text{Vector} \right] = \text{Wave} \left[ \tilde{\nu} \cdot f_n \right] \equiv f_1 = (E^2 + H^2) = n \frac{(1+\sqrt{5})\sigma}{4\pi} = \frac{B}{\pi r^2} \) and it is a Propagating Wave \( \{ \text{W} \equiv \text{EM-R} \equiv [\varepsilon E^2 + \mu B^2] = 2, \lambda c \sin \theta \} \).

3. Gravitational - constant \( \equiv \Phi^2 \left[ \left[ \sigma \Phi \right] = 2\pi f_p = w \equiv \tilde{\nu} \equiv m \equiv \tilde{c} = \frac{2B}{\pi r^2} \right] \)

Particle & Wave Duality Photon, and Cosmic-Particles Origination.
B... THE TOTAL WORK DUE TO MOTIONS :

It was shown in [58] that the maximum velocity in a closed system occurs in Common circle, when the two velocities, \( \vec{c} \), \( \vec{v} \) are perpendicular between them, and Work is not produced. From them a dispersion follows Pythagoras theorem and the resultant Quantized linear Space length \( r \), becomes, as the Resultant of Energy Vectors \( r = |(\vec{c}.T)| = \sqrt{\vec{r}^2 + c^2} \) and by using Geometry-Space Vector \( \vec{r} = |(\vec{c}.T)| = \sqrt{\vec{r}^2 + c^2} \) then the total Rotating energy \( \vec{A} \) is → 
\[
\vec{p} = (M.c).r = (M.c).\sqrt{\vec{r}^2 + c^2}
\]
and squaring both sites \( |\vec{A}|^2 = p^2.r^2 = M^2.c^2.(v^2+c^2) = (M^2.v)^2 + M^2.c^4 = (p^2.c^2) + M^2.c^4 = [m_\circ.c^2]^2 \) or is \( \vec{E} = \vec{E}_r + \vec{E}_k \) i.e.

The Total - Energy of Elementary-particle ≡ Intrinsic Rotational + Kinetic Energy,

1b... The Beyond Planck-Scale \( r < L_p = 1,616199.10^{-35} \ m \):

Preliminaries:

In [23] was shown that, Any Distance AB between Two-Points is Quantized as \( ds = |AB|/n \)

\( \begin{align*}
[A] & \quad ds = (AB/n = \infty) = 0 \\
[B] & \quad ds = \rightarrow AB/n = 1
\end{align*} \)

Continuous as Points (.) \quad Discrete as monads (r ≡ ds = 1 → n)

Work done (W) by Impulse (P) on a Virtual displacement (ds > 0) is zero, or

\[ W = |A-B| = |P.ds| = 0 \rightarrow [ds.(P_A + P_B) = 0] \rightarrow P_A ≡ Points \text{ in Space} [S] \]

and \( P_B ≡ \text{Anti-Space} \ [AS] \) or \[ [ds.(PA + PB) = 0] \], Therefore, Each Unit \( AB = ds = r > 0 \) exists, by this Inner Impulse (P) and so \( P_A + P_B = 0 \) i.e.

The Position and Dimension of all Points which are connected across the Universe and that of Spaces exists, because of this Static Inner Impulse, on the contrary should be one Point only (Primary Point \( A = \text{Black Hole} \rightarrow ds = 0 \) and \( P = \infty \)). [70]

It was shown that in PNS, \( v = \infty \), \( T = 0 \), meaning that velocity is infinite and Time is not existing and thus any length \( |AB| \) in [PNS] is constant, because \( AB = ds = \text{Constant} = v \cdot 0 = \infty \). Straight line \( AB \) is discontinuous (discrete) with dimensional Units \( ds = AB/n \) where \( n = 1 \rightarrow \infty \), and continuous with points \( [ds = 0] \), (This is the Dual Nature of lines in, geometry, as discrete and continuous). From definition work \( W = \text{Force} \cdot \text{Distance} \equiv \text{Momentum} \cdot [mv] \cdot \text{Distance} \cdot [r] \equiv mv \cdot r \) or \( W = mv \cdot r \), exists Work where \( 1 \rightarrow r \) Becomes from Material-Geometry where the Quantization of Space for the Rotated Energy case \( (s = 0 \text{ and } \cos \varphi = 0) \), In-Prinary-Quaternion \( [s + v \cdot \nabla i]^{1/w} = e^{-i(\pi/2+2k\pi)w} \) (for angle \( \varphi = \pi/2 \), dimension power \( w=b=10 \) and \( k=0 \)) exists the minimum-Energy-Cave \( r \). For base \( e = 2,71828 \) and base \( b = 10 \) then \( e^h \cdot (16,1181) = 1 \cdot 10^{-7} \) or \( r = 1,07.10^{-7} \ m \)

\( r_{min} = 1,07.10^{-7} \ m \) → i.e. \( r_{min} \equiv \) The minimum Energy-Space-Cave \( \equiv \text{Space-Quantum} \).

Placing the \( r_{min} \) in the Dynamic-Space-Energy relation, \( g \cdot r^3f_p^2 = 1 \), when \( g = l \), then, \( f_p^2 = \frac{1}{r^2} = 8,0647139.10^{20} \ m \), \( f_{min} = 2,839844.10^{10} \), The Electron-Nutation-frequency.

\( 2 \rightarrow f = f_{min} = 2,839844.10^{10} H \equiv \text{The minimum Energy in Cave} \equiv \text{The-Energy-Quantum} \)

From wavelength-relation \( n \lambda = 2r = n v/f \), exists \( v = \lambda f \) or \( \vec{v} = \vec{c} = \lambda f \). and since \( v = w \cdot r = [2\pi/T].r = 2\pi.f_1 \cdot r \), wavelength \( \lambda = cT = c/f_1 \), and from cave \( r = n.(\lambda/2) = n.(c/2f_1) \) then \( v = 2\pi.f_1[n(c/2f_1)] = n.\pi.c \), or \( v = n.\pi.c \). i.e. → The Quantum of velocity is constant c.

Particle & Wave Duality Photon, and Cosmic-Particles Origination.
From Constant-Energy Orbit-relation \( k = (\mathbf{v} \times \mathbf{v}). \mathbf{r} = v^2 \mathbf{r}^2 = (w r)^2 \mathbf{r} = \frac{2\pi}{T} \mathbf{r}^2 \mathbf{r} = \frac{4\pi^2 r^2}{T} \mathbf{r} = 4\pi^2 r^2 \mathbf{r} \) = \( 2\pi f \mathbf{r} \) = Kepler Universal Laws for macrocosm and microcosm.

Frequency \( \rightarrow f_\text{min} \), becomes from velocity relation \( v = w r = 2\pi f \mathbf{r} \), as \( f_\text{min} = \frac{v}{2\pi r} \) or \( f_\text{min} = \frac{v}{2\pi r} = \frac{n \mathbf{c}}{2\pi r} = \frac{n \mathbf{c}}{2\pi r} = \frac{2.99810^8}{21.07.10^{-7}} = 1.4009345.10^{14} \) H

From momentum relation \( B = m v = m r^2 w = m r^2 (2\pi f) = \frac{1}{2} m \mathbf{r}^2 \left[ \frac{\pi f}{2} \right], \) then the Mass of the elementary particles is \( m = \frac{\pi r^2}{4} = \frac{\pi(1.0710^{-7})}{4} = 8.992023.10^{-15} \) Kg or ,

3... \( \rightarrow m = m_\text{min} = 8.992023.10^{-15} \) Kg . while from relation \( B = m v = \frac{\pi r^2}{2} f \), then

Planck mass \( m = \frac{\pi r f}{2 v} = \frac{\pi r f}{2 c} = \frac{\pi^2 (1.0710^{-7})^3 \times 1.4009345.10^{14}}{2.299810^8} = 2.8248572.10^{-15} \) Kg = \( m_\text{min}/\pi \)

Quantization, \( \text{ for } k = 1 \), is the Planck-minimum-Energy-Scale Decimal-Cave \( L_\text{min} = L_p \)

\( L_p = \frac{1}{h} \left( \frac{\pi r}{2} + 2\pi k \right) = e^{-\left( \frac{n \pi L}{2} \right)} = e^{-\left( \frac{78.3998}{2} \right)} = 8.906.10^{-35} \) m = \{ \sqrt{3} \pi. 1.616199.10^{-35} \} m

From [70] the velocity of Elementary particles is the light velocity-vector \( \mathbf{c} = \mathbf{v} = 2\pi r. f_\mathbf{c} \) and the frequency \( f_\mathbf{c} = \frac{c}{2\pi r} \)...(1). The Balancing of , space and Anti-Space in a rotating sub-space Common circle happens from the \( \pm \) equilibrium - Rotational-Energy as relation \( \mathbf{B} \mathbf{w} = L = \frac{1}{2} J_1 \mathbf{w}_1^2 + \frac{1}{2} J_2 \mathbf{w}_2^2 + \frac{1}{2} J_3 \mathbf{w}_3^2 \), or A-momentum \( \mathbf{B} = \frac{1}{2} \mathbf{w} = \frac{\pi r^2}{2} \left[ \frac{\pi f}{2} \right] = \frac{\pi r^2}{2} \) \( f \)...(2)

Frequency \( f = 2B \frac{1}{\pi r^2} = \frac{2B}{\pi r^2} = \left[ 1 + \sqrt{\frac{1}{4}} \right] \mathbf{a} = \frac{c}{2\pi r} \Phi \mathbf{a} \text{ or } 2c = \left[ 1 + \sqrt{\frac{1}{4}} \right] \mathbf{a} \) \text{...}(3) A-momentum

\( \mathbf{B} = \left[ 1 + \sqrt{\frac{1}{4}} \right] \mathbf{a} \cdot \mathbf{c} \mathbf{r}^2 = \frac{\pi r^2}{2} \Phi \mathbf{a} \text{...}(4) \), where Unite-energy-constant

\( \mathbf{T} = \mathbf{a} \cdot \mathbf{c} \mathbf{r}^2 \) = \( k = \left[ \frac{4\pi^2}{6.m} \right] \), or \( kah^2 = 1 \)

The Rotational energy is \( \rightarrow E = \mathbf{B} \cdot \mathbf{w} = 2L = J. w^2 = J \frac{c^2}{r^2} = \frac{\pi r^2}{2} \mathbf{c}^2 \), \text{...}(5)

Mass is the Reaction to any motion or change and is measured by the cage-moment of Inertia \( J \). Energy and frequency of Elementary particles can be found from cave \( \mathbf{r} \) only since \( \mathbf{e} \), is constant. Total-Energy \( \rightarrow E_T = E_R + E_K = \frac{\pi r^2}{2} \mathbf{c}^2 + \frac{1}{2} m. v^2 = 1.4118323.10^{16} \mathbf{r}^2 + \frac{1}{2} m. v^2 \) ...(5a)

Since Total-Energy \( L = B \mathbf{w} = \frac{1}{2} \mathbf{w} = \frac{1}{2} \mathbf{w} \), then \( 2L = J. w^2 \), and \( \mathbf{B} = r.m.v = \frac{r\pi r^2}{2} \mathbf{r} = \frac{\pi r^2}{2} \mathbf{r} \)

From momentum relation \( \mathbf{B} = m r \mathbf{v} = m r^2 \mathbf{w} = m r^2 (2\pi f) = \frac{1}{2} m \mathbf{r}^2 \left[ \frac{\pi f}{2} \right], \) then the Mass of the elementary particles is \( m = \frac{\pi r^2}{2} \), i.e. is dependent on the radius of cave , and for Gravity cave \( \mathbf{r} = 10^{-62} \text{ m} \), then Material-Points mass \( \rightarrow m = \frac{m^{10^{-124}}}{2} = 1.570796.10^{-124} \) Kg.

However from \( J_1 \mathbf{w}_1^2 + J_2 \mathbf{w}_2^2 + J_3 \mathbf{w}_3^2 = 2L \) then , \( \mathbf{w}_1^2 + \mathbf{w}_2^2 + \mathbf{w}_3^2 = \frac{2L}{J} = \frac{4L}{\pi r^2} = B \mathbf{w} = 2\pi f.B \)

Angular-velocity-momentum-Ellipsoid \( L = \frac{B_1 \mathbf{r}_1}{J_1} + \frac{B_2 \mathbf{r}_2}{J_2} + \frac{B_3 \mathbf{r}_3}{J_3} \), where \( B_1, B_2, B_3 \) are the components of the Angular-momentum-vector along the Principal axes , and \( J_1, J_2, J_3 \) are the Principal moments of Inertia. Issues also \( B^2 = 2L = 2L \frac{\pi r^4}{2} = \pi L \mathbf{r}^4 \) and \( \pi L = B^2. \mathbf{r}^4 \)

2b. In Planck’s Scale , length \( \mathbf{r} = L_p = 1.616199.10^{-35} \text{ m} \) velocity \( \mathbf{v} = \mathbf{c} \):

Mass is the Reaction to any change of motion or change , and is measured by Kg .

7 Particle & Wave Duality Photon , and Cosmic-Particles Origination .

Volume-6 | Issue-10 | Oct, 2020
From velocity relation \( c = w r = 2\pi r f \), frequency \( f = \frac{c}{2\pi r} = \frac{2.998 \times 10^8}{2\pi \cdot 1.616199 \cdot 10^{-35}} = 2.95236210^{42} \) H 
and Period \( T = \frac{2\pi r}{c} = 3, 3871185.10^{-43} \) s. From Angular momentum \( \vec{B} = r m v = \frac{\pi r^4 f}{2} \) then mass \( m = \frac{\pi r^4 f}{2r v} = \frac{\pi r^2}{2} = \frac{(1.616199 \cdot 10^{-35})^2}{2} = 4.1030756.10^{-70} \) Kg, Stress \( \sigma \) from above equation \( f_p = \frac{\pi r^4 f}{2r v} \) is \( \sigma = \frac{2\pi rf}{2r} = \frac{2\pi \cdot 1.616199 \cdot 10^{-35}}{1.6180339} \) = 1.846462. 10^8 t/m = 1.846462. 10^{11} Kg/m², and Angular velocity \( |w| = \frac{\sigma}{2r} [1+\sqrt{5}] = \) 4.46462. 10^{11} Joule.

Velocities in caves become from equation \( v² = \frac{2}{m} \left[ E - \left( \frac{k}{r} + \frac{l²}{2m r²} \right) \right] \) = [4\pi².k]. [\{1+x\}] where constant, \( k = a^2 p^2 \), Is the Energy executed by the radius, \( r = \) Focus-Planet, in a second, and which is The Quantum of Energy in Cave-Orbit. From \( E_T = E_K + E_R \), then the Total energy in cave \( E = \frac{mv^2}{2} + \left( \frac{k}{r^2} + \frac{l²}{2m r²} \right) \) where \( L = S = \) the Spin of Particles.

From Mechanics In the One degree of freedom Vibration of a mass, \( m \), and Stiffness, \( k \), in a distance, \( a \), is for, \( w² = \left[ \frac{k}{m} \right] \) from equation, \( m \ddot{x} + w² x = 0 \), with solution \( \rightarrow \) the Period \( T = 2\pi \sqrt{\frac{\frac{m}{k}}{\frac{m}{k}}} \), frequency \( f_H = \frac{1}{2\pi} \frac{k}{m} \), and Energy \( E = h f_H \), where, \( h = \) Planck’s constant, and from Orbit-equation \( \ddot{v} = \frac{2}{m} \left[ E - \left( \frac{k}{r} + \frac{s²}{2m r²} \right) \right] \) and for \( v = c \) then, \( E = \frac{mc²}{2} + \frac{k}{r} + \frac{l²}{2m r²} = h f_R \)

From Hydrogen Orbit-motion, \( r = \frac{3}{4\pi²} \frac{1}{k.d²} \), or \( k.d²r³ = 1 \) and Constant-Unit-Energy \( k = \frac{1}{r.²} \).

For Black-Holes, the Total-Energy \( L = \vec{B} \cdot \vec{w} = \frac{J \omega}{2} = \frac{\pi r^4}{2} [2\pi f]^2 = 2\pi^3 r^4 f = r m v = r m \cdot w r 
and mass \( m = \frac{2\pi r^4 f}{r²2\pi f} = \frac{\pi r^2}{1} = \frac{m v^2}{2} \) , while Angular-Momentum \( B = r m v = \frac{\pi r^2}{2} \sqrt{v^2 = \frac{\pi r^2}{2} \left[ \frac{\pi}{2} r c² \right]^2 = \frac{\pi r^2}{2} - c²} \), or Black-Hole-Energy \( \rightarrow B_E = 2\pi^3 r^4 f² = (\pi r^3) w² \), i.e. Velocity in Black-Holes is Related to Cave, \( r^3 \), and Energy \( w^2 \) times of light velocity.

C... THE ENERGY CAVES , AND E - GEOMETRY :

**Figure – 1 - :** The Periodic motion in Caves follows Material-Geometry rules.

Particle & Wave Duality Photon , and Cosmic-Particles Origination.
In (1). Is shown the Geometrical Expose of, Dynamic-Space-Energy relation \( g \cdot r^3 f^2 p = 1 \)

In (2). Is shown the Mechanical Impress of the, Orbit-Space-Energy relation \( g \cdot r^3 f^2 p = 1 \)

In (3). Is shown the Extreme Design of the, Dynamic-Space-Energy relation \( g \cdot r^3 f^2 p = 1 \)

To Proof:
The Right-angled-Triangle ABC at A = 90°, lies on [O,OC=OA] circle and CE is the tangent at C. Since angle BAC = 90° of triangle CAE, then angle < CAE = 90°.

Since BA \( \perp \) AC and AT \( \perp \) BC then, the Power of Point B on ACT triangle is \( \text{BA}^2 = \	ext{BT}.\text{BC} \)

Since BC \( \perp \) CE then, the Power of Point B on ACE triangle is \( \text{BC}^2 = \	ext{BA}.\text{BE} \) ....(2)

Squaring the first relation and substituting (2) then \( \text{BA}^2 = \text{BT}^2. \text{(BC}^2 = \	ext{BA}.\text{BE}) \) and \( \text{BA}^4 = \text{BT}^2. \text{BA}.\text{BE} , \) or \( \text{BA}^3 = \text{BT}^2. \text{BE} \) or \( \text{BA}^3 \text{BE}^2 = \text{BT}^3 \) o.e.δ ≡ q.e.d ...(3)

Remarks:
1. Physics follow the Geometry-Rules in all levels, either in microcosm or in macrocosm.
2. Constants in Geometry, are defined as Geometry-Linear-monads, or the opposite.
3. The Physical dimensions are defined in two Perpendicular-Lines as the Surfaces are.
4. Linear-Vibrations \( [\vec{x} + w^2 x = 0] \) of Two-masses In Orbit-Caves, Occur on the Line Vectors or on Straight-lines in the x, y Plane as Centripetal forces.
5. Linear-Vibrations \( [\vec{x} + w^2 x = 0] \) of Three-masses, Occur on Two-Line-Vectors Perpendicular each other, vibrating on Straight-line, \( \vec{y} + w^2 y = 0 \), of x \( \perp \) y Plane and follow the Lissajous Shapes, [83], where for,

a. Difference of Phase \( d_\varphi = 90° \) emission is → The Eight-Shapes \( CO \).

b. Difference of Phase \( d_\varphi = 0° \) emission is → The Ellipse-Shapes \( \alpha \).

c. Difference of Phase \( d_\varphi = 45° \) emission is → The Double-Saddle-Shapes \( \beta, CO \).

6. For Planck length [73] P-49, was shown that the Rotated Energy case, when \( s = 0 \) and \( \cos \varphi = 0 \), exists for angle \( \varphi = \pi/2 \) and Quaternion \( (s + \sqrt{v})^{1/w} = e^{-i(\pi/2+2k\pi)/2} \) ...(1)

the dimension power → \( w = b \) ← and for \( k = 1 \) then (1) becomes, [84]-P.74

\[ e^{-i(\pi/2+2k\pi)/2} = e^{-i(\pi/2+2k\pi)b} = e^{-i(5\pi/2)/2} = e^{-i(5\pi/2)/2} b \equiv e^{-i(5\pi/2).10} \] \[ e^{-i(\pi/2+2k\pi)/2} = e^{-i(5\pi/2).10} \] ....(2)

Equation (2) fits, as minimum case, in the Planck length and is \( L_p = e^{-i(5\pi/2)/2} \) ....(3)

Equation (3) is the smallest Energy-Unit of Space, and this because of \( s = 0 \) and \( k = 1 \).

It was shown [31] that Space and Energy is quantized and measured on the two Constant and Natural numbers \( e, \pi \), where for base the natural logarithm, \( e \), and exponent \( \delta \), the decimal base, \( b = 10 \). From → \( z^{1/w} = (s + \sqrt{v})^{1/w} = |z|^{-w}.[\cos.(\varphi + k\pi)/w + i.\sin.(\varphi + k\pi)/w] \)

\[ = |z|^{-w}.e^{-i(\varphi + k\pi)/w} \] for \( \cos.(\varphi + k\pi)/w = 0 \) then exists only the Imaginary part of monad

\[ (\sqrt{v} \sqrt{i}) \neq 0 \], where \( \varphi = \pi/2 \) and then, \( z^{1/w} = |z|^{-w} \cdot e^{i(\varphi + k\pi)/w} = e^{-i(2\pi + k\pi)/2} \) which is the Diffraction Energy mechanism for all Space Levels of quantization which are the Energy Particles only i.e. The Energy particles in Stationary caves are \( z^{1/w} = |z|^{-w}. Lv = E-Monad \).

Extending quantization of Energy according to exponential formula → \( L_v = e^{-i(5\pi/2).10} \) then \( L_v \) on the decimal base \( b = 10 \) and for \( k = \pm 0 \rightarrow \pm \infty \), are the Energy caves as,

For base \( e = 2.71828 \) and base \( b = 10 \) then \( e^\gamma = (13.8155) = 1.10^{-6} \) m

For base \( e = 2.71828 \) and \( k = 0 \) \( L_v = e^{i(\pi/2)} \) then \( e^{\gamma} = (15.7079) = 1.78118 \cdot 10^{-7} \) m

For base \( e = 2.71828 \) and base \( b = 10 \) then \( e^\gamma = (16.1181) = 1.10^{-7} \) or \( r = 1.0710^{-7} \) m.

Particle & Wave Duality Photon, and Cosmic-Particles Origination.
Placing \( r \), in the Dynamic-Space-Energy relation when \( g = 1 \) then \( r^3f^2_p = 1 \) and \( f^2_p = \frac{1}{r^3} \) \( = 8,0647139.10^{20} \) m and occurs the, minimum frequency \( f_m = 2,839844.10^{10} \) H ... (4)

For Electron radius \( r_e = 5.82.10^{-16} \) m, Weight of Electron \( Q = m_e \), \( g = 9.11.10^{-31} \), 9,808 \( = 8,93.10^{-30} \) Kg, the Moment of Inertia-Disk \( J_e = J_3 = \frac{\pi a^4}{2} = \frac{\pi}{2}[5.8.10^{-16}]^4 = 1,777591.10^{-61} \) m\(^4\), Angular velocity \( w_e = \frac{v}{r_N} = \frac{c}{1836} = \frac{3.10^8}{1836} = 1,633.10^5 \) m/s because of masses analogy and Electron-Nutation-frequency \( f_N = \frac{sQ}{2\pi J_3w} = \frac{8,82.10^{-16} \cdot 8,93.10^{-30}}{2\pi 1,777591.10^{-61} 1,633.10^5} = \frac{8,82.10^{-16} \cdot 8,93.10^{-30}}{2\pi 1,777591.10^{-61} 1,633.10^5} \)

\[ f_N = f_R = 2,839844.10^{10} \text{s}^{-1} \text{ exists in all Atoms} \text{ due to the Hydrogen first cave}, \text{ is the Resonance-frequency between Atoms and Molecules} \text{ in Cosmos}.

i.e. THE SPACE \{ \( r_{\text{min}} = 1.07.10^{-7} \) m } \text{ - ENERGY \{ } \{ f_m = 2,839844.10^{10} \text{ H} \} \text{ IN QUANTIZED-CAVE \{ g \cdot r^3. f^2_R = 1 \}} \text{ OF SPACES \{ as Energy, Resonance Energy, or for } f \text{ and occur the, Frequency as The Images in MRI}} \text{ becomes the minimum Quantum-Frequency again}, \text{ in above r, cave and which is following}.

\[ \text{CONSORTS The min. QUANTUM-ENERGY} \rightarrow E = 1,1745 \text{ eV}. \]

7... For Energy-Cave equation \( \rightarrow e^{-i(5\pi/2)} \) Formats min-cave \( \rightarrow r = 1.07.10^{-7} \) m which turn in which the Unit-Energy Orbit-Surface-U-Planck-relation, \( g = 1 \approx g \), and from ,

8... Unit-Energy-Mould \( g \cdot r^3. f^2_R = 1 \) or \( f^2_R = \frac{1}{r^3} \) creates the minimum frequencies , Energy ,

\[ f_R = 2,839844.10^{10} \text{ H} \text{, between}, 1,330265.10^{10} \text{ H} \text{ and} 4,1701097.10^{10} \text{ H} \text{, in caves and the in Electron-Cave which is The Nutation-Unit-Frequency} \text{ and becomes the minimum Quantum-Frequency} \text{ again}, \text{ in above r, cave and which is following}.

\[ \text{a... Frequency} f_N = f_R = g \cdot \frac{s_{\text{me}}}{2\pi J_3w} \text{which passes through atoms structure and as Energy-Spring in Magnetic-field}, \text{ Strengthens and manifested, as The Images in MRI}. \]

This Property of Electron-Nutation is Probably very interested in Medicine, MRI and in many other Media as Mobiles and Others, because of \( \rightarrow \langle r_{\text{min}} | \cup \cup | f_m \rangle \leftrightarrow | f_N \rangle \leftarrow \)

It is proved \( \text{ in [86] that this Energy-Spring of Electron-Nutation creates the Energy -Bonds in Atoms so that these bond to Originate-Molecules} \text{.} \)

b... The Article, New Electromagnetic-Structure of Atom [90] contains ,

1. The Unit-Quantization of Planet-Focus line \( r \), sweeping \( r \cdot mv = k \text{=} \text{Constant Area} \}

2. The Unit-Cave-Energy Quantization as Work and is \( \rightarrow W = 4\pi^2 r^3f^2_p = 1 \)

3. The Resonance Unit-Cave-Frequency \( f = \sqrt[4]{\frac{1}{4\pi^2 m r^3}} \) of Masses \( \frac{1}{M_T} = \frac{1}{m_p} + \frac{1}{m_n} + \frac{1}{m_e} \)

4. Charges \( \frac{1}{Q_T} = \frac{1}{q_p} + \frac{1}{q_e} \) from Lorentz force, \( F = qE + qvB \), in Magnetic-Field \( B_F = \frac{2\pi M_T}{Q_T} \)

5. The Resonance Energy \( E = \frac{1}{a} \left[ \frac{4\pi^2 r^2 + s^2}{c^2} + 2m^2 \right] \) or \( E = \frac{1}{r^1} \left[ g^2 r + 2.5^2 f^2 \right] \) \text{ in cave a} \( = 1 \text{/g f}^2 \)

c... Equations (f-8) which is extreme case, \text{Space-Energy for the velocity in Hydrogen cave} \text{ or for Geometry and Mechanical interpretation either Separating each other or Both. Energy-Constant k (f-7) regulates motions in caves as the constants in integrations}.

d... For Hydrogen-Circular-radius \( a = 3 \sqrt{1/g f^2} = 2,1127839.10^{-11} \) m, issues \( E = hf_1 = 13,6 \text{ eV/h} \)

\[ \text{and for e} = 0 \text{ then } v^2 = [4\pi^2 k] \frac{1}{r} \text{, and constant } k = \frac{r v^2}{4\pi^2} = \frac{a v^2}{4\pi^2} \text{. The Constant k of} \]

Particle & Wave Duality Photon , and \text{ Cosmic-Particles Origination}.
Electron-Nutation is measured as \( k = \frac{2,1145016.10^{-11}(2.998.10^8)^2}{4\pi^2} = 4.81406.10^4 \text{ m}^3/\text{s}^2 \)

c. For any Material-Point occupying only Spin \( \Theta \) then, \( \frac{k}{r} [1+2\pi^2mk(1+e)] = 0 \) or
\[ \text{Principal stresses } \tau_1, \tau_2 \text{ and for Electron } \ k = -\frac{1}{2m^2}(1+e) = -\frac{1}{(1+e)} [6,999, 10.299] \text{ N and} \]

Rotating-Energy due to Electron-Spin is \( E = \frac{s^2}{2mr^2} = \frac{(1.152.10^6)^2}{2.16.10^4(2.4.10^2)^2} = 2,604.10^{43} \text{ J} \)

Rotating-Energy due to a Black Hole-Spin is \( E = \frac{s^2}{2m^2} = \frac{(1.152.10^6)^2}{2.16.10^4(2.4.10^2)^2} = 2,604.10^{43} \text{ J} \)

The Golden Ratio Pattern \( \Phi \) Properties.

\[ \Phi = \frac{1+\sqrt{5}}{2} \]

\[ \frac{AB}{AC} = \frac{AC}{CB} = \Phi = \frac{1+\sqrt{5}}{2} \]

**Figure 2**: The Physical explanation of The Golden-Ratio \( \Phi \) in Universe:

In figure -2, AB Sector is divided by point C such that \( AC = \frac{AB}{2} [\sqrt{5}+1] \) \( \ldots \ldots \text{(1)} \)

Proof:

According to the definition of Mean ratio exists \( AB / AC = AC / CB \), or \( AC^2 = AB. CB \) = \( AB \cdot (AB-AC) = AC^2 = AC(AB) + AB^2 = AC^2 + AC(AB) - AB^2 = 0 \) \( \ldots \ldots \text{(2)} \)

Solving the second degree equation (2)

then \( AC = \frac{AB}{2} [\sqrt{5}+1] \), i.e. Point C on AB sector, is such that issues (1).

*The Physical meaning* becomes from Mechanics where, when a force \( P \), acting on a surface \( S \), of a differential volume \( ds \), then Principal stresses \( \sigma_1, \sigma_2 \), and Shear stresses \( \tau_{12} \) are as equation \( \sigma = \sqrt{(\sigma_1 - \sigma_2)^2 + 4 \tau_{12}^2} \), and

\( \sigma_{1,2} = (\sigma_1+\sigma_2) / 2 + (\sqrt{2}) \sqrt{(\sigma_1 - \sigma_2)^2 + 4 \tau_{12}^2} \), where \( \tan \theta = 2 \tau_{12} / (\sigma_1-\sigma_2) \ldots \ldots \text{(3)} \)

When the surface becomes a Point [This is the Extreme case where surface is interchanged as line or line-segment, it is the same as the infinite small, ds, in Calculus], then \( \sigma_2 = 0 \) and \( \tau_{12} \) is very small i.e.

It is a type of vanishing-Shear due to layers laterally shifted. Since force \( P \) is a vector then as in cross-product to a right-handed coordinate system, where exists \( \sigma_2 = 0 \) and \( \tau_{12} = \sigma_1 \), then equation (3) becomes.

\[ \sigma_{1,2} = \sigma_1 / 2 + (\sqrt{2}) \sqrt{\sigma_1^2 + 4 \sigma_1^2} = \frac{\sigma_1}{2} [1 + (\sqrt{5})] = \frac{\sigma_1}{2} [\sigma_1, (\sqrt{5})] \ldots \ldots \text{(4)} \]

Equation (4) denotes the way that Stresses \( \sigma_{1,2} \) are shaped on any Volume according to the Principal Stress \( \sigma \), and which is the Golden-ratio \( \Phi = \frac{\sigma_1}{2} [1 + (\sqrt{5})] \) of Stress \( \sigma \).

Particle & Wave Duality Photon, and Cosmic-Particles Origination.
Since also Stress $\sigma$ eternally exists in Material point and is of the Golden-ratio-pattern $\Phi$, therefore microcosm and sequence all macrocosm follows, the Stress $\sigma$, Property Vector, of the → Growing-Golden-ratio-pattern $\Phi$ as this is stated in,

1. Stress with Golden ratio Property,
2. Centripetal acceleration due to Stress,
3. Gravity = Stress = Centrifugal acceleration,
4. Gravitation constant G Stressing, g.

All above related vectors, of frequency $f_n$, occupying the Growing - Golden-ratio pattern $\Phi$, give the analogous strength to enter caves, and incidentally in satiation Systems to follow the Split-Property as this happened to Organic - Chemistry.

The $\Phi$ Properties :

To show that $\Phi = 1+ \frac{1}{\Phi} = 1, 6180339887$ : Proof ,

It is holding → $1+ \frac{1}{\Phi} = 1 + \frac{1}{(1+\sqrt{5})/2} = 1 + \frac{2}{[\sqrt{5}+1]} = \frac{2[\sqrt{5}-1]}{[\sqrt{5}+1][\sqrt{5}-1]}$ or ,

$1+ \frac{1}{\Phi} = 1 + \frac{2[\sqrt{5}-1]}{4} = 1 + \frac{[\sqrt{5}-1]}{2} = \frac{2+\sqrt{5}-1}{2} = \frac{[\sqrt{5}+1]}{2} = \Phi$, therefore, $\Phi = 1 + \frac{1}{\Phi}$ ....(5)

Equation (5) is a very Interesting Property of the Golden - Ratio because is that, it can be Defined in terms of itself, i.e. of unit 1 equal to a new $\Phi$ which defines the Space, and of $\frac{1}{\Phi}$ defining the Opposite which is the Anti-Space,

and as continuous fraction is, $\Phi = 1 + [\frac{1}{1 + \frac{1}{1 + \frac{1}{1 + \ldots }}}]$ .... (6)

Because number $\Phi$, multiplied with its Reciprocal number $\frac{1}{\Phi}$, is process of Addition, and equal to unit 1, so → Space * Anti-Space ≡ Monad ← or $\Phi * \frac{1}{\Phi} ≡ 1$ because ,

$\rightarrow \Phi * \frac{1}{\Phi} = [1+ \frac{1}{\Phi}] \frac{1}{\Phi} = 1$ or $\rightarrow \frac{1}{\Phi} + \frac{1}{\Phi^2} = 1$ and $\Phi + 1 = \Phi^2$ or $\Phi^2 = \Phi + 1$ ...(7)

Equation (7) is written $\Phi^2 - \Phi - 1 = 0$ and the roots of the second degree equation is

$x = \frac{\Phi \pm [\sqrt{[\Phi^2+4\Phi^2]}]}{2} = \frac{[\sqrt{5}+1]}{2} * \Phi = \Phi * \Phi$ i.e. Golden-Ratio Property is continuously increasing by its self, a Self-Growing Property of frequency $f_n$ of Material-point.

Equation (7) is also a very Special property of the Golden ratio because, according to Euclid, A straight line AB is said to have been cut in Extreme and Mean ratio when as the whole line is to the greater segment AB / AC, so is the greater to the lesser AC / CB, and according to Markos, Since frequency in Material-point becomes from Equilibrium of → The Two-Opposite-Rotational-Energies $[\pm ]$ ← as relation

$\overrightarrow{B} \overrightarrow{w} = L = 1 + \frac{1}{2} l_1 w_1^2 + \frac{1}{2} l_2 w_2^2 + \frac{1}{2} l_3 w_3^2$, or Angular-momentum $B \equiv \pm \text{Spin} S$ as ,

$\overrightarrow{B} = \frac{\pi r^4}{4} [\frac{2\pi f}{[\frac{\pi r^4}{2}]}] \equiv [\text{Constant} * f] \equiv \frac{2L}{\overrightarrow{w}} = \frac{2L}{2\pi f} = [\frac{L}{\pi}].[\frac{1}{f}] = \frac{4\pi L}{(1+\sqrt{5})} \sigma$, or

$\overrightarrow{B} = \frac{4\pi L}{(1+\sqrt{5})} \sigma = \frac{2\pi \frac{L}{h} = [\frac{\overrightarrow{B}}{2\pi f}]}{[\frac{\pi r^4}{2}]} \sigma = \frac{h f}{2\pi f} = [\frac{h}{2\pi}] = \text{SPIN}$, where $L = h f = \text{Constant}

and Frequency related to $\Phi$ is → $f_n = [\frac{2}{\pi r^4}]$, $\overrightarrow{B} \equiv [\frac{1+\sqrt{5}}{2}].[\frac{\sigma}{2\pi r}] \equiv [\frac{\Phi \sigma}{2\pi r}]$ ...(7a) → Occupies the Property of the Golden-Ratio-Pattern $\Phi$, and equation (7-7a) defines that Material Point of frequency $f_n$, when collide with another Material Point, or with

Particle & Wave Duality Photon, and Cosmic-Particles Origination.
another Particle or particles then Produces another monad as $→ 1 \equiv \text{New Quaternion}$ and the first continuous to be of the same Identity , frequency $f_n$, as before and from Euler’s , rigid body dynamics work $W = 2L = \vec{B} \cdot \vec{w} = J \cdot w^2 \equiv h. f_n \leftarrow \text{i.e.}$

The Frequency of Photon, embodied with the $→$ Growing-Golden-ratio-pattern $\Phi$ Uses the Vibrating Physical Structures, the Granular Material-Instruments, to Kick Start energy on all of them and everything in this World. The How is in [86]

2c... The STPL Pattern of Particles-Interactions and Forces-Exchanged:

![Diagram](image)

**Figure – 3 -**: The Physical explanation of The Cosmic-Particles and Forces in Universe:

In figure -3-, $[O , OA]$ is the Common-Circle, DP the STPL line, DA tangent to the circle, OI is Perpendicular to DP, IT = IM is the tangent to the circle and $P$, any other Point on line. To show 1) $DM = DA$, 2) $PM = PM'$ where $PM'$ is the tangent from $P$.

Proof :

From the right-angled-triangle DAO, and Pythagoras theorem then $DA^2 = OD^2 - OA^2$,

From the right-angled-triangles IMD, IOD and Pythagoras theorem then $DM^2 = DI^2 + MI^2$ and issues $DO^2 = DI^2 + OI^2$, or $DO^2 = DM^2 - MI^2 + OI^2 = DM^2 + [OI^2 - MI^2] = DM^2 + [OI^2 - IT^2] = DM^2 + OT^2$ i.e. $DM^2 = DO^2 - OT^2 = DO^2 - OA^2 = DA^2$, or $DM = DA$, meaning that the Tangent DA of any Point $D$ or $P$ on STPL is always equal to the segment $DM$ or $PM$.

For point $P$ issues $PM = PM'$ where angle $< PM'O = 90^\circ$.

Remarks :

1. The Tangent DA from Point P denotes the, Power of Point D to circle $[O , OA = OT ]$, or $P_0^D = DA^2 = MD^2$, and $P_0^P = MP^2 = PM'^2$ (1)

2. On triangle DMP where MI is the height, issues Pythagoras relation $\frac{MD^2}{MP^2} = \frac{DI}{PI} = \frac{P_0^D}{P_0^P}$ ...

Meaning that the Ratio of the Powers of Any-Two Points on STPL is expressed Linearly as their Distance from the foot-point $I$ as, $\frac{P_0^D}{P_0^P} = \frac{DI}{PI} = \frac{+DI}{-PI}$. i.e. a Standing-Wave.

3. Considering the Power of Any-Point be the Charge of the Point then the Charge of Point $D$ is $→$ Charge $p_0 = + DI$, and Charge of Point $P$ is $→$ Charge $p = - PI$. i.e. The Physical Interpretation of Point-Charge is the Positive-Linear-Vector, $+ DI$, and the Negative-Linear-Vector, $- PI$, which are the Interactions from the two Points in loop DP.

4. In Material-Geometry the $[\oplus]$ Charge Attacks $[\ominus]$ Charge and are created the Interactions between Forces, and because Desargues $D$, Pascal $P$, Points occupy a different Voltage, therefore $D, P$ Points Exchange Forces in the Range of Standing-Wave $DP$.

It is proved that Charges $[\oplus] \leftarrow a \rightarrow [\ominus]$ exist in Standing-Wave as the Four-Forces of SM.

Particle & Wave Duality Photon, and Cosmic-Particles Origination.
**Figure -4-** : The Energy-Space, **Stress-Strain** in wavelength $\lambda = 2\pi r$, of a moving Photon : 

c... The Forces, Stresses, velocities and Spin Relations:

1. For area $A = 0$, the acting Force $\mathbf{F}$ which is an Energy-Space cave, is manifested into the Transverse-Principal stresses, $\sigma$, $\tau$, and then as an Moving-Storage (1)-(2) is transported as Velocity-Vector $\tilde{v}$. The force $\mathbf{F} = \sigma.A \rightarrow \bar{p}$ vector $= M.\bar{v} = (m\lambda).\bar{v} = [m c.T].\bar{v} = \frac{[m c]}{f}$. $\bar{v} = \frac{[m c]}{f}$ c.$\bar{v}$, i.e. Force $\mathbf{F} \rightarrow$ becomes a Velocity-Vector $\bar{v}$ or, a Force as Stress $\sigma$, enters in Space $\Phi$ as $[\sigma, \Phi]$ and becomes frequency $\tilde{f} = \frac{\sigma.\Phi.r}{2\pi r\text{r}n}$ and exists Force $\mathbf{F} = \sigma.A = \frac{2\pi fc}{\Phi}, A = w r \cdot \frac{\mathbf{A}}{\Phi} = \bar{v} \cdot \frac{\mathbf{A}}{\Phi}$, which Force $\mathbf{F}$ becomes a moving Storage.

2. For area $A > 0$, Force $\mathbf{F}$ which is an Energy-Space-cave, resolves as Electromagnetic Radiation in the Principal stresses $\pm \sigma_1$, $\pm \sigma_2$, $\pm \sigma_3$, which is the Passage through which Forces travel in moving Solids. From the theory of Elasticity the equilibrium of a surface -Configuration in an Isotropic material obey equilibrium equation $\mu.\bar{v}^2 + (\lambda + \mu).\bar{v}.\{\nabla.\bar{u}\} = 0$

3. For area $A < 0$, because Force $\mathbf{F}$ is an Energy-Space-cave which at first passes from the Zero area $A = 0$ and becomes velocity-vector $\bar{v}$, this velocity-vector $\bar{v}$ is entering any trough, Potential, and transformed to an Energy-Rim, as these are the Orbits of Electrons. Because Photon is one of the moving-energy-stores, when it enters a cave $L_s < L_p$, then the cave becomes an Discrete Energy-Packet which is the Rim $L_V$.

4. For area $0 = A = 0$, The Extreme case, where surface is interchanged as line or as line-segment, and is the same as the infinite small, in Calculus, where stresses $\sigma_2 = 0$ and $\tau_{12}$ are very small, **it is the equation of stresses $\sigma_1, 2$, and from Cauchy $\sigma_1 / 2 = \pm \left(\frac{1}{2}\right) \cdot \sqrt{\sigma_1^2 + 4.\sigma_2^2} = \sigma_1 \cdot \frac{[1 \pm (\sqrt{5})]}{2}$, which is the Golden-ratio-Pattern of the Material-Point as a Type of a vanishing-Shear due to layers laterally shifted. [26]

This minimum quantized energy $\sigma$, was proved that is going out the Material point as acceleration and creates Stationary-gravity $g$ as $f_n$, acting on Spin as $S_{PA} \cdot r^4$. The Proof Centripetal Force $F_c = m v^2/r = (1.(w/r)) = w^2$. $r = \pm \sigma = (2\pi f_1)^2$. $r = \sigma_1 \cdot \frac{[1 \pm (\sqrt{5})]}{2}$ and $w^2 = f_n = \frac{(1+\sqrt{5})}{4\pi r}$ From Kinetic energy $E = \frac{m v^2}{2} = 1.\frac{w^2}{2} = h f$, then $w^2 = \frac{2E}{r^2}$ and $E = \frac{[(1+\sqrt{5})]}{4\pi r^2}, f_n = \frac{[1+\sqrt{5}]}{4\pi} \cdot 2B = \pi r^2 E\sigma$, then force $f_n$ orients Spin $\bar{n}$ to $B$ as, $\vec{g} = f_n \times \bar{B} = [f_n|B|\sin \theta = \frac{[(1+\sqrt{5})]}{4\pi r^2} \cdot \pi r^2 E\sigma \cdot 1 = \frac{[0.5r^2(1+\sqrt{5})]}{8} = \frac{[\sigma r^2]}{2}$ ....(g)
Equation (g) which is Gravity constant $g$, is the permeable Path for inner stress $\sigma$, to pass the Material’s-point a surface $4\pi r^3/3$ and to expenditure its Energy. The same exists also to the Electromagnetic force which is associated with a fundamental Property of matter which is the Electric-Charge and which is a clue to The ubiquity of Electromagnetism. From equation of Gravitation $G = k_\text{E} g = g_\text{} [k_\text{ER} g_\text{R}]$ seems that the two constants are related i.e. act each other through Local-coefficients or through Field-lines, called the Medium or Permissible Path which is as $\sigma = \frac{F}{A} = \frac{2\pi m r.}{\Phi} = \frac{w r.}{\Phi}$, velocity vector in a Unit-Space $\Phi$.

It was shown that the first Path is Gravity $g$ and Original Field-lines of Force, $G$, are distorted by these Charges, Local-coefficients, the Layers following Newton’s laws. The Original Field-lines terminate at the surface on one side of the Medium, and new field lines originate from the other side of it. It was shown that the Momentum vector $\mathbf{B}$, is equal to spin $S$, because it is following the Stationary - Wave - Nodes - Principle in the Material-Point, creates the minimum quantized Energy which is conserved in lobes.

This Property is extended also to the Number of lobes as well to, $\pi$, number as velocity $\{v = n.\pi.c\}$ which is the minimum Number relating Lines and Surfaces.

Analogous happens in equation (c) when $v = c$, and $r = c$.

From Inner-velocity equation $v = w.r = (2\pi / T).r = 2\pi f_1. r$, of fundamental frequency $f_1$, of wavelength $\lambda = c.T = c / f_1$, and cave $r = n.[\lambda/2]$, then $r = n.(c / 2f_1)$ and $v = 2\pi f_1 = n.\pi.c$ or $v = n.\pi.c$ .......(π)

Equation (π) shows that velocities in lobes are, $n.\pi$ times that of light, following $\pi$, number in circle, i.e. in Material-points exist velocities multi-times that of light and the minimum Surface-constant, Unit $\pi$, or the Growth of the velocity-vectors occurs in lobes by following the logarithm laws of Energy-constant $c$ which is acting on Space constant $\pi$. From velocity, $v = n.\pi.c$, is seen that light-velocity is the Quantum of Unit-velocity in Planck’s length. The Why velocity $c$ and $\pi$, is such in [42-51-63] and now later.

Kepler’s Laws → Explain How the Planets move around the Sun But NOT the WHY.

Newton’s Laws → Explain the WHY by filling this Gap by a Force $F = G.m_1 \cdot m_2 / r^2$, acting instantly between the bodies that are moving around each other But NOT their Nature and NOT the HOW Force is Acting.

Markos-Spaces → Explain the WHY by filling the Gap with a Double-Ocean of the Pointy-Spinning- Material-Points, becoming from the Stationary- Material-Points, Photons or Electrons, and from the moving-Energy-Storages, the Duality-Photons, $\tilde{\nu} \cdot [\frac{f_n}{f_n} + f_n] = n.\pi.c \cdot [\mathbf{B} n] + [\mathbf{V} \cdot \frac{f_n}{f_n}] f_n$, of the two frequencies which Orientate and Re-orientate the Stationary-Spins and explain the HOW and the WHY all motions follow the ubiquity of the Electromagnetism, starting from the Primary-Material-Points, the Photons, which through the Golden-Ratio-frequency-Growth effect and conserve the Whole of the Natural-World from microcosm to macrocosm.

The Recent Annex relating the Greatest-Pressure-Level denotes the Pressure in the filling Gap of Space-Energy reality. It is done an effort of the Cosmic-Particles-Origination.

5. The Four Forces: Material-Point is the Attack of the $[\oplus]$ $→$ to $[\odot]$ and from a different Voltage as Forces $\equiv \Sigma^+ = + +$, $\Sigma^+ = +$, $\Sigma^- = - -$, $\Sigma^{++} = + +$, $\Sigma^{-} = - -$ and happening in Standing-Wave-caves and in Travelling-Wave-caves, as motion.

From above equation (4) is seen that, Since Particles are Waves therefore occupy the Energy-Storages either Moving or in Not-Moving.

D. THE PHOTONS:

Particle & Wave Duality Photon, and Cosmic-Particles Origination.
Figure - 5 - : The Propagation of Photon-Electromagnetic-Field-Storage EP:

In figure  \( r = \lambda/2 = EP \) is the Energy-Storage-monad [\( S \equiv EM-R \equiv f_1 \Rightarrow f_2 \), \( f_3 \), \( f_D \), \( f_n = w^2 \)]

Propagating with \( \vec{v} = \lambda_n, f_n = c \cdot [\frac{\sigma}{2\pi} + \frac{\sigma \Phi}{2\pi}] = c \cdot [\frac{\sigma}{2\pi} + \frac{\sigma \Phi}{2\pi}] = \{ \vec{c} \cdot \vec{f}_n + \vec{c} \cdot f_n \} \), where for frequency \( f_p = \frac{\vec{c} \cdot \sigma}{2\pi} \), as Particle, where velocity \( \vec{v} = w.r \), follows the Breakage-Principle which is Quaternion \( \vec{z} = [s + \vec{v}, \vec{vi} \rightarrow s^2 - |s|^2 + 2|s|^2.\vec{v}i \equiv \sum \equiv \frac{[\epsilon E^2 + \mu B^2]}{\text{Energy}} \equiv \text{The Energy-monad, EP, and as a Wave as, } f_p = \frac{\vec{c} \cdot \sigma \Phi}{2\pi} = \frac{\sigma \Phi^2}{2\pi}, \text{as Particle, where velocity } \vec{v} = w.r \), follows as a Particle. for \( \lambda_n = 2r \), then \( v_n = v_1 \), and then \( n \cdot \lambda_n = 2r \) or
The Work, W, Produced from the Wave-Energy-Pattern, with wavelengths $\lambda_{n}$, and Created from all Points of the Periodic Oscillation in any Cave, $r$, is Stored into the, $n$, Integer and Energy - Lobes of this cave $r$, where $E^2 + H^2 = B^2$. Photon $\rightarrow \{ \mathbf{c} \cdot f_n + \mathbf{c} \cdot f_n \}$

From Mechanics, the Only - Possible motions are, the Periodic-Excitation, and the Revolving-Motion therefore all Moving-Energy-Stores travel as a Wave and Not as a Particle. The $n$, Energy-Tanks, the N Antinodes in its moving Store $2\lambda = r = h/p \equiv [f_1, f_2, f_n = w^2 \equiv n$ lobes ] follows the Stationary-Wave-Nodes-Principle, i.e.

The Glue-Bond-Stress Rotation of opposites on Small - circles creates, $n$, Integer number of lobes, which is the Wave-Nodes-Principle of the moving-energy-stores, one of which is the Photon.

The |n| Energy - Storages of The Moving - Monads. Figure -4-

In Electromagnetic field, EM-field, Magnetic-field is the Storage in which Energy = Motion is Stored, and Electric-field is the Force, The Energy, which Pushes the Energy-Store- Basket = The Magnetic-field, executing the Helicoid motion.

In Store, $r$, Wavelength $\lambda_{n} = \frac{2\pi}{n}$, Fundamental-frequency $f_1 = \left[ \frac{\sigma_1 + \sqrt{5}}{4\pi r} \right]_{1}$, and Work $= h.f_1$

The Energy-Storage length $E-P = \lambda/2$, is composed of 4 Lobes with wavelength $\lambda_4 = \frac{2\pi}{4}$, $f_4 = \frac{4\pi}{2r} = 4f_0$, and $W_4 = \frac{h}{2r} v_4$, and for $\rightarrow$ Loop-Total-Work, $W = \frac{4\pi r f_1}{3}$ n(n+1)

or $W = \frac{80\pi^2 f_1}{3}$, and from Photon $\rightarrow \{ \mathbf{c} \cdot f_n + \mathbf{c} \cdot f_n \} \rightarrow v_4 = \lambda_4.f_4 = 4\lambda_4.f_0$, therefore for, $n = 1 \rightarrow f_1 = 1.\left[ \frac{\sigma_1 + \sqrt{5}}{4\pi r} \right]$, Wavelength $\lambda_1 = \frac{2\pi}{1}$, Energy $W_1 = \frac{4\pi r^2}{3}$, $f_1 = 1.\left( \frac{1 + \sqrt{5}}{3} \right)$

$n = 2 \rightarrow f_2 = 2.\left[ \frac{\sigma_1 + \sqrt{5}}{4\pi r} \right]$, Wavelength $\lambda_2 = \frac{2\pi}{2}$, Energy $W_2 = \frac{4\pi r^2}{3}$, $f_2 = 2.\left( \frac{1 + \sqrt{5}}{3} \right)$

$n = 3 \rightarrow f_3 = 3.\left[ \frac{\sigma_1 + \sqrt{5}}{4\pi r} \right]$, Wavelength $\lambda_3 = \frac{2\pi}{3}$, Energy $W_3 = \frac{4\pi r^2}{3}$, $f_3 = 3.\left( \frac{1 + \sqrt{5}}{3} \right)$

$n = 4 \rightarrow f_4 = 4.\left[ \frac{\sigma_1 + \sqrt{5}}{4\pi r} \right]$, Wavelength $\lambda_4 = \frac{2\pi}{4}$, Energy $W_4 = \frac{4\pi r^2}{3}$, $f_4 = 4.\left( \frac{1 + \sqrt{5}}{3} \right)$

i.e. In store, $r$, can exist $n$, frequencies as $f_n = n.f_0$, $n$, times the fundamental frequency.

Electromagnetic waves are created by the vibration of an Electric-charge. In Material – Point, The eternal rotation of the $\oplus$ constituent around the $\ominus$ constituent creates the, $n$, Energy-lobes in a Tank $r = n \frac{\lambda}{2}$ or $\lambda = \frac{2\pi}{n}$, since the velocity of the wave is $\mathbf{v} = \lambda/T = \lambda x f$. The frequency is $f = \frac{n.c}{2\pi r}$ where $n$ is a positive integer number. Because in lobes the inner particles are the $\{+\}$, $\{-\}$ constituents of, Space and of Anti-space, the maximum amplitude of each constituent is related with its Position and each Amplitude oscillates periodically as the wave equation, $x = v_0 \cdot \sin wt = A \cdot \sin \left[ \sqrt{(a/Am)}t + \pi/2 \right]$ ……..(1) where

a. Velocity $\rightarrow |\mathbf{v}| = w r = \frac{2\pi}{T} r = 2\pi f$, and $f_n = \frac{n.v}{2\pi r} = \frac{n.\sigma}{4\pi r} [1 + \sqrt{5}] = \frac{n.\sigma.\Phi}{\pi^2 r^4}$

b. Angular velocity $\rightarrow |\mathbf{w}| = \frac{\sigma}{2r} [1 + \sqrt{5}] = \frac{\sigma.\Phi}{r}$, and Fundamental frequency $f = (\frac{1 + \sqrt{5}}{4\pi r}).\sigma$

In cave, $r$, in where, Wave propagates, as in a Magnetic-device the arced pattern, by travelling from North to the South Pole, and thus creating the Inner - Electromagnetic-Displacement, the Current which is $\rightarrow \partial E / \partial t$, $\partial H / \partial t \leftarrow$ and when reduced to one line as, $E = H e$ $E \rightarrow \partial E / \partial t \rightarrow H \rightarrow \partial t \rightarrow H$.

This vibration of opposites creates a Wave which has both an Electric, $E$, and an Magnetic component, $H$, perpendicular each other and is as

$[ E^2 + H^2 ] = 2.(\sigma r).c \sin 2\Phi, [\sigma = \frac{\Phi}{\Phi}]$ ……..(2) on-where exists the Skin-effect. [68-70]

This happens because of the difference in density on Stress-common-curve, $\rho = \sigma$ instead

Particle & Wave Duality Photon, and Cosmic-Particles Origination.
The Electric force

Absorption and Reemission of EM

Because E without New Electromagnetic wave motion A occupy a finite

The mechanism of motion presupposes the velocity vector \( \mathbf{v} \), which when it is in motion collides with other velocity vectors, creating a Constant Work \( \mathbf{k} \).

Motion may be Linear or Rotational for any displacement \( \mathbf{r} \), in any Store \( \equiv \text{cave} \), so exists in Vectors the Quantum-Constant-Work \( \rightarrow \mathbf{k} = \mathbf{v} \cdot \mathbf{v} = v^2 \cdot \mathbf{r} \), and becomes from relation \( n \lambda = 2r \), issuing \( 2r = n \frac{v}{f} \), and is \( v = \lambda \cdot f \) or \( \rightarrow \mathbf{v} = \mathbf{c} = \lambda \cdot f \).

Constant-Work \( k = v^2 \cdot r = (w \cdot r)^2 \cdot r = \frac{2\pi}{T} \cdot r \cdot r = \frac{4\pi^2}{T^2} \cdot r \cdot r = \frac{4\pi^2 + r^2}{r^2} = 4\pi^2 \cdot r^3 \cdot f^2 = 1 \rightarrow \)

which are the universal Kepler Laws for macrocosm.

For Unit-Stress-Gravity \( g \), as \( k = E = \frac{T^2}{a^3} = g = \frac{1}{E \cdot a^3} \) and for \( a = r \) then \( g \cdot r^3 \cdot f^2 = 1 \),

which is the Kepler second constant-Unit-law for Areas.

i.e. Photon during Motion in [MFMF] Chaos collides with other Photons, by means of Cross Product Produces a Constant - Work, which is stored into the Only-Four Energy and Geometrical - Shapes, of the motion which are the Conic-Sections. The Interior motion is kept in its Wavelength-Storage \( 2r = n \lambda \), and the Linear motion is continued by the Propagating Electromagnetic - Wave, the Energy-Store-Conveyor.

The mechanism of Energy-transport through a Medium involves the Absorption and the Reemission of the wave-energy by the Atoms of the material. Since Quanta of Energy occupy a finite space \( \lambda = 2r \), as motion, then an Electromagnetic wave impinging upon the Atoms of a material, its energy is absorbed by the atoms of the material, and since Energy \( \equiv \text{motion} \) then occurs Resonance, and electrons within the atoms undergo vibrations. After a short period of vibrational-motion, the vibrating electrons, due to \( g \) effect on Spin \( \mathbf{S} \), create a New Electromagnetic wave with the same frequency as the first one and motion is conserved without delay through the medium. Nutation occurs due to the \( g \), above referred effect.

Because Energy is related to wavelength \( \lambda \), as equation \( E = h \cdot \frac{f}{\mathbf{c} \cdot (c/\lambda)} \), then once the energy of EM-wave is reemitted then it travels through a small region of space, its Magnetic-field, between atoms and once it reaches the next atom the EM-wave is absorbed and transformed into electron vibrations and then reemitted as an → Electromagnetic-wave \( \equiv \text{motion} \leftarrow \).

The actual speed of an Electromagnetic-wave through a material-medium, due to the Absorption and Reemission-process, is dependent upon the Optical - density of the medium, or when their atoms are closely packed upon their, Material - density, Impedance-Type

The Electric force \( \mathbf{F} \), originated in, Energy-field \( \mathbf{E} \), by any two charges \( q_1, q_2 \) and Spread in a Fixed distance \( r \), occupies velocity \( \mathbf{v} = \mathbf{c} \) and is equal to distance \( \mathbf{f} \). The Above vector is \( \mathbf{v} = \mathbf{f} = \mathbf{c} \) and is used for the Pointy- coves, one of which is the Atom-Nucleus. [82]

The Eternal-rotation \( \bigoplus \bigcup \bigodot \) of the \( \bigoplus \) constituent around the \( \bigodot \) constituent in M-Point and for Photon on a Cycloid, is the Creation OF, Period as \( w = \frac{2\pi}{T} = \frac{g}{4r} = \frac{\sigma}{4r} \) and Frequency

\[
\mathbf{f} = \frac{\alpha = \left[\alpha \Phi\right]}{2\pi r} = \left[\frac{1 + \sqrt{5}}{2}\right] = \frac{\alpha \Phi}{2\pi r}, \text{ from Intrinsic Angular-Momentum-Vector relation } \mathbf{B} = \frac{2L}{w} =
\]

Particle & Wave Duality Photon, and Cosmic-Particles Origination.
\[ \frac{L}{m} = \pi^2 \frac{r^4}{f} = \frac{h}{2\pi} = \text{SPIN} - S , \text{of Particles} \], From \( \vec{v} = \frac{G \Phi}{A} = \sigma \Phi = \vec{c} \) the Light-Velocity and From \( a = \frac{3}{1/g f R^2} \) The-Hydrogen-cave, and from \( E_R = \frac{1}{n^2} \left[ \frac{4 \pi^2}{c^2} \frac{S^2}{2m} \right] \) the Atoms-Molecules. i.e. Photon is an Energy-Spring-Store, \( r \), in a Stationary-wave of wavelength \( n \lambda = 2r \), and consisted of \( n \) stationary lobes filled in \( \lambda \) with inner motion the Electromagnetic-Displacement current, while Outward Propagates with light-speed as an Energy-Store \( [\vec{v} \hat{f}_n] \rightarrow \lambda = 2r/n \), and [+] Electric-field as Space-motion and [-] Magnetic-field as Anti-Space-Store \( [\vec{v} \hat{f}_n] \).[70]

1d. The Duality Of Isochronous Photons

![Diagram](image)

Figure – 6 - : The Material-Geometry Mechanism-of-motion in Photons-Cave :

FROM MECHANICS The Eternal-Rotation of the Two Elements, \( \{ \oplus \cup \ominus \} \), Up or Down in the Material-Point circles, Originates the Spins, \( \pm \frac{1}{2} \), \( \pm 1 \), of All Particles, Fermions or Bosons, which combine from the above Three-States just by Adding their Spins [36]. From Cauchy-Stress-Tensor under Plane-stress-conditions, The Equation of stresses \( \sigma 1,2 \), is \( \sigma 1 / 2 = \pm ( \frac{\sqrt{2}}{2} ) \sqrt{\sigma 1^2 + 4 \sigma 1^2} = \sigma 1, \left[ 1 \pm ( \sqrt{5} ) \right] / 2 = \sigma . \Phi \) which is the Golden-ratio-Pattern of the Material-Point as Type of a vanishing-shear due to layers laterally shifted. This minimum quantized energy \( \sigma \), was proved that is going out the Material point, because of Skin effect, as acceleration and creates the Stationary gravity \( g \) as \( f_n \), acting on Spin as \( S_{PA} \cdot r^4 \). The Centripetal Force is equal to Stress \( \sigma \), so \( F_c = m v^2 / r = 1. (w r)^2 / r = w^2 \), \( r = \pm \sigma = (2 \pi f_1)^2 \), \( r = \sigma 1, \left[ 1 \pm ( \sqrt{5} ) \right] / 2 = \Phi . \sigma \), and since \( m = \frac{\sigma}{w . r} = \frac{\sigma}{w . c} = \frac{\Phi}{r . c} \), then \( \pm \sigma = \frac{cB}{r^2} \) which is a relation between Stress Momentum and light-velocity \( c \).

It was shown in [70-P32] that in a Cycloid, the area between the curve and the straight line is \( A = 3 \pi r^2 \) and the arc length \( 1 = 8r \). For the motion on cycloid, we consider a Weight \( Q \), at a point \( A \), moving with free motion. Since reaction \( N \) is vertically acting, doesn’t give any Tangential component therefore the only one becomes from \( Q \), which is equal to \( AT = g \sin \varphi \) and since \( \sin \varphi = \frac{s}{4r} \) then \( AT = g \cdot \frac{s}{4r} \). Since acceleration \( a = \frac{ds}{dt^2} = \frac{dv}{dt} = \frac{d^2s}{dt^2} = \frac{d^2s}{dt^2} = - g \cdot \frac{s}{4r} \)

Particle & Wave Duality Photon, and Cosmic-Particles Origination.
then \( \frac{d^2\hat{s}}{dt^2} = -g, \) or \( \hat{s} = -w^2 \hat{s} \) where \( w = \frac{2\pi}{T} = \frac{g}{4r} \) ...(a) which is a Harmonic Oscillatory motion showing that Acceleration is proportional to displacement and is directed towards the origin with a period \( T = \frac{2\pi}{w} = \frac{2\pi}{\sqrt{\frac{g}{4r}}} = 4\pi \sqrt{\frac{r}{g}} \), or and \( w^2 = \left( \frac{g}{4r} \right)^2 \), where \( w = 2\pi f \).

**Origination of Frequency , or Period**, happens from above Property where \( \left( \frac{g}{4r} \right)^2 = 2\pi f \).

In Material-Point the Cycloidal-acceleration \( g_{cyc} \) is transformed as Centrifugal acceleration \( g_{cyc} = \left( \frac{v^2 r}{R} \right) = \frac{g}{4r} \), where \( r \) is the Radius of the Cycloidal-circle and \( R \) is the radius of curvature

In Cycloid velocity-vector \( \vec{v} = \vec{\omega}.\vec{r} = 2\pi \vec{f}.\vec{r} = \vec{\sigma} = \sigma \vec{\Phi} \), Frequency \( \vec{f} = \frac{\vec{\sigma} = [\sigma \Phi]}{2\pi r} \) and Total-Energy \( 2L = J.w^2 = 4\pi^2 f^2 \)

\( w^2 = \left( \frac{\sigma \Phi}{r^3} \right)^2 = \left( 2\pi f \right)^2 \), or \( \text{Frequency of Photon} \ f_p = \frac{\sigma \Phi}{2\pi r} = \left[ 1 + \sqrt{5} \right] \frac{\sigma \pi r^3}{4 \pi r} = \frac{\pi r^3 \Phi \sigma}{2} \) ...(a) i.e. using the Harmonic Oscillation due to Any-Force or Weight, which follows the free motion on Cycloid, is Independent of the Amplitude of oscillation and is Isochronous.

Equation (a) denotes that the Harmonic Oscillation due to Any-Force or Weight, which follows the free motion on Cycloid, is Independent of the Amplitude of oscillation and is Isochronous. This Property belongs to Photon also, since it is a Material-Point. [70]

Since Total-Energy \( L = Bw = \frac{1}{2}w^2 \) then \( 2L = J.w^2 \), and \( \vec{B} = r.mv = \frac{\pi r^4}{2}2\pi f r = \pi^2 r^4 f \)

From momentum relation \( \vec{B} = m r \vec{v} = m r^2 w = m r^2 (2\pi f) = \frac{1}{2}w^2 = \left[ \frac{\pi r^4}{2} \right] \) then Spin \( \vec{S} = \pi r^2 \Phi \sigma \)

**Angular-momentum** \( \vec{B} \equiv \vec{S} = \frac{1}{2}w^2 = \pi^2 r^4 \) \( \left[ \frac{\pi \Phi}{2} \right] \equiv \frac{\left( 1 + \sqrt{5} \right) \sigma}{\pi r^3} \)

Frequency of Photon is \( f_p = \frac{\left( 1 + \sqrt{5} \right) \sigma}{\pi r^3} \), where \( \Phi = \frac{\left( 1 + \sqrt{5} \right)}{2} = 1.6180339887 \) and \( 2r \) is The Diameter of Energy-Cave \( AB = 2r \) of circle \( O,OA = \) Monad \( \rightarrow \Theta \rightarrow \Theta \equiv \Phi \) and

\( BC = |\sigma| = \) The Glue-Bond-Vector from the main-Strresses magnitude.

\( ABCD = \) The Energy-Space Rectangular Parallelogram in Plane ABC.

\( ABFE = \) The Energy-Anti-space Rectangular Parallelogram in Plane ABC

\( BF = |\Phi|, \sigma| = \) The Anti-Space-Vector, and \( FG = |\Phi| = \) The Space-Vector magnitude.

From Kepler 2nd Orbit laws the Unit-Quantized-Area, or Unit Quantized Energy is that per/sec \( \rightarrow r \) d\( r \), following equation \( L = k.f^2 u^3 \), and expresses the area of triangles.

**Triangle 2(ABC)=BC.BA= \sigma.[\Phi+1] \equiv \sigma.\Phi + \sigma = [\text{Stress-In-Storage-}\Phi] + [\text{Moving-Stress}]**

Or **Storage \( S \equiv \left[ \Theta \leftrightarrow r \equiv \Theta \rightarrow \Theta \right] \) + Motion \( M \equiv \vec{\nu} - \text{Vector} \) and from Figure-4-

**Triangle 2(BFG) = FB.FG = \sigma.\Phi[\Phi] = \sigma.\Phi^2 = \sigma.[\Phi+1] \equiv \sigma.\Phi + \sigma \equiv S_{\text{storage}} + M_{\text{motion}}**

**Triangle 2(DEG) = EG.ED = \sigma + \sigma \Phi \equiv \sigma.\left[ 1 + \Phi \right] \equiv \sigma.\Phi + \sigma \equiv S_{\text{storage}} + M_{\text{motion}}**

and since Energy = motion / \( T \equiv \left( \frac{v}{2\pi} \right) \). \( \sigma + \sigma \Phi \equiv \vec{\nu} \cdot \left[ \sigma \frac{\sigma}{2\pi r} + \frac{\sigma \Phi}{2\pi} \right] \equiv \vec{\nu} \cdot [\vec{f}_n + f_n] \)

Moving - Storage \( \rightarrow [\vec{\nu} \cdot \vec{f}_n] \) \( \leftarrow \) Moving-Frequency \( \rightarrow [\vec{\nu} \cdot f_n] \) \( \leftarrow \equiv \) Material-Point i.e.

The Energy produced in Photon-Cave is consisted of **Two-moving-Storages**, that travelling as Particle \( [\vec{\nu} \cdot \vec{f}_n] \rightarrow [\vec{\nu} = \vec{c} = \lambda \vec{f}_n] \rightarrow [S \equiv \text{EM-R} \equiv f_1 = N, f_2, f_3, f_D, f_n = w^2] \) and,

20

**Particle & Wave Duality Photon**, and **Cosmic-Particles Origination**.

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Volume-6 | Issue-10 | Oct, 2020

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as Wave \( [\bar{v} \cdot f_n] \rightarrow [f_1 = (E^2 + H^2) = n(\frac{1 + \sqrt{5}}{2})^2] \rightarrow [W \equiv EM-R \equiv [\varepsilon E^2 + \mu B^2] = 2.\lambda c \sin 2\phi] \)

and the Duality of an Energy-Storage \( S \equiv \begin{bmatrix} \bar{v} \rightarrow \Theta \end{bmatrix} \) + Motion \( M \equiv \bar{v} - \text{Vector} \)

Therefore → Photon is travelling both as Particle and as Wave, as

1. Energy-Storage \( S \equiv \begin{bmatrix} \bar{v} \rightarrow \Theta \end{bmatrix} \equiv \text{Particle} \left( \bar{v} \cdot \frac{\hat{f}_n}{n} \right) \rightarrow \{ \bar{v} = \bar{c} = \frac{f}{G} \} \rightarrow \text{i.e. a Stationary Standing} \)

2. Energy-Motion \( M \equiv \bar{v} - \text{Vector} \equiv \text{Wave} \left( \bar{v} \cdot f_n \right) \equiv \{ f_1 = (E^2 + H^2) = n(\frac{1 + \sqrt{5}}{2})^2, f = \frac{B}{r^2} \} \rightarrow \text{i.e. a Propagating Wave} \left( W \equiv EM-R \equiv [\varepsilon E^2 + \mu B^2] = 2.\lambda c \sin 2\phi(\varphi = \frac{B}{\Phi}) \right) \)

The Physical-Interpretation of \( f_{\text{Photon}} \):
Using the Material-Geometry-Vectors for the Anti-Space Action then,

From Force \( G_{\text{ON-Antispace}} = \begin{array}{c} \vec{A} \times \vec{B} \end{array} = \{ [\Phi + 1] \times \{ \vec{G} \} \equiv \Phi \sigma \Phi \sigma \Phi \equiv \Phi \sigma \} \) or ,

\( G_{\text{AN}} \equiv \begin{array}{c} \vec{A} \times \vec{B} \end{array} \equiv \{ \vec{G} \} \equiv \{ \vec{G} \} \equiv \{ \vec{G} \} \) as Stress \( \begin{bmatrix} \bar{G} \rightarrow \Theta \end{bmatrix} \) \[
\Rightarrow \begin{bmatrix} \bar{G} \rightarrow \Theta \end{bmatrix} \approx \begin{bmatrix} \bar{G} \rightarrow \Theta \end{bmatrix} \approx \begin{bmatrix} \bar{G} \rightarrow \Theta \end{bmatrix} \)

and \( \rightarrow \rightarrow \rightarrow \) Primary-Energy \( \equiv G \cdot f_{\text{P}} \equiv h \) and OR \( G^{-1} \cdot \sigma \cdot \Phi^3 \equiv 1 \) \( \leftarrow \rightarrow \rightarrow \) where

\( G \equiv \text{The Newton’s-Universal Force} = 6,680561.10^{-11} \text{ m3/Ns²} \)

\( \sigma \equiv \text{The Glue-Bond-Stress in Material-Points} \equiv (\frac{2\pi n}{\Phi}) = 1,851.10^{-11} \text{ Kg/m2} \) and , \( f \), in Planck’s length \( r = L_p = e^{-i(5\pi/2)10} \) is Frequency \( f_{\text{Planck}} = \frac{c}{2\pi n} = 2,95236210^{42} \) H ,

in Planck’s Length \( L_p = e^{-i(5\pi/2)10} = \sqrt{3.\pi.1,616199.10^{-35}} \) m

\( \Phi \equiv \text{The Golden-Ratio Pattern} \equiv (\frac{1 + \sqrt{5}}{2}) = 1,6180339887 \)

It is seen that , in Universe exists the only one Force \( G \equiv \sigma \Phi^3 \), which is Acting on all

Quantized-Quantities \( \rightarrow G \equiv \sigma \Phi^3 \equiv \Phi^2 \cdot \left[ \begin{bmatrix} \sigma \Phi \end{bmatrix} \equiv 2\pi f_{\text{P}} \right] \equiv w \equiv r \equiv \bar{v} \equiv \bar{m} \equiv \bar{c} \) \( \leftarrow \rightarrow \rightarrow \) and

From \( \sigma \cdot \Phi^3 \equiv G \rightarrow [1,846462.10^{-11},3,618033989] = 6,680561.10^{-11} \text{ o.e.}\delta(q.e.d) \) i.e. Universe is a Monad , Becoming from a HUGE-MAGNET of Opposites \( \Theta, \Theta \) which Forms \( \rightarrow \rightarrow \) The 3-Dimensional SPACES \( \Phi, \text{ANTI-SPACES} \left[ \Phi, \sigma \right] \), and \( \rightarrow \rightarrow \) The ENERGY \( \equiv \text{MOTION} \) through the \( G \) - Force and Stress - \( \sigma \) becoming from Photon.

i.e. Ubiquity of Material-Geometry in Electromagnetism is Everywhere.

Remarks on the Duality-Photon \( \rightarrow \{ \bar{c} \cdot \frac{\hat{f}_n}{n} + \bar{c} \cdot f_n \} \leftarrow \equiv \rightarrow \) Particle + Wave \( \leftarrow \)

a. From equations \( f = \frac{\sigma_1 \Phi}{2\pi} \) and \( \sigma_1 \cdot [1 \pm (\sqrt{5})] / 2 = \sigma \cdot \Phi \), then Frequency \( f_{\text{P}} \) of Photon is Independent of the Amplitude \( [\varepsilon E^2 + \mu B^2] \) of the Vibration , it is Not-Damped and Not-Driven , and so can be related to Any-Force that can produce Energy as Wave and thus can be Quantized to a Monad.

b. Photon striking an Object of Microcosm or Macrocosm then , Is a Source that Gives Energy as Energy-Storage , and Information as Propagating - Energy.

c. Photon in the Microcosm of Hydrogen - Cave can-Give such Potential-Energy as Resonance-Energy - Frequency \( f_{\text{R}} \), as that Energy in [ Bracket – Orbit - Hook ] which Joints the Atoms to produce the Molecules .

Particle & Wave Duality Photon , and Cosmic-Particles Origination .
d. **Photon** striking on **Hydrogen-Cave** can produce a **Resonance-Energy-Frequency** \( f_R \), such that can produce **Photos** and **Images** of Inter-Atom or any other Structures.

e.. **Photon** striking on **Cells** can produce a **Resonance-Energy-Frequency** \( f_R \), such that can enter Cell and Break-It-Up. Duality-Photon places \( f_R \) store everywhere.

The **Kinetic-Energy** \( E_K \) of a moving Material - Point, *as this is the Photon*, is stored as motion in its Storage \( r = [n \Lambda/2] \) with the, \( n \) frequencies \( f_n = n \cdot f_1 \), with \( n \) lobes and fundamental frequency \( f_1 \). From above is seen the **Passage and The - How EM-Radiation can travel in Crystals** and which are the Cauchy-Stress-Tensor where \( E \perp B \perp r \equiv \sigma_1 \perp \sigma_2 \perp \sigma_3 \) in-where Energy Propagates along Directions **without Birefringence** and carries the motion \( E \equiv \text{Energy Storage} \), which radiation is **The conveyer**. Above procedure can be used in Cells where cells are cases of a Birefringence material and the Resonance-Passage happens as the Force of **EM-Radiation in Two directions**, can travel in **Cell** through Cauchy-stress-Tensor where the two Conveyers \( E \perp B \perp r \equiv \sigma_1 \perp \sigma_2 \perp \sigma_3 \), can carry the Energy-Storage \( r \), in Cell. Interfacial Properties are detected from Surfactant, and **change the Inner-Structure of Cell** to another desirable Property.

15/3/2020 A wide Analysis in \([84-86-90]\).

2d... The **Origination of Stresses** \( \sigma \):

**Gravitational-Constant-Force** \( G \), becomes as **Stress** \( \equiv \text{Force/Area} \equiv g \), as equation

\[
G = g k_E = g \cdot [g_E k_E] = [\frac{T_p}{a^3}] \cdot [g_L k_L] = [\frac{c^2}{a^3}] \cdot [g_L k_L] = 9.8076925 \times 6.8116.10^{-12} \equiv 6.68056.10^{-11} \frac{m^3}{Ns^2} ,
\]

and **Effects on gravity** \( \rightarrow g \equiv 9.8076925 \) **Stress** \( \frac{Kg}{cm^2} \). \([73]\)

The Beyond-Planck-length Force \( F = \sigma \cdot A = \text{The Glue-Bond} \equiv \text{Stress} \times \text{Area} \equiv [2\pi r \cdot A \equiv \frac{A}{\Phi} = \frac{\vec{v}}{\Phi}] \), and becomes a moving Storage \( \frac{A}{\Phi} \) travelling with velocity \( \vec{v} \), \( n \) times that of light-velocity \( c \), as equation \( \vec{v} = n \cdot c \).

**The Beyond-Planck-Length Force** is \( \rightarrow F = \Phi^3 \cdot [\frac{A}{\Phi} \sigma \equiv \sigma \cdot \Phi^3 \) where \( \sigma \equiv \left[ \begin{array}{c} \sigma \end{array} \right] \equiv \text{The Stress of Cave as the Quantized distance} \ r \rightarrow [\begin{array}{c} \sigma \end{array} \rightarrow \mathbf{O}]

and \( \Phi = \left( \frac{1+\sqrt{5}}{2} \right) \) is the mould of Quantization, a kind of Impedance as in Electricity, so from Material-Point frequency \( f = \frac{c}{2\pi} = 2.93949410^{42} \) \( H \), and \( \sigma = \frac{c}{\Phi} \). For the Planck length Stress \( \sigma = \frac{2\pi f}{(n)\Phi} = \frac{2\pi f}{1.0} \equiv \frac{2\pi 1.616199.10^{-35} 2.93349446^{42}}{1.6180339} = 1.84456315.10^{10} \) \( \text{t/m2} \)

\( = 1.84456315.10^{11} \) Kg/m2, and the Angular velocity, \( w \), of Total-Planck Cave is,

\[
|w| = \frac{\sigma}{2r} \left[ 1 + \sqrt{5} \right] = \frac{1.852616510^{11}}{2.1616199.10^{-35}} = 9.274599.10^{46}, \text{rad/sec then}
\]

**Stress Outside Plancks-Length-cave** \( \rightarrow \sigma_{pl} = 1.84456315.10^{11} \) Kg/m2, and \( G = \sigma \cdot \Phi^3 \equiv [1.84456315.10^{11}] \cdot [3.6160339887] = 6 \cdot 673692.10^{-11} \frac{m^3}{Ns^2} \), *Nevertheless*,

For Earth-System mass \( M_E = 5.9723.10^{24} \) Kg, and for Area \( \rightarrow \text{Radius} 6378,137 \) Km

\( = 6,378.10^6 \) m then Earth-constant \( k_E = \left( \frac{6.378.10^6}{5.9723.10^{24}} \right)^2 = 6.811551018.10^{-12} \) and Gravitational

Force \( G = g \cdot k_E \equiv g \cdot [g_L k_L] \equiv \left( \frac{T_p}{a^3} \right) \cdot [g_L k_L] = 9.80769.6.8115518.10^{-12} = 6.68056.10^{-11} \frac{m^3}{Ns^2} \)

Remarks:

a. The Stresses become from a Force and a Surface as equation \( \sigma = \frac{F}{A} \), and in the case of

Gravitational constant \( G \) and a cave, \( r \), then \( \rightarrow \sigma = \frac{G}{4 \pi r^2} = \frac{G}{\pi (2r)^2} = \frac{G}{\pi s^2} \), or vector \( s \).

Above relation means that Force \( G \) needs a Vector-surface \( \pi \cdot s^2 \) to be spread as Stress \( \sigma \)

Particle & Wave Duality Photon, and *Cosmic-Particles Origination*. 
which is the case of Constant-light-velocity $c$ as the first Surface.

b. The case of a vector $s$, is the Linear-Stress while of an Plane is the Surface-Stress and, consequently of a Volume is a Space-Stress, as this was referred before for G Force, i.e. $G = \sigma \Phi^3 = \Phi^2 \left( \{ \sigma \Phi \} = \frac{2B}{\mathbf{m}^2} \right) \equiv 2\pi r = w r = \Phi m a = m g = \mathbf{c} = \frac{2B}{\mathbf{m}^2}$

c. Since Stresses follow equation $\sigma = \frac{F}{A} = \frac{2\pi r}{\Phi}$, conclusively Forces and Areas are everywhere and are related to any-cave $r$ through $\mathbf{f}$, which is the mean of every-Information.

3d... The Origination of Light-velocity $c$ and Photon:

Figure – 7 - : The light-velocity-Mechanism in Material-Geometry and The Photons:

In (1). Is The Beyond-Planck's-length-Region where exists, The Gravitational-Constant $G$ which is the Force $G$. The Photon is Particle + Wave $\equiv$ Energy with light-velocity and its Duality is in frequency where $\mathbf{v} = \mathbf{c} \left[ \mathbf{f}_n + \mathbf{f}_n \right]$. The Material-Points with velocities $\mathbf{n} \cdot \mathbf{c}$, are as $\mathbf{v}_m = \mathbf{n} \cdot \mathbf{c} \left( \mathbf{f}_n + \mathbf{f}_n \right)$, where $\mathbf{f}_n$ is the Stationary-Storage and $\left[ \mathbf{f}_n \right]$ is the Propagating Electromagnetic-Radiation where $\mathbf{E} = \mathbf{B} \cdot c$.

In (2). Is the Planck’s-length-Region in-where Exist $\rightarrow$ The Photon Particle + Wave $\equiv$ Energy, with light-velocity and the Duality in frequency as $\mathbf{v} = \mathbf{c} \cdot \left[ \mathbf{f}_n + \mathbf{f}_n \right]$.

The Primary-Particles Fermions and Bosons, with their Spin $\mathbf{S}_F$ and according to their frequency $\mathbf{f}_F$ is their velocity $\rightarrow$ The Constant-Light-velocity $\mathbf{c} = \frac{G}{\Phi^2 \mathbf{L}_P}$ $\rightarrow$ The Hydrogen Cave $\mathbf{H}_e$ from $g \cdot r^3$. $\mathbf{f}_p^2 = 1 \rightarrow$ The Electron-Charge and Electron from $4\pi^2 \mathbf{f}_e^2 \cdot m_e = k = \pi g$ and from Kepler's relation $4\pi^2 \mathbf{f}_e^2 \cdot m_e = k$.

The Proof:

It was shown That $\rightarrow$ The Cycloidal-acceleration $g_{\text{cycloidal}}$ is transformed as Centrifugal acceleration and becomes the frequency of Photon as $\mathbf{f}_p = \frac{\mathbf{c} = \left[ \sigma \Phi \right]}{2\pi r} = \frac{\sigma \Phi}{2\pi r}$, and Stress $\sigma$ becoming from Space $\Theta$ to Anti-Space $\Theta$ as $\sigma = \frac{2\pi r}{\Phi} = \frac{w r}{\Phi} = \mathbf{v}$ .........(a)

It was proved that $\rightarrow$ Photon-Travels with velocity $\mathbf{v} \cdot \left[ \mathbf{f}_n + \mathbf{f}_n \right]$, which is a Moving Stationary-Wave $\equiv$ Storage $\rightarrow$ $\left[ \mathbf{v} \cdot \mathbf{f}_n \right] \leftarrow$ Plus a Propagating-Electromagnetic -Wave $\equiv$

Particle & Wave Duality Photon, and Cosmic-Particles Origination.
Storage \rightarrow [ \vec{v} \cdot \vec{n} ] \leftarrow \text{which is Material-Point i.e. From Photon} \rightarrow \{ \text{c} : \vec{f}_n + \text{c} \cdot \vec{n} \} \\

The Energy produced in \textbf{Photon - Cave} is consisted of Two-Storages, that are travelling, 
\textbf{as Particle} \quad \vec{f}_n \rightarrow [ \vec{v} = \text{c} = \lambda f] \rightarrow \text{[S = EM-R \equiv f_1 = n, f_2, f_3, f_D, f_n = w^2]} \quad \text{and,} \\
\textbf{as Wave} \quad f = (E^2 + H^2) = n \sigma (1 + \sqrt{\lambda}) \frac{4\pi}{2\pi} = \frac{\vec{b}}{\pi r^2} \rightarrow \text{[W = EM-R \equiv E^2 + \mu B^2 = 2\lambda c \sin 2\varphi]} \\
and as \textbf{Duality} An Energy-Storages \textbf{S} = \{ (\oplus \rightarrow \rightarrow \ominus) + \text{Motion M = [\vec{v} - \text{Vector}]} \}

It was shown also that \quad \text{Energy} = \text{motion} / T = (\frac{\nu}{2\pi r}). \quad \text{[\sigma + \varphi \Phi = \text{velocity} = \vec{v} \cdot [\frac{\sigma}{2\pi r} + \frac{\sigma \varphi}{2\pi r}]} \equiv \vec{v} \cdot [\vec{f}_n + \vec{f}_n], \text{consisted of the Two kinds of frequencies ...(b)}

From Force definition \textless A \textbf{ Force F is a Push or a Pull} acting upon an Object as a result of its interaction with another Object >> or \rightarrow \text{in Material-Geometry}

\textbf{Push} \rightarrow \text{[\oplus \rightarrow \text{Push} \rightarrow \ominus]} \quad \text{and} \quad [\oplus \rightarrow \text{Push} = \text{Force} \rightarrow \ominus] \equiv \text{Force} \quad \text{i.e. Both cases Push or Pull are Forces} \quad \text{.....(c)}

It was shown That \quad \text{Force F} \text{becomes a Velocity-Vector} \vec{v}, \text{as,} \\
\textbf{Force} = \textbf{Stress} \times \textbf{Area} \equiv \sigma \times A \quad \text{and from (1)} \rightarrow F = \sigma \cdot A = \frac{2\pi f}{\Phi} \cdot A = w r \cdot [\frac{A}{\Phi}] = \vec{v} \cdot [\frac{A}{\Phi}]

and Because by definition \textbf{Angular-velocity} w = 2\pi f \quad \text{and velocity} \quad v = w r \quad \text{i.e.}

\textbf{Stress}, \sigma, \text{enters in Monad-Space} \Phi \text{as [\sigma \Phi]} \text{and \textbf{frequency becomes} \quad f = \frac{\sigma \Phi}{2\pi r_n}}

and the Force \quad F = \sigma \cdot A = \frac{2\pi f}{\Phi} \cdot A = w r \cdot [\frac{A}{\Phi}] = \vec{v} \cdot [\frac{A}{\Phi}], \text{becomes the moving Storage} \frac{A}{\Phi}.

Newton’s gravitational constant G is a Force directly proportional to the product of any two masses m_1, m_2 in macrocosm and inversely proportional to the square of the distance between their centres, instead of the microcosms Coulomb’s law of, two charges q_1, q_2.

From Mechanics, For area \theta = \text{A} = \text{0}, \text{The Extreme case}, \text{where Surface is interchanged as line or as line-segment, and is the same as the infinite small, ds, in Calculus, where stresses \text{\sigma}_2 = \text{0} \quad \text{and \text{\tau}_{12} are very small, it is the equation of stresses \text{\sigma}_1, \text{\sigma}_2, or is \text{\sigma}_1 / 2 = \pm \text{(1/2)} \cdot \sqrt{\text{\sigma}_1^2 + 4 \cdot \text{\sigma}_1^2} = \text{\sigma}_1 \cdot [1 \pm (\sqrt{5})] / 2 = \text{\sigma} \cdot \Phi, and is the Golden-Ratio - Pattern of the Material-Point as type of a vanishing-shear due to layers laterally shifted.}

According to \textbf{Cauchy}, the stress \textbf{\sigma}, at any Point in an Object assumed as continuum and loaded by an external Force, \textbf{F}, is defined by nine stress components as a second order Tensor, the Cauchy-Stress-Tensor and Force for the One Dimension extreme-case \textbf{F} = \textbf{\sigma} \cdot \Phi, while for the three –Dimension extreme-cases \textbf{F} = \textbf{\sigma} \cdot \Phi^3, and represents the \textbf{Equal Apportion} of the External-Force to the Internal-Forces.

According to Material-Geometry Distance \equiv \{ (\oplus \rightarrow \text{r} \rightarrow \ominus) \}, and Stress \equiv \Phi \cdot \{ \oplus \sigma \ominus \}

and for the three-Dimension extreme-cases \Phi^3, \{ \oplus \sigma \ominus \} \text{is Force} \quad \text{F} = \Phi^3 \cdot \{ \oplus \sigma \ominus \} \\
i.e. \textbf{Forces Beyond-Planck-Length are} \quad \rightarrow \text{F} = \Phi^3 \cdot \{ \oplus \sigma \ominus \} = \text{\sigma} \times \Phi^3 \quad \rightarrow \text{... (d)}

Force \textbf{G} \rightarrow \text{on Spinning M-Points} \textbf{S} \text{through} \quad \textbf{g} \rightarrow \text{on Planck’s} - \textbf{B} \rightarrow \text{on} \textbf{g}_G, \text{through} \textbf{f}_R.

\text{Particle & Wave Duality Photon, and Cosmic-Particles Origination.}
\[ G = \sigma \Phi^3, \text{ and } \sigma = G_{\Phi^3} = \frac{G_{\sigma^3}}{e^3}, \text{ or } \sigma^G = e^3(e), \text{ where } \sigma \text{ is a Stress between frequencies.} \]

From Force-relation \( F = \sigma A = (2\pi f) \frac{A}{\Phi} = \text{wr} \frac{A}{\Phi} = \vec{v} \Phi \frac{A}{\Phi}, \) is seen also for G become velocity \( \vec{v} \). In the case of Planck’s length velocity \( c = \frac{w}{r} = \frac{\Phi}{r} r_p = \sigma x \Phi = \frac{G_{L_p}}{r_{\Phi^2}} |\Phi| = \frac{G_{L_p}}{r_{\Phi^2}} \) and from relation \( G \equiv \sigma \times \Phi^3 \text{ then } \] in which is the Light-velocity vector.

Since \( r \), becomes from the Beyond-Planck’s-Region then → \( \vec{v} = \frac{F \Phi}{A} = \left[ \frac{G \Phi}{A} \right] \) ....(f)

Equation (f) may be written as Force \( G = \vec{v} \frac{A}{\Phi}, \) which is a Viscous-Damping-Force

where \( \frac{A}{\Phi} \) is a constant of Proportionality and the equation of motion as \( F_G = \left[ \frac{A}{\Phi} \right] . \dot{x} \)

Force \( G \) is applied in all Quantized-Universe \( A \) as Velocity \( \vec{c} \) and as Stress \( \sigma \) on Spaces Anti-spaces as Spaces-relation \( L_p = e^{i\left(\frac{\pi}{2}+2k\pi\right)b} \), where from Material-Geometry [24-58],

Space \( \equiv 1 \) and Anti-Space \( \equiv \sqrt{1} = +1, -1 \), and \( \sqrt{\sqrt{1}} = i = \text{The Imaginary Part into the} \)

Anti-Space + Space ≡ motion ≡ i \( \equiv \sqrt{1} \equiv \sqrt{\sqrt{1}} \equiv e^{-i(\frac{\pi}{2})b} = 0.707106781 \) b.

The Base \( b \), which for Natural logarithms issues \( \ll \) The Natural logarithm \( \ln(x) \) of a Magnitude \( x \), is the Power to which , \( e \), would have to be raised to equal \( x \) and Defining that → \( \ln(x) \) is the Period-needed to Grow \( x \), as this is in Integration \( \int x \).

\( e^x \) is the Amount of Growth after Period \( x \) and the Possible-Repetitive-Permutations for moulds and elements which is Mould Elements = The -Growth-Periods i.e.

when Mould = Elements then is succeeded maximum and for \( e \) is \( e^x \), and any \( \log_x x \).

For \( \log_{10} x \) and Base \( x = 10 \) then \( \log_{10} 10 = 1 \times 10^0 \) and for the two elements \( [\Theta, \Theta] \) is \( 10^{[10]^2} = 10^{20} \) Positions ≡ Distances ≡ r and since \( 10^{-x} = \frac{1}{10^x} \) then \( b = 10^{-20} \), and Anti-Space + Space-Positions are , 0.707106781.10^{-20} = 1, 0707106781.10^{-19}.

In this Way The Non-Dimensional-number \( \{ 0.707106781*10^{-1} = 0, 0707106781 \} \), Is Quantized in cave \( r \), as distance and Becomes The-Dimensional-Space in the Decimal - System \( b = 10 \) as cave \( r \), and which cave is \( r = 1, 0707106781 \) or , \( r = 1, 0707106781 \) m, having Unit-Area \( \pi r^2 \approx 3.601588 \) m2, and the QUA-Universe is \( A = 3.601588 \times 10^{-19} \) m2/s, which are The Space + Anti-Space Positions in Universe ... (i)

From (h) , light-velocity \( \vec{v} = \frac{G \Phi}{A} = 6.673692.10^{-11}1,6180339987 \approx 2.99819938 \times 10^8 \) m/s.

i.e. Force \( G \equiv \text{motion} \), is Quantized → is Spread in \{ Space and Anti-Space \}

or ≡ QUA ≡ [is The Quantized-Units-In-Area of Space and Anti-space],

and as mould \( \Phi \) exists in the Impedance \( b \).

Impedance in Mechanics is the Friction Coefficient , where for Force G be Proportional to the Light-velocity \( c = \vec{v} \), then the Harmonic – Oscillation is an Damped-Oscillator , and Can-Oscillate due to the excitation as .

a.. with a frequency lower than in the Undamped case and an Amplitude Decreasing with time ,the Under-Damped-Oscillator which Originates the Quantum of motion which is a limiting case between the oscillatory and Non-Oscillatory motion the

Particle & Wave Duality Photon , and Cosmic-Particles Origination.

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Volume-6 | Issue-10 | Oct, 2020

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33
Critical Damping , and which Originates the Light-velocity \( \hat{c} \), [49]

b. with Undamped case frequency and Decay to the Equilibrium-Position without oscillation and The Over-Damped-Oscillator Originating the \( n \)-times-\( c \).

What is Quantization of motion and Impedance is analytically referred in [83]

A Parallel solution becomes also from the attendant logic ,

The Three Elements \( \equiv \) Digits of Material-Geometry are \( \rightarrow \{ \oplus , \bigoplus \leftrightarrow \bigotimes , \bigotimes \} \equiv [+, 0, -] \rightarrow \)

The Permutation, arrangement of the Two-Elements \( P_1^2 = 2 \), i.e. are \( \rightarrow \{ \oplus , \bigotimes \} \cdot \{ \bigotimes , \oplus \} \rightarrow \)

The Three-Elements in Space need \( P_3^1 = 3 \cdot (3-1) \cdot (3-2) = 6 \) Positions and the same for Three-Elements in Anti-Space need \( P_3^1 = 3 \cdot (3-1) \cdot (3-2) = 6 \) Positions, and Total Places \( \rightarrow P_3^3 = 6 \times 6 = 36 \) Positions for Spaces and Anti-Spaces as Impedance , and as before for \( \log_{10} x \) and Base \( x = 10 \) then \( \log_{10} 10 = 10^0 \) and for the two elements \( \{ \oplus , \bigotimes \} \) the Growth is \( 10^{10^2} = 10^{20} \) Positions \( \equiv \) Distances \( \equiv r \), and since issues \( 10^{-\infty} = \frac{1}{10^x} \) then \( b = 36.10^{-20} \), and \( \rightarrow \vec{v} = \frac{F \Phi}{A} = \left[ \frac{G \Phi}{A} \right] = \left[ \frac{6.673692 \cdot 10^{-11} \cdot 1.6180339887}{36.10^{-20}} \right] = 2.9995163 \cdot 10^8 \) m/s

i.e. Ubiquity of Material-Geometry in Electromagnetism is Everywhere. 22/3/2020

4d... The Origination of Gravity \( g \), from velocity \( c \) :

A... The Gravity-System, is an Infinite of \( \pm \) Equilibrium-Rotating vectors \( \vec{r} \), where for Stability \( \uparrow \vec{r} \downarrow \vec{r} = 0 \), and which Gravity-System interacts with Hydrogen-Cave-Systems.

The condition for Irrotational Energy is \( \rightarrow \nabla \times \vec{B} = \nabla \times \vec{S} = 0 \), or \( \nabla \times \vec{B} = \nabla \times \vec{r} + 2 \pi m \vec{f} = 0 \), and \( \vec{r} = \pm 2 \pi m \vec{f} \). Vector \( \vec{r} \), occupies Both directions for Rotational-equilibrium, i.e.

The vector \( \vec{r} = \pm \vec{B} \equiv \vec{S}_\pi = 2 \pi m \vec{f} \), and \( f_n = \frac{B}{2 \pi m e} = \frac{E}{h} \), is the Stationary-Filling-Ocean of the Spinning-Gravity-Material Point, in the called Empty-Space, with frequency that of Material-Point \( f_n = n. f_1 = \frac{E}{h} = \frac{n. v}{2 \pi r} = \frac{n. 2 \pi r}{4 \pi r} = [1+\sqrt{5}] \), and from \( v = \pi r = 2 \pi f \) then , \( f_n = \pi r / 2 \pi r = \frac{[1+\sqrt{5}] \sigma}{4 \pi r} = \frac{\sigma. \Phi}{2 \pi r_n} \), and \( \vec{v} = \sigma. \Phi \cdot (a) \), and \( \pm \) Spin \( \vec{S}_G = \vec{B} = J = \pi \cdot r^4 \), \( f_n = g \)

i.e. Gravitational-Constant Force \( \equiv G \), is Spread-over a minimum - Surface, the Layer or Conductor or, a Surface, or The-Permissible-Path, in-where exists Reaction as mass

From the Energy-force \( F_g \) in any cave, \( r = L_p \) of Planck’s scale of any reaction to a a change of motion and which is mass the \( m_g = J. w^2 \) and in Electricity is Impedance, where angular-velocity \( w = \frac{c}{r} \) and in the 3-Dimensional Space of the Two Elements \( [2^3 = ( \oplus \leftrightarrow \bigotimes \bigotimes )^3] \), The Impedance, \( g_z \), of the 3D-Space is \( \rightarrow \text{ln}(3) \) and of Anti-Space is \( \rightarrow \pi \sqrt{3} \) and this because consist the moulds of Growth [45]. From above ,

→ The Light velocity vector \( \vec{v} = \hat{c} \) is Acting on cave , \( r = L_p \), and finding Impedance , \( m_g \), becomes the Centrifugal-Force \( F_g \) of Cave and is Equal to Gravity \( g \) \( \leftarrow \)

\( F_g = m_g \left[ \frac{c^2}{r} \right] = J. w^2 \cdot \frac{c^2}{r} \cdot g_z = [\frac{\pi r^3}{2}]. \left[ c^2 \right] \cdot \left[ \frac{c^3}{r} \right] \cdot [2^3 \cdot \text{ln}(3) \cdot \pi \sqrt{3}] = 4 \sqrt{3} \cdot \text{ln}(3) \cdot \pi^2 \cdot L_p \cdot c^4 \) \( \leftarrow \)

Is a Force between The Spinning \( S_{pg} = \vec{B} \)

and \( F_g = \vec{g} = 4 \sqrt{3} \cdot \text{ln}(3) \cdot \pi^2 L_p c^4 \)

Particle & Wave Duality Photon, and Cosmic-Particles Origination.
Gravity $\vec{g}$, is The effection of $G$ force, on $\vec{c}$, light-velocity in the 3-Dimensional Space and Anti-Space, $2^3$, which is the Planck-length $L_P = r$.

Velocity-vector $\vec{v} \equiv \vec{c} = \frac{G}{A}$ and Gravity-vector $\vec{g} \equiv 4\sqrt{3} \ln(3) \cdot \pi^2 L_P c^4$ are both Constants because \{ $G$, $\Phi$, $A \equiv b$. Impedance\} are all constants.

From Inner-velocity equation $v = w r = (2\pi/T).r = 2\pi.f_1 \cdot r$, wavelength $\lambda = c T / f_1$ case $r = n.(\lambda/2)$, then $r = n.(c/2f_1)$ and $v = 2\pi.f_1 [n.c/2f_1] = n.\pi.c$ or $v = n.\pi.c$...

Showing that velocities in lobes are, $n.\pi$, times of that and for $n = 1$ then $v = \pi.c$ more than three times faster of light velocity, and is the Velocity-Quantization.

From velocity $v = n.\pi.c$, is seen that light-velocity is the Quantum of Unit-velocity in $L_P$.

From above In-Planck’s-length velocity $\vec{c} = w \cdot r = \frac{\sigma \Phi}{r_n} = \sigma \cdot \Phi = \frac{G \cdot r}{L_P \cdot \Phi^3}$ and

$G \equiv \sigma \cdot \Phi^3$ then $\{ \vec{c} = \frac{G \cdot r}{\Phi^3 \cdot L_P} \}$ ← which is Light-velocity in $L_P$.

For the Out-Planck’s-length velocity equation $\vec{v}_m = n.\vec{c} \cdot \{ f_n + f_n \}$ and from equation

$\vec{v}_m = w r = n.\pi.c \cdot f = \left( \frac{n.c}{2r} \right)$, then $\vec{v}_m = n.\vec{c} \cdot \{ f_n + f_n \}$ ← which is velocity-Out $L_P$.

Photon was proved to be a Material-point in cave, $r$, where its Inner Storage is the Stationary-Standing-wave the Electromagnetic-Wave $|E^2 + H^2| = 2(2r).c.\sin 2\phi$ with $n$ Lobes representing the Normal mode vibration with frequencies $f_n = n . \frac{c}{h} = \frac{n.\pi.c}{4r} = \frac{n.\pi.c}{2\pi r}$, and Outward the Storage is the Propagating Electromagnetic-Wave $\rightarrow ([E^2 + \mu B^2] = 2.\lambda c.\sin 2\phi)$ ← where Particle $2r = n \lambda$, Cave $r$, is the Electromagnetic - Energy - Storage, and Electromagnetic-Radiation $E$, $B$, is the Wave Conveyer of Cave, $r$, with frequency $f = Energy E / Planck$-constant $h$, or $f = E / h$. (Figure - 6), i.e.

Gravity $\vec{g}$, is The effection of $G$ Force, on $\vec{c}$ light-velocity, in the 3-Dimensional Space and Anti-Space, $2^3$, of Planck-length $L_P = r$. For more analysis in [90]

from relation $\sigma \cdot \Phi^3 \equiv G \rightarrow [1,845632.10^{11}],[3,6180339887] = 6,673692.10^{-11}$ q.e.d.

**Figure – 8** - : The Two Points Problem Stability of Equilibrium with One or Two Planets. Electron is created through the vibration, $f_n$, in the Energy-Space, $g = \pi$. meters. Electron cave is the minimum cave of light-velocity $c$ to enter and possessing max Energy of $L_P$ which is $h$.

**5d.. The Origination of Electron $e$, and $e$ - Charge :**

Particle & Wave Duality Photon, and Cosmic-Particles Origination.
Electron is created through the vibration, \( f_n \), in the **Energy-Space**, \( g - \pi, \text{meters} \) and follows both Rotational and Linear motion and so the **Constant-Energy** \( k \) is the same. From M-Point, frequency \( \rightarrow f_N = n \frac{(1+\sqrt{5})\pi}{4\pi r} \), and \( \rightarrow w = 2\pi f_N = n \frac{(1+\sqrt{5})\pi}{2r} \) The **Spring-like central-force** from a fix point, *the Source*, on an attached, *probe*, mass is \( \rightarrow F = -k r = -k r \) as equation \( x + w^2 x = 0 \ldots (1a) \) with a general solution \( x = A \sin \omega t + B \cos \omega t \), where \( A, B \) are constants and evaluated from the initial conditions and which become \( x = [\dot{x}(0)/\omega_n] \sin \omega_n t + x(0). \cos \omega_n t \) ........(1)

The Natural-frequency in Planck’s length for the **Primary-Particle** occupying the less **Negative-frequency**, is the **Electron** and is as equation (1) with solution,

\[
\frac{\omega_n}{2\pi} = f_e = \frac{1}{2 \pi} \sqrt{\frac{k}{m}}, \text{ or } 4 \pi^2 f_e^2. m_e = k = \pi g \text{ and } \rightarrow m_e = \frac{g}{4\pi f_e^2} ....(2)
\]

where \( k = \text{Unit-Spring-Force} = \text{[meter of area]*[meter of force]} = \pi g \) ....(2a)

From Planck’s equation \( f_e = E / h = [ - 13.6 \times 1.602.10^{-19} = 2.17872.10^{-18} \text{ Joule} ] / [ 6.626.10^{-34} \text{ J.s }] = 3, 2881029.10^{15} / \text{s} \), where min-energy -13.6 eV is Hydrogen-atom

Substituting all the **minimum-meters** of Planck’s scale then, **Electron mass** is,

\[
m_e = \frac{g}{4\pi f_e^2} = \frac{9.8076754}{4\pi(3.288110^{15})^2} = -7, 219016. 10^{-32} \text{ kg} \text{ .........(2b)}
\]

\[
f_e = 3, 2881029.10^{15} / \text{s}, \text{ and } L_e = 1, 6819781.10^{-17} \text{ m} \text{ .........(2c)}
\]

Equations become from relation \( \rightarrow 4\pi. f_e^2. m_e = g \) \( \rightarrow \text{In Planck’s length} \)

**Electron - Charge**, becomes from the **Periodic excitation** of the motion of the, \( \Theta \), constituent to the \( \Theta \) constituent, *Tack-Geometry*, **Not** in loop (\( \Theta \rightleftharpoons \Theta \)), But through the **One way**-N-**Electric-Paths** [\( \Theta \rightleftharpoons \Theta \)], which formulate the **Electric Field-Pattern**, following charge-equation \( \rightarrow \vec{q} = \frac{m_e c^2}{2} = \frac{g c^2}{8\pi f_e^2} \). From Gravitation \( \vec{G} = k_e \cdot g \), and Voltage \( \vec{V} \equiv \vec{V}_p \equiv \frac{c \vec{q}}{h} \), Spin = \( B / \pi \), where Electrons-equation of motion into \( \Theta \rightleftharpoons \Theta \) is \( \vec{r} + w^2 \vec{r} = 0 \) and equation’s Solution \( \rightarrow 4\pi. f_e^2. m_e = g \) \( \rightarrow \text{Electron} \), and ** Charges**, \( \vec{q} \).

**Electron Charge** \( \vec{q} \) *Becomes* from Magnetic Field \( \vec{M} \) which creates the Electric - Field \( \vec{E} \), which is acting on Charge \( \vec{q} \), and the acting Force per second creates Work which is conserved and coincide with the Planck’s constant \( h \). This is because \( \vec{h} \rightarrow J = N m s = \text{Power} \), where from, *Energy* = *Power* x *Time*, issues the Beyond Planck’s length \( \vec{L}_p \), & Voltage \( \vec{V} \) as \( \rightarrow \vec{q} \equiv \frac{K_e}{\vec{V}_p} = \frac{m_e c^2}{2} = \frac{g c^2}{8\pi f_e^2} \) and \( \vec{V} \equiv \vec{V}_p \equiv \frac{c \cdot \text{Charge}_{\text{Total-Energy}} = \frac{c \vec{q}}{h} \) ....(3)

Using the two Energy-equations for **Plane-motion** \( \rightarrow f_n = \frac{1}{2\pi \sqrt{m}} \) and **Orbital-motion**

\[
a = \sqrt{\frac{2E}{K f_e^2}}, \text{ for Unit-Energy-Space-frequency } k = g, a = \pi, \text{ then } \rightarrow g.f^2. \pi^3 = 1 \) ....(4)

Frequency \( f_n = \frac{1}{2\pi \sqrt{\frac{2E}{K f_e^2}}} = \frac{1}{2\pi \sqrt{9.808238 \pi^2}} = 1.8133418.10^{-3} \) , i.e. The **Unit-Charge-Cave** \( \vec{q} \) into Hydrogen cave \( [a = 1.82043047.10^{-12}m,] [1.813342.10^{-3}/s] = 3,3010625.10^{-15} \text{ C} \)

From equations Charge and Voltage is the **Self - Growing** Property of frequency \( f_n \) in **Particle & Wave Duality Photon**, and **Cosmic-Particles Origination**.
Material-point, therefore and for Hydrogen-cave is equal to → \( \tilde{\Phi} \).

**Because Gravitational Force** is equal to → the Geometric-Resultant of light-velocity \( \mathbf{c} \), acting on **Electron-Unit-Charge** \( \mathbf{\tilde{q}} \) ← or, \( G = \mathbf{c} \sqrt{2} \mathbf{\tilde{q}} \), then Electron-Charge is

\[
\mathbf{\tilde{q}}_{\text{Electron}} = \frac{G}{c \sqrt{2}} = \frac{6,673,692.10^{-11}}{1,41429,2,9979346.10^{8}} = 1,574.10^{-19} \text{ C}.
\]

For **Photon** issues of Gravitation in Planck’s-cave → \( G = f_n \sqrt{2} \cdot \mathbf{\tilde{q}} \) and for Photon is,

\[
\mathbf{\tilde{q}}_{\text{Photon}} = \frac{G}{\sqrt{2} f} = \frac{G_{\text{m}}}{\sqrt{2} E} = \frac{[6,673,692.10^{-11}][6,626,069,7,10^{-34}]}{\sqrt{2} E=1} = 3,127 \ 10^{-44} \text{ C}.
\]

6d... The Origination of Hydrogen - Cave \( \mathbf{H} \), \( \mathbf{e} \):

The Light velocity vector \( \mathbf{\bar{v}} = \mathbf{\bar{c}} \) is Acting on cave, \( \mathbf{r} = \mathbf{L_P} \), and finding Impedance which is the mass \( m_g \), becomes the Centrifugal-Force \( F_g \) of Cave and is Equal to Gravity \( g \), while the **Light velocity vector** \( \mathbf{\bar{v}} \neq \mathbf{\bar{c}} \) Acting on an-cave, \( \mathbf{r} \neq \mathbf{L_P} \), finds The-Impedance \( Z_c \), of the Vector \( \mathbf{c} \), and becomes the Angular-Momentum-Vector B, of the minimum – Energy Cave in \( \mathbf{L_P} \), which is equal to \( \mathbf{B} = \mathbf{E} = \mathbf{r} Z_c \mathbf{c} \) ......(1) where, \( \mathbf{E} = \) The Planck’s Total-Energy \( E_p = h = 6,626,069,7,10^{-34} \text{ J} \cdot \text{s} \), \( r \) = The min-Energy Cave of Hydrogen \( Z_c = \) The Total Impedance in Universe, **of Space + Anti-Space**, from velocity motion and \( \mathbf{c} \) is The-light-velocity in m/s. Equation (1) becomes → \( r Z_c c = h \) ← ......(1a)

The **Three Elements ≡ Digits** of Material-Geometry are \[ \{ \oplus, \{ \oplus \leftrightarrow \ominus \}, \ominus \} \equiv [+ , 0 , -] \] and as before for log\( x \) \( x \) and Base \( x = 10 \) then \( \log_{10} 10 \ = 10^{0} \) is the Growth, **Impedance is the Anti-Growth or Anti-logarithms** \( 10^{-10} \) of their \( g \)-Position so Antilog \( 10^{-10} \) = 0,10460975 For the three dimensions Total-Impedance \( Z_c = 0,10460975.(10^{-10})^3 = 1,04609710^{-31} \) and

\[
\mathbf{r}_H = \frac{h}{c Z_c} = \frac{[6,626,069,7,10^{-34}]}{2,99798.10^{8}.10460975.10^{-31}} = 2,1127839.10^{-11} \text{ m}, \text{ and is the Hydrogen cave i.e.}
\]

\[
\mathbf{L_H} = \mathbf{r} = \frac{h}{c Z_c} = 2,1127839.10^{-11} \text{ m is the min-cave in Planck’s-cave with max-Energy h}.
\]

**From Kepler third law**, Closed-Space-Energy equation of Newton’s Laws of motion the

Constant \( k = v^2 \). \( r = (w \ r)^2 = r \left[ \frac{2\pi}{T} \right]^2 = \frac{4\pi^2 \ r^3}{T^2} \). \( r = \frac{4\pi^2 \ r^3}{T^2} \), \( \mathbf{r} = \frac{4\pi^2 \ r^3}{T^2} = 4\pi^2 \ r^3 \) \( f_p \) ......(k)

Because \( (k) \) is constant, \( r^3. \ f_p^2 \), is also a Constant multiplication of cave, \( r \), and the frequency \( f \) is also .The **Work ≡ motion**, which is conserved in cave \( r \) as the \( n \) frequencies

\[
f_N = n \left( \frac{1^{+\sqrt{5}}}{4\pi r} \right) = \frac{2 \mathbf{B}}{\pi r^2}, \text{ and for the Damping-cave → } \mathbf{r}(t) = (t + w) \leftarrow \text{ as Planck’s scale is with min-Damping = 1, and Unit-Energy-Quantity } \mathbf{W_u} \text{, ( the critical-energy-unit in the min, r ) to be the Unit-Stress-Gravity } \mathbf{g} \text{, as } \mathbf{k} = \mathbf{E} = \frac{T^2}{a^3} = \mathbf{g} = \frac{1}{\mathbf{f}_p^2 \cdot \mathbf{a}^3} \text{ and for } a = r \text{ then } \mathbf{g} \cdot r^3. \ f_p^2 = 1, \text{ which is the Kepler second constant-Unit-law for areas } \text{ i.e. } \mathbf{Stress} \ \mathbf{g} \text{, when is entering into the minimum cave, a, of a minimum Surface, then from the Period of Rotation } T, \text{ on the Perimeter, is created in Surface the minimum}
\]

Particle & Wave Duality Photon, and **Cosmic-Particles Origionation**.
**Quantity of Energy-cave and is that of Hydrogen-Atom**, where issues,

\[ g f^2 \equiv \text{The Energy-Part} \]

embodied with stress, g, and

\[ \text{cave} a^3 \equiv \text{The Space-Part}, \text{in the} \ 3\text{-DOF space, as Period and Frequency,} \]

\[ T^2 = g a^3 = 9, 8076925 \]

[2,1127839.10^{-11}] \]

\[ T^3 = 9, 2497939.10^{-32} \text{ s, and Period} \]

\[ T = 3,013473.10^{-16} \text{ s, or frequency} \]

\[ f \equiv 3,3184302.10^{15} / \text{s} = 3,3184302.10^{15} \text{H} \]

From equation \[ E = h f = 6.62607.10^{-34} \cdot 3,3184302.10^{15} = 2,175999.10^{-18} \text{J/(1,6.10^{-19})} \]

\[ = 13, 599999 \text{ eV a Quantized Energy corresponding to Hydrogen-Atom-cave.} \]

Above Quantity is the Quantum-Energy in the minimum cave \[ a_H \] of \[ L_p \].

It was shown that in **Conservative Systems** of Central-Force, the Total energy \[ E \] is conserved and at Periapsis, Energy \[ E = \frac{GMm}{2a^2} \]

and for \[ e = 0 \], a circle, then → \[ E = \frac{GMm^3}{2L^2} \], i.e. energy is always Negative. From Hydrogen cave issues \[ k = E = \frac{T^2}{a^3} = g = \frac{4\pi^2a}{GM} \] therefore, \[ GM = \frac{4\pi^2a}{g} \] and from

\[ \text{Total-energy} \] \[ E = - \frac{GMm}{2a^2} \], Rotational-Momentum \[ L = \sqrt{(1 - e^2)} \cdot GMm^2.a \]

the eccentricity \[ e = 0 \], \[ G = \frac{2aE}{a} \]

and then → \[ L^2 = GMm^2.a = 2aE[a]m = -2a^2Em \].

i.e. \[ \text{Equation} \] \[ L^2 = -2a^2Em \], Denotes that Angular-Momentum \[ L \equiv B \] in the Circular Orbit Rims is always Negative and equal to \[ L = -a\sqrt{2Em} \], while \[ E = -L^2/2ma^2 \].

The lightest and the less-Energy -\[ Z_c \] = mass Particle of this universe, is the **Hydrogen** with the maximum Quantized Energy of 13.6 eV. In-Spaces or Volumes with the maximum energy is formulated the, Hydrogen - cave, by oscillating under the action of the Inherent forces in M-Points and which are the **Instruments** that, **Golden–Ratio–frequency** uses to **Kick-Start** everything In this world. Both motions, the **Periodic and Rotational**, exist as the Mean between the Two Primary - Opposite in **PNS** = **Primary-Neutral-Space**. This Mean is the Ocean of the, **Two kinds of Spins** created from the inner motion in Material-Points both Oriented by the acceleration \[ g \], created from the Rotational-motion and which \[ g \], continually effects on Spins through which force \[ G \], Flows to all Energy Structures wherever these are.

The **Strong-force** in Nucleus is as, \[ F_{\text{nuclues}} = h \cdot f_n = h \cdot n \cdot \frac{1 + \sqrt{5}}{4\pi} \cdot \frac{4\pi}{\pi^2} \equiv h \cdot \frac{\frac{6}{\pi^2} + \frac{4}{\pi^2}}{2\pi} \equiv \frac{10}{9} \cdot \frac{\pi^2}{\pi^2} \equiv \frac{10}{9} \cdot \frac{\pi^2}{\pi^2} \]

From \[ r_{\text{min}} = 1.07.10^{-7} \text{ m and} \]

\[ f^2 = \frac{1}{r^2} \text{ or} \]

\[ f_{\text{min}}=2.839844.10^{10} \text{H} \]

then Bonding Energy \[ L = h f_N = 6.62607.10^{-34} \], 2.8398447.10^{10} \text{ J} / 1,6.10^{-19} = 1, 176063.10^{-6} \text{ eV} \]

\[ E = -L^2/2a^2m \]

and for \[ a = r \to a^2 = L^2/2Em \]

\[ \frac{\frac{1176063.10^{-6}}{2(13.6.10^{-18})}}{5,08501.10^{-4}} = 5,018918.10^{-8} \text{ m} \]

the Brackets \[ \equiv \{ \text{Proton-Electron-Hook} \} \equiv \{ \text{Electric-Field–Loops} \} \to \text{H-Atom-Radius} \].

**E.. : THE ORIGIN OF SPIN AND ENERGY IN LOOPS :**

It is an Application to Material-Points, \[ \equiv \{ \oplus \leftrightarrow \oplus \} \]

by considering the Positive-constituent with angular velocity \[ \vec{\omega} = \vec{\nu} / r = \frac{\alpha}{2r} \]

[1+ \sqrt{5}] ...(1) [70] and for an angle 45° from \[ , x \],axis,

30

Particle & Wave Duality Photon , and **Cosmic-Particles Origination**.
where then the Ellipsoid of Angular-velocity is perpendicular to the Plane of motion.

Moment of Inertia to , z , axis is that of Sphere equal to \( J_3 = \frac{\pi r^4}{2} \) which is the same in all Principal axes, and exists , \( J = J_1 = J_2 = J_3 = \frac{\pi r^4}{2} \), therefore Angular-Kinetic–Energy \( \equiv \) Angular-velocity-Ellipsoid and then becomes , \( J_1 w_1^2 + J_2 w_2^2 + J_3 w_3^2 = 2E \) .......(2)

The Energy-Ellipsoid as \( \overline{B} \equiv \text{Spin} \) is \( \rightarrow \ w_1^2 + w_2^2 + w_3^2 = \frac{2E}{J} \) = \( \frac{4E}{(\pi r^4)^{\frac{1}{2}}} \) = \( \frac{B^2}{J} \).

**Angular-momentum \( \equiv \text{Spin} \equiv \overline{B} \equiv \frac{\pi r^4 (1+\sqrt{5})}{4} \) .......(3) In Figure -6- and for the center , K , of \( \Theta \) sphere , issues \( \overline{v}_K = [ \overline{w}, \overline{r}_K] = [\frac{\sigma(1+\sqrt{5})}{2r} \sigma \{1+\sqrt{5}\} \) and for \( m = 1 \) then \( \overline{B} = [r \sigma \sigma \{1+\sqrt{5}\} \). The Interchangeable Ellipsoids of Angular velocity [70-P49] , and Momentum for the same Moment of Inertia \( J_1 = J_2 = J_3 = J_0 \), and Angular Velocity \( w_1 = w_2 = w_3 = w \), the Momentum \( B_1 = B_2 = B_3 = B \) becomes \( 3Jw = C \) and \( 3B^2/J = C \) and since for circle \( J = \frac{\pi r^4}{2} \) then \( \frac{3\pi^2 r^2 w^2}{2} = C = \frac{(3\pi^4)}{2} \) w^2 = \( \frac{(3\pi^2)}{2} (rw)^2 = \frac{(3\pi^2)}{2} [\sigma \{1+\sqrt{5}\}]^2 = 3\pi^2 [\sigma \{1+\sqrt{5}\}] \rightarrow \text{The Ellipsoid of Angular-velocity} \overline{w} , \) and \( 3B^2/J = \frac{3\pi^2 (rw)^2}{2} = \frac{3\pi^2 (rw)^2}{2} \rightarrow \text{The Momentum-Ellipsoid} \overline{B} \).

**The Angular-momentum In Planck’s-Length \( \equiv \text{Spin} \equiv |\overline{B}| \equiv \pi^2 r^4 f \) .......(3) \)

The value of \( |\overline{B}| = [2.8,79455.10^{-35}] \cdot 1, 6180339] = 2,845976.10^{-34} \) [Kg/m/s]. For Planck-Length \( r_p = 1,61623.10^{-35} \sqrt[3]{\pi} = 8,79455.10^{-35} \) m , velocity \( |\overline{v}| = \overline{v} = \sigma \{1+\sqrt{5}\} \) and from (3) then \( \rightarrow \text{Planck-cave-Stress} \ \sigma = \frac{B}{\pi r^4 \Phi} = 1 \), Total-Energy \( 2E = [J w]^2 \), From \( |\overline{v}| = \frac{\sigma}{r} \{1+\sqrt{5}\} = c = 3.10^8 \) m/s then , \( \sigma = \frac{3.10^8}{3.679551.10^{34}} = 8,147732.10^{-27} \) Kg/m² \( |w| = \frac{\sigma}{2r} \{1+\sqrt{5}\} = \frac{8,147732.10^{-27}}{2,8,794551.10^{-35}} \cdot 3,2360675 = 1,499.10^8 \) , or \( |w| = 1,5.10^8 \) rad / sec , For \( \sigma = 8,147732.10^{-27} \) Kg/m² and \( \overline{B} = 5,691952.10^{-34} \) then , Period \( T = \frac{2\pi}{w} = \frac{2\pi r^4}{\sigma \{1+\sqrt{5}\}} = \frac{4\pi^4 r^4 8,794551.10^{-35}}{\sigma \{1+\sqrt{5}\}} = \frac{3,43151}{\sigma} 10^{-34} \) s , or Period \( T = \frac{4,191584}{10^9} \) s , and frequency \( f = \frac{1}{T} \)

i.e. **Planck-frequency** \( f_1 = 2,38573294.10^{34} \) Hz . From above issues , a). The Spin of cave , r , is Equal to the Angular-momentum-Vector \( \rightarrow \text{Spin} \equiv |\overline{B}| \equiv \pi r^4 \Phi \) which contains and is the Golden-Radio-frequency \( \Phi \) as Pressure , \( \sigma \), in cave \( r \).

b). In Planck’s-length [ for light velocity \( c = 3.10^8 \) m/s ] , velocity \( \overline{v} = \frac{\sigma}{r} \{1+\sqrt{5}\} \) m/s and in cave \( r_p = 8,79410^{-35} \) m , the Pressure \( \sigma = \frac{r_p c}{\sigma \{1+\sqrt{5}\}} = 8,147732.10^{-27} \) Kg/m².

c). In Planck’s-length the Period of Oscillation is \( T = \frac{r_p c}{\sigma \{1+\sqrt{5}\}} = 4,192.10^{-8} \) s , and

Frequency \( f_p = \frac{1}{T} = \frac{\sigma \{1+\sqrt{5}\}}{4\pi r^4} = 2,3857265.10^{7} \) Hz , which is the minimum in Planck-cave .

The extreme for stresses \( \sigma_1, \sigma_2 = \sigma_1 \pm \sigma_2 \) (\( \pm \sigma_2 \)) , \( \sqrt{\sigma_1^2 + 4, \sigma_1^2} = \sigma_1 \cdot [1 \pm (\sqrt{5})] / 2 = \sigma \Phi \),

velocity \( \nu = (\nu - \frac{2\pi r}{T}) = (\frac{\sigma}{r \{1+\sqrt{5}\}}, \nu = \frac{(1+\sqrt{5})}{4\pi r}, \) Frequency \( f = \frac{1}{4\pi r}, \) Period \( T = \frac{4\pi r}{\sigma \{1+\sqrt{5}\}} \)

d). From Kepler-Orbit-Vibration the equation of inverse Period \( f_n = \frac{(1+\sqrt{5})}{4\pi r}, = \frac{\sigma}{2\pi r} \), Frequency \( f_n = \frac{\sigma}{2\pi r} \), Period \( T = \frac{4\pi r}{\sigma \{1+\sqrt{5}\}} \)

Particle & Wave Duality Photon , and Cosmic-Particles Origination .
W = 2E = B w = J.w² , or 2E = 2π f B  i.e. → Total - Spin # Frequency ≡ \( \overline{B} \) f = \( \frac{E}{\pi} \), and

Energy ≡ motion in Planck-scale-cave r = L_p. is 2E = \( \overline{B} f_n = \frac{[1(\sqrt{5})\sigma]}{4\pi r} \). \( \overline{B} = \frac{\sigma}{2\pi r} \) B  Φ, or

\[ E = \Phi \frac{\sigma}{4\pi r} \] \( \overline{B} = \frac{\left| \frac{B}{2\pi} \right|}{2f} \) \( \overline{B} = \frac{|B|}{2f} \) ...... (4) i.e.

Energy of Particles In-Beyond Planck-cave is dependent on their Spin only, and for the Electron with cave \( r = a_e = 1,6819781.10^{-17} \) m, and Principal-stress \( \sigma = 1 \), then,

\[ E = \Phi \frac{\sigma}{4\pi r} \overline{B} = 1,6180339 \left( \frac{1}{4\pi1.6819781.10^{-17}} \right) . 2.845976. 10^{-34} = \frac{2.17872.10^{-18}}{1,602.10^{-19}} = 13,6 \text{eV} \]

All above equations define → The Ubiquity of Golden-Ratio-Φ ← in motions in Angular-Momentum, Stresses, Frequency or Velocity in nature ....[ 64-A-B-C ]

1e. The Dynamic Structure of Atom :

The two elements In Nature are motion ≡ Energy and Space ≡ Displacement only.

In Mechanics Work ≡ Energy ≡ motion is, Force (x)Displacement and is conserved.

In order that Motion is Conserved as Displacement in all directions, then this Displacement must be kept, Quantized, in a Finite Space differently is annihilated.

In Mechanics the only-possible motion in a Finite Space, is the Periodic excitation [↔] or, Reciprocating-motion, and the Revolving motion [⊕∪∭] which defines the Quality of Particles. The Rotational motion defines different Period or frequency or Energy.

Atom is a Finite-Energy-Space in where exists motion ≡ Energy ≡ Force x Orbit-ray.

Motion occurs from Electrons with Impedance \( Z_e = \frac{\text{mass}[\text{m}]}{\text{executing Circular and Elliptical-Plane-Orbits from Nucleus mass}[\text{M}]} \) obeying Kepler’s laws and Newton’s Lagrange laws for Mechanics in an Equivalent System. Lagrange equations of motion in any Potential is, \( \frac{d}{dt}\left( \frac{\partial L_a}{\partial q_i} \right) - \frac{\partial L_a}{\partial q_i} = 0 \)

where, Lagrangian \( L_a = (T_K - L) \ldots(1) \) and

\[ L = \text{The Potential Energy} \equiv \text{Pointy motion} = \text{Spin} \]

\[ T_K = \text{Kinetic-Energy} \equiv \text{Linear or Rotational-motion} \]

\( T_K = T(q_1, q_2, ..., q_N, q_1, q_2, ..., q_N) \)

\( q_i = \text{The generalized coordinates}, \)

\( q_i = \text{The generalized velocities } \cdot i = 1,2,...N \)

\( \theta = \text{The r} \rightarrow \text{v} \uparrow \text{angle on Orbit-Nucleus} \)

The Lagrangian of motion is \( (1) \downarrow \) as

\[ L_a = \frac{1}{2} m \dot{r}^2 - V(r) = \frac{1}{2} m[ \dot{r}^2 + \dot{\theta}^2 ] - V(r) \ldots(1) \] since \( \dot{r} = \dot{r} + r \dot{\theta} \) and the coordinates of electron are given by the Polar-coordinates \( (r, \theta) \), and are respectively.

Equations of motion \( \frac{d}{dt}\left[ \frac{\partial L_a}{\partial \dot{q}_i} \right] - \frac{\partial L_a}{\partial q_i} = 0 \) and \( \frac{d}{dt}\left[ \frac{\partial L_a}{\partial \dot{\theta}} \right] - \frac{\partial L_a}{\partial \theta} = 0 \) ......(2)

Angular momentum vector \( \overline{L} = \overline{r} m \overline{v} = m.r.r \overline{\dot{\theta}} = (m \overline{r}^2 \dot{\theta}) \) and \( r^2 \dot{\theta} = \frac{L}{m} \ldots(2a) \)

and from Kepler’s law of areas \( dA = \frac{1}{2} r \cdot r.d \theta = \frac{1}{2} .r^2 \cdot 0 \), or \( dA/dt = \frac{1}{2} \left( \frac{L}{m} \right) = \frac{L}{2 m} \)

i.e. the area swept by the central radius \( r \), is \( \frac{dA}{dt} = \frac{L}{2 m} = \text{constant} \) ......(3)

Lagrange’s equation (2) for the \( r, \theta \), coordinates becomes ,

\[ \frac{d}{dt}\left[ m \dot{r} \right] - [ m.r \dot{\theta}^2 ] + \frac{\partial V}{\partial r} = 0 \] and integrating \( \frac{1}{2} m \dot{r}^2 + \frac{1}{2} \left[ \frac{L^2}{m r^2} \right] + V(r) = E \ldots(4) \)

Particle & Wave Duality Photon, and Cosmic-Particles Origination.
from Kepler’s relation r
The general solution of (5) is then

The Energy E of the cave, r, the Orbit and of the Angular-Momentum Vector L of caves, which is equal to Spin, S. Since Energy-Areas dA/dt, are constant, consist The Potential-Energy in Capacitors.

2e. The Atoms Physical Properties:
1. Total Energy E = T_K + L = The constant of Integral.
2. Spin ≡ Torsional momentum ≡ L ≡ B = constant.
3. Potential Energy U = V(r) + \( \frac{L^2}{2mr^2} \) = -\( \frac{k}{r} \) + \( \frac{L^2}{2mr^2} \), where k = a constant, and then,

a. As r → 0, then U = -\( \frac{k}{r} \) + \( \frac{L^2}{2mr^2} \) = \( \frac{1}{r^3} \left( \frac{L^2}{2m} - k \right) \) ≡ \( \infty \) → Strong-Forces

b. As r = \( \infty \), then U = -\( \frac{k}{r} \) + \( \frac{L^2}{2mr^2} \) = \( \frac{1}{\infty^3} \left[ -\frac{L^2}{2m} + k \right] \) ≡ 0 → PNS-Field

c. As r → \( \infty \), then U = -\( \frac{k}{r} \) + \( \frac{L^2}{2mr^2} \) = -\( \frac{1}{\infty^3} \left[ \frac{L^2}{2m} + k \right] \) ≡ < 0 → Black Hole

d. As r = \( \frac{L^2}{2km} \), then U = \( \frac{4k^2m^2}{L^4} \left[ \frac{L^2}{2m} - \frac{L^2}{2m} \right] \) = 0 → Turning-Points

e. As r = \( \frac{L^2}{2km} \), then U = \( \frac{4k^2m^2}{L^4} \left[ \frac{L^2}{2m} - \frac{L^2}{2m} \right] \) = 0 → Black-Hole i.e.

For a, The Potential-Energy becomes infinite (\( \infty \)), as r → 0, as this happens in Focus where Protons are very close to Neutrons. These are the Nucleus Strong-forces.

For b, The Potential-Energy becomes Zero (0) as r = \( \infty \), as this happens in PNS - Energy-field where time T, is not existing and Energy, E, is Infinite.

For c, The Potential-Energy becomes Negative (<0) as r = \( \infty \), for any L and r.

Integrating (3) then, A = T L /2m = 2 a b, where T the Period of Orbital rotation and \( b^2 = a^2(\cos^2 \theta) \) and from Kepler laws \( \frac{T^2}{a^2} = \frac{4\pi^2m}{2E} = \frac{4\pi^2a}{GM} \) or \( T^2 = \frac{4\pi^2a^3}{GM} \) = constant ..(6)

The First-term is the Kinetic-Energy of the Planet on Orbit, The Second-term is the Constant-Rotational-Energy OR the Spin of Atom, The Third-term is the Constant-Gravitational-Potential-Energy.

When velocity \( \dot{r} \), of the First-term is zero, and this happens at the turning points then

\[ U = \frac{L^2}{2mr^2} - \frac{GmM}{r} = 0, \text{ and } U' = \frac{dU}{dr} = -\frac{k}{r} + \frac{L^2}{2mr^3} = 0, \]

\[ U'' = \frac{d^2U}{dr^2} = -\frac{\delta f}{\delta r} + \frac{3L^2}{mr^4} > 0, \text{ and } \]

\[ \frac{\partial f}{\partial r} < \frac{3L^2}{mr^4} \text{ becomes according to position } r_0, \frac{\partial f}{\partial r_0} < \frac{3f(r_o)}{r_o} \text{ ......}(8a) \]

2e. The Boundedness of Orbits:
The general solution of (5) is \( \frac{1}{r} = \frac{GmM}{L^2} + c_1 \cos \theta \) ...(5a), where \( c_1 \) is a constant and

from Kepler’s relation \( r = \frac{a(1-e^2)}{1+e \cos \theta} \) inversing then \( \frac{1}{r} = \frac{1}{a(1-e^2)} + \frac{e \cos \theta}{a(1-e^2)} \) and compared

Particle & Wave Duality Photon, and Cosmic-Particles Origination.
to prior then \( c_i = \pm e \frac{Gm^2M}{L^2} \) and \( \frac{1}{r} = \frac{Gm^2M}{L^2} \pm e \frac{Gm^2M}{L^2} = \frac{Gm^2M}{L^2} [ 1 \pm e ] \) ……..(9)

Semimajor axis \( a = \frac{L^2}{G m^2 M (1 - e^2)} \) \( \equiv \frac{Gm}{2 E} \) ……..(9a)

Total-Energy \( E = \frac{Gm^2M^2}{2 L^2} (e^2 - 1) \) \( \equiv \frac{Gm m}{2 a} \) ……..(9b)

Eccentricity \( e = \sqrt{1 + \frac{2EL^2}{G^2m^3}} \) ……..(9c)

Spin \( \rightarrow \mathbf{B} \equiv \mathbf{L} = \sqrt{1 - e^2}. G M m^2 . a \) ……..(9d)

Energy in Orbit. \( E = - \frac{G m m}{2 r_p} (e - 1) \) and \( \mathbf{L} = \sqrt{1 + e}. G M m^2 . r_p \) ……..(10)

From Orbit-Geometry is \( g . f \cdot a_3 = 1, g . f \cdot \pi^3 = 1 \), and \( E = h f \) ……..(11)

Using the known equations for Spin then \( \mathbf{Spin} = \mathbf{B} = ( \pi^2 a^3 ) . f_p = \) The Energy

in \( n \) wave-node loop where \( f_n = [ n \frac{\sigma (1 + \sqrt{5})}{4 \pi} ] \equiv \frac{(1 + \sqrt{5}) \cdot \sigma}{4 \pi} \equiv \frac{\Phi \cdot \sigma}{2 \pi} \equiv \frac{E}{h} \) ……..(12)

\( \mathbf{B} = [ \pi^2 a^3 \sigma (1 + \sqrt{5}) / 2 ] \) . Total - Energy \( 2 L = 2 n \cdot (3 + \sqrt{5}) \left( \frac{\sigma^2}{\pi r_p} \right) \equiv [ \frac{\pi a \cdot \sigma (1 + \sqrt{5})}{4} \right] = \) ……..(13)

From relation \( f_1 = [ \frac{1}{\pi^2 r_\pi}] \mathbf{B} \) and \( \mathbf{B} = \frac{\pi^2 a \cdot (1 + \sqrt{5})}{4} \) then \( \mathbf{B}^2 = [ \frac{\pi^2 r_\pi^4}{} \] \( f_1 \) \( ^2 \) ……..(14)

3c. The Euler-Analysis of Motion in Orbits : Figure 7-1, 2, 3 :

The Euler Vector equation of motion for a Rigid-Body is as below,

\[ J_1 [ -\frac{k d^2k}{dt^2} ] + J_3 w_3 \cdot \frac{dk}{dt} + \bar{s}_o Q [ k \bar{k} ` ] = 0 \] ……..(15) where ,

\( J_1, J_2, J_3 \) → Are the Moments of Inertia of Ellipsoid related to Principal axis .

\( \mathbf{w} [ w_1, w_2, w_3 ] \) → Is the constant Angular-Velocity-Vector with respect to changes in \( i, j, k \) → The Unit constant-vector of the moving Body-System . { the Origin}.

\( i, j, k \) → The Unit constant-vectors of Body-System .

\( \bar{s}_o, \bar{s} \) → The Unit motion vector on the common section of Planes \( i - j, i - k \).

\( \varphi, \theta, \psi \) → The Three axial angles of vectors \( \mathbf{i}, \bar{s}_o - \mathbf{i}, \bar{s}_o - \mathbf{k} \)

\( Q \) → The weight of the Rigid-Body = \( m g \).

\( \frac{d\varphi}{dt}, \frac{d\theta}{dt}, \frac{d\psi}{dt} \) → The Angular-velocities of angles , \( \varphi, \theta, \psi \),

\( \mathbf{B} [ B_1, B_2, B_3 ] \equiv \bar{S} [ S_1, S_2, S_3 ] \rightarrow \) The Angular-Momentum-Vector = Spin.

Energy Relations :

\( \mathbf{B} = J_1 w_1 i + J_2 w_2 j + J_3 w_3 k \) ……..(16)

\( \mathbf{B}^2 = J_1^2 w_1^2 + J_2^2 w_2^2 + J_3^2 w_3^2 \) ……..(16a)

\( \mathbf{B}_{w} = J w^2 (= 2 L) = J_1^2 w_1^2 + J_2^2 w_2^2 + J_3^2 w_3^2 \rightarrow \) Ellipsoid of Angular-velocity

\( L = \frac{B_1 w_1^2 + B_2 w_2^2 + B_3 w_3^2}{2 J_1 + 2 J_2 + 2 J_3} \rightarrow \) The Constant-Angular-momentum-velocity-Ellipsoid ……..(17)

i.e. → For any radius OP of \( \mathbf{w}-\text{vector} \) exists another radius of \( \mathbf{B} - \text{vector} \) Perpendicular to , The \( \mathbf{w}-\text{edge} \) Tangential-Plane of the Angular-Vector-Ellipsoid , and The \( \mathbf{w} \)-vector is Perpendicular to the \( \mathbf{B}-\text{edge} \) Tangential-Plane of the Angular - Momentum-Vector Ellipsoid . In case of Zero-Moment , related to the equilibrium Point O , then ,

The motion of a Solid Body is Identical to the Rolling of the PO-\( \mathbf{w} \)- Vector-Ellipsoid

Particle & Wave Duality Photon , and Cosmic-Particles Origination .
4e. The Precession and Nutation of Electron:

Gravitational constant, \( G \), is The Pulling and Cohesive Force on all the Quantized Energy-Structures which communicates with everything due to Periodic excitation on all Spaces. Newton’s laws issues for masses and the same to Electrons in caves as below,

\[
G \equiv g.k_E \equiv g.[g_L]_k_L_\left[\frac{R^2_p}{a^2}\right][g_L]_k_L = 9.8078925 \times 6.8116.10^{-12} \equiv 6.68056.10^{-11} \frac{m^3}{N s^2}
\]

Electron being in Hydrogen-cave Precesses because of the different axis of rotation and Nutation’s, from the immense-communication to gravity, \( g \).

Electron-Spin is the Angular-momentum-vector \( \vec{B} \) and rotates according to equation \( \frac{dB}{dt} = [\ddot{u}B] = uB.[k\kappa] \) in Gravitational Potential \( U_g = [mg].s.cos \theta = -sQ.[k\kappa] \), so the change of \( \vec{B} \) is \( \frac{dB}{dt} = \frac{u}{\vec{B}} = \frac{sQ}{B} = \frac{sQ}{I_3w_3} \), and from 1-degree equation of motion, \( u, \dot{u} + w^2 u = 0 \), then

**Period of Nutation** \( T = \frac{2\pi}{u} = \frac{2\pi j_3 w}{sQ} \), and **N-Frequency** \( f_N = \frac{s\pi j_3 w}{2\pi j_3 w} \) ......(1)

With Total Energy of Nutation [70], \( E_N = \frac{j_1}{2} [w_1^2 + w_2^2] + \frac{j_1}{2} w_3^2 \) ......(2)

**For Material-Point**, the chains of Spins due to Periodic excitation \([\leftrightarrow]\) is created in Orbit a Magnetic field due to LRC-circuit and which is tuning to the critical Quantum critical-State \( E_g \). The Light velocity vector \( \vec{v} = \vec{c} \), by Acting on cave, \( r = L_p \), finds the Impedance \( m_g \), Becomes the Centrifugal-Force \( F_g \) of Cave Equal to Gravity \( g \).

The chains of Spins for the, ONE-WAY Pointy vibrating, is the Resonance Frequency \( f_R = \frac{(1+\sqrt{5}) \cdot \sigma}{4\pi^2} \) of \( c \) and \( \vec{B} \) of The-Stationary-Photon-cave, where \( \vec{B} = \vec{S} \equiv \text{Spin} \).

The Moving Electron in Orbit of charge \( \vec{q} \equiv \bigcirc \) with the Orbit-Velocity-Vector \( \vec{v} \) is

\[
\vec{v} = \frac{2}{m} \left[ E - \left( \frac{k}{r} + \frac{L^2}{2m r^2} \right) \right], \text{ Creates IN Orbit }, r \text{, the Varying and Perpendicular Magnetic-Field}, \vec{B}, \text{ which in time-turn Creates an Electric-field } \vec{E} \perp \vec{B}, \text{ with resultant force } \vec{F} \text{ acting on Electron, Velocity } \vec{v} \text{ is composed of } \vec{V}_p, \text{ Perpendicular to the Magnetic-circles } \vec{O} \perp \vec{B}, \text{ and } \vec{V}_v, \text{ Parallel to the Magnetic-field-Vector } \vec{B}, \text{ tending such that } \vec{L} = S = \text{Spin} \text{. The resulting motion of Electron is the Helical motion.}
\]

Since Work is Produced during motion, The Conservation exist in Orbit \([p\leftrightarrow e]\), so the Orbit occupies Energy as frequency quite differing that of those of Energy-levels.

Since frequency \( f_N = f_R = 2, 8398447.10^{10} \) s\(^{-1}\) (C-S) and exists in all Atoms, due to the Hydrogen first cave, then is the Resonance-frequency between all Atoms and Molecules.

Energy from equation \( E = h.f_N = 6.62607.10^{-34} \times 2.8398447.10^{10} = 18.817009.10^{-24} J / (1.6.10^{-19}) = 1.174463 \times 10^{-6} eV \) is conserved as **Thermal-Energy** \( E_T \) in kilo Cal and is \( E_T = 18.817009.10^{-24} J / [(4.19.10^{-3}) = kcal] = 4.49093.10^{-27} \text{ kcal} \). This happens because of the closed Energy-Orbit-Rims, \( r \), and of the constant light velocity \( c \), and from Spin equation \( S = m \cdot c \), Taking into consideration the Thermal - Energy of a Photon when it is pressing 1 m\(^2\) surface for 60s and which is \( E_p = 20 \) kcal = 20. (4.19.10\(^{-3}\)) = 8,3777.10\(^4\) J the ratio, \( [E_T / E_p] = 4.49093 \times 10^{-27} / 20 = 2.24546.10^{-28} \) is a Quantity **Not-detected**.

Hydrogen caves created in Sun 1 Million-years-ago = 10\(^6\).365.24.3600 = 3,1538.10\(^{13}\) sec, is accumulated Thermal-Energy of \( E_T = 3,1538.10^{13}.4.49093.10^{-27} = 1,41625.10^{-13} \text{kcal} \), i.e.

35

Particle & Wave Duality Photon, and Cosmic-Particles Origination.
The Stationary Hydrogen-wave–cave Thermal-Energy needs 1-Quadrillion years to be 1-kcal.

For Half-frequency \( f_R \) / 2 = 1,4199223.10\(^{10}\) s\(^{-1}\), the Kinetic Energy is Zero and Potential-Energy is , \( U = E = h \, f = 6,62606957.10^{-34} \) . 1,4199223.10\(^{10}\) = 9.4.10\(^{-24}\) J = 5,8722.10\(^{10}\) eV , which agree with Bohr-Magneton.

The Produced-Work in Orbit as Frequency \( f_N \) = \( \frac{sq}{2\pi j_3w} \) = 2,8398447. 10\(^{10}\) s\(^{-1}\) is Constant and is Conserved . Because of the Magnetic - field created On-Orbit , and Applied At - Nucleus with the same Effect then , exists LARMOR - Equation as \( w_0 = \gamma \cdot \beta_0 / 2\pi \), and for Hydrogen at 1.5 T Magnet , \( \gamma = 2,675. 10^8 / sT \), \( \beta_0 = 1.5 \) T then \( w = 63,864 \text{ MHz} = 63,864.10^8 \text{ Hz} \) and frequency \( f_N = 2\pi w = 4,012575. 10^{10} \text{ s}^{-1} \).

Remarks :
1. Since the frequency created from Electron-Nutation is the Basic , first , Orbit of Atoms , therefore allows a Resonance-frequency between all Atoms , Molecules and others .
2. Since Electron is continually-oscillating with the Nutation-frequency \( f_N \), so Produces an oscillating magnetic field which in turn is the source of an oscillating field , which implies the Regeneration each other , i.e. a Propagating Electromagnetic-Wave where \( E = B \) c

This is a Way of Information and Storage in Nature.
3. Since Resonance-frequency is IN the first Orbit of Atoms ,therefore allows Electromagnetic Wave , to get out the Atoms-cave , with a quantum-Energy \( E = h \, f_N \) or \( E = 2\mu.B \).
4. Since Electron is rotating in Orbits so Electromagnetic Wave is also rotating , therefore is needed a Proper-Stationary-Magnet on which Rotation becomes Oscillation in order to succeed a clear 3-dimensional , \( \Phi^3 \), Magnetic-Resonance-Imaging [The MRI] and other Systems using this Property of Bottom-Information . This Property of Spin in all depths of Energy-caves allows the Granularity of Energy in Energy-loops , and after to be Bonded.

5e.. The Spin , and Magnetic-moment Relation-Analogous.

1. Magnetic Dipole - moment (\( \vec{μ} \)), or the Torque on a current loop , is a vector - quantity arising from the rotation of a current (I) in a circular loop of radius , \( r \), and area \( A = \pi r^2 \).

2. Angular-momentum-Vector becomes from the Eternal-Rotation of the \( \bigodot \) constituent around the \( \bigodot \) constituent in a cave of radius , \( r \), and area \( A = \pi r^2 \).

i.e. The Phenomenon , The Same-Vector , measured Electrically and Mechanically.

The magnetic moment generated by circular current is the current times the area of circle.

Its direction is perpendicular to the area , A , and is determined by the right-hand rule and is ,

\[
\vec{μ} = I \cdot A \quad \text{.........(a)}
\]

From material point ([86],p-48) \( 2L \equiv \vec{B} \vec{w} \equiv h \cdot f \), \( |w| = \frac{\sigma}{2r} \left[ 1 + \sqrt{5} \right] \), and \( f = \frac{(1+\sqrt{5}) \cdot \sigma}{4\pi r^2} \)

Angular momentum \( \vec{B} = \frac{2L}{w} = \frac{2L}{2\pi f} = \left[ \frac{L}{\pi f} \right] = \frac{4\pi \cdot L}{(1+\sqrt{5}) \cdot \sigma} = [\pi r^2 \sigma (1+\sqrt{5}) / 2] = \frac{\pi^2 r^4 f}{2} \quad \text{...(b)}

From (a) , (b) the Angular – velocity - Ellipsoid \( \vec{w} \), is the analogous to circular current , I , and Angular - Momentum-Ellipsoid \( \vec{B} \), is the analogous to the Torque , \( \vec{μ} \), on this circular loop so \( \vec{μ} = I \cdot A = \frac{\text{Energy}=\text{Motion}}{\text{Unit}=\text{Time}} = \frac{1Ar \cdot s}{s} = \vec{B} = \frac{2L}{w} = \frac{2L}{2\pi f} = \left[ \frac{L}{\pi f} \right] = \frac{4\pi \cdot (hf)}{(1+\sqrt{5}) \cdot \sigma} = \left[ \frac{h}{2\pi} \right] = \text{SPIN} \quad \text{...(c)}

i.e. The Magnetic – moment \( \vec{μ} \) of Material – point = \( \left[ \frac{h}{2\pi} \right] \equiv \text{SPIN} \), and also equal to the Angular-Momentum-Vector \( \vec{B} = \pi^2. r^4. f = \frac{\pi^2 r^4}{2} \left[ 1+\sqrt{5} \right] \equiv \pi r^3. \sigma \Phi \equiv \left[ \frac{h}{2\pi} \right] \equiv \frac{2L}{2\pi f} \).

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The effect of Magnetic-moment on an External magnetic field \( \vec{P} \) is the Torque acting on the Dipole \( \vec{r} = \vec{\mu} \times \vec{P} \), representing the lowest Energy configuration, and has a Potential energy \( U = -\vec{\mu} \cdot \vec{P} \) with Force in the loop \( F_{\text{loop}} = \nabla (\vec{\mu} \cdot \vec{P}) \) and for Dipole \( F_{\text{dipole}} = (\vec{\mu} \cdot \nabla) \vec{P} \) or \( F_{\text{loop}} = F_{\text{dipole}} + \vec{\mu} \cdot [\nabla \times \vec{P}] \).

The Potential energy associated with the magnetic moment is \( U = -\vec{\mu} \cdot \vec{P} \) so that the difference in Energy Aligned and Anti-aligned is \( \Delta U = 2 \vec{\mu} \cdot \vec{P} \). From Physics, The intrinsic magnetic moment \( \vec{\mu} = \frac{\vec{g} \cdot \vec{q}}{2m} S \), where \( \vec{g}_s \) is a dimension-less quantity \( q = \) the charge, \( m = \) the mass, \( S = \) the Spin of particles and from \( c \ldots \), \( L = B \ w / 2 \), and since \( B = S \) then, \[
\vec{\mu}_{\text{intrinsic}} = \frac{4rL}{(1 + \sqrt{5})} \sigma = \frac{2w \cdot B}{(1 + \sqrt{5})} \sigma \quad \text{and} \quad \vec{g}_s = \frac{\vec{g} \cdot \vec{q}}{2m} S, \quad \text{or} \quad g_s = 2(\frac{m \vec{\mu}}{q S}) \]
and because charge \( q \) is equivalent to Angular-velocity-Vector \( \vec{w} \), then \( g_s = 2 \cdot (\frac{m}{w \cdot S}) = 2 \cdot \left[ \frac{m (\vec{\mu} = 2L)}{\vec{w} \cdot (S = 2L)} \right] \) \ldots (d)

i.e. Dimensionless quantity \( g_s \), is related to \( \rightarrow \) mass \( m \), charge \( q \), Spin \( S \), and Intrinsic magnetic moment \( \vec{\mu} \), or \( \rightarrow \) is analogous to mass \( m \), Angular velocity \( w \), and Glue-bond \( \sigma \).

This Intrinsic Angular-Velocity \( \vec{w} \), of the Material-point allows Spin \( S \), to be quantized as to Straightly in Great-circles, \( [S = \pm 1] \) by rotation Up or Down to the circles, \textit{either} is anticlockwise in Left-Small-circle, \( [S = -1] \), by rotation Up or Down to the circles, \textit{or} is clockwise in the Right-Small-circle \( [S = +1] \) by rotation Up or Down to the circles.

All particles Fermions or Bosons are becoming from above three states just by \textbf{Adding the Spins}, so \textbf{Complex structure} would have a \textit{Spin of} \( -\frac{1}{2}, 1, +\frac{1}{2}, \) or \( +\frac{1}{2}, -1, -\frac{1}{2} \), only.

The specific rotational velocity \( v = w \ r = \left| w \right| \ r = \frac{\sigma}{2} \left[ 1 + \sqrt{5} \right] r = \frac{\sigma}{2} \left[ 1 + \sqrt{5} \right] = \sigma \Phi \), is related to Glue-bond \( \sigma \), only, meaning the \textbf{Granularity of Spin in all depths of Energy-caves}.

The nature of, + Spin, is exactly the same to, - Spin, because is the Angular-momentum Vector \( \vec{B} \) of opposite direction and has nothing to do with Spinors. \[35-36\]

Space is a Quaternion, having discrete quantized Energy boundaries those of the two \( (\Theta) \), \( (\Theta) \), constituents eternally rolling on Great or Small circles and accordingly, Clockwise or Anticlockwise Originating the \( \pm \) Spin or (+), (-) Spin and is the first Quantized – Energy – monad. Charge in Physics is the Physical properties of matter that \textbf{Causes} it to experience a \textbf{Force} when placed in an Electromagnetic field, \textbf{In contrast to Material-Point}, where Force, \( \vec{B} \), is originated \textbf{From the Glue-bond}, \( \pm \sigma \), of any two Opposite-Constituents in Energy-caves. Since current, \( I \), is the net outward current through a closed surface and, \( \vec{q} \), is the Electric-Charge contained within the volume defined by the surface, then Electric charge is equivalent to Magnetic moment, or \( \vec{q} \equiv \vec{\mu} \), and current equivalent to angular velocity, or \( I \equiv w \). \textbf{Mass in Physics} is a property of a Physical-Body, and it is a measure of an object’s resistance to the acceleration, a change in its state of motion when a net force

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is applied, while in **Material-Point**, from its **Angular acceleration**, \( a_\alpha = \frac{\mathbf{B} \times \mathbf{w}}{J} \), where 

\[ J = \frac{\pi r^4}{2} \] is The Polar moment of inertia and from Newton equation \( 2E = m \cdot a_\alpha \) then, \( m = \frac{2E}{a_\alpha} = \frac{1}{|\mathbf{B} \times \mathbf{w}|} \). \( J \) is the reaction to Angular-velocity-changes in direction, a Scalar magnitude, and since Inertial mass is equal to Gravitational mass then, Mass of Material - point equals to, 

\[ m = \frac{2E}{a_\alpha} = \left[ \frac{\mathbf{B} \times \mathbf{w}}{\mathbf{B} \times \mathbf{w}} \right]. \]

\( J \equiv a \text{ number measuring Energy-quantities in caves} \).

For an inclination of 45° then the Dot Product of \( \mathbf{B} \cdot \mathbf{w} \) is \( |\mathbf{B}| \cdot |\mathbf{w}| \cdot \cos 45^\circ \) and the Cross Product of \( \mathbf{B} \times \mathbf{w} \) is \( |\mathbf{B}| \cdot |\mathbf{w}| \cdot \sin 45^\circ \) equal to Dot Product, and In Planck’s – length - cave \( r = 4,453.10^{-35} \) then mass becomes \( m = \frac{1}{J} \). \( J = \frac{\pi r^4}{2} = 617,63.10^{-40} = 6,1763. \cdot 10^{-138} \) Kg, and

The Ellipsoid of Angular-velocity remaining \( \frac{w_1^2}{2} + \frac{w_2^2}{2} + \frac{w_3^2}{1} = \frac{2L}{I_3} \)

Since also \( w = \frac{v}{r} \), and since in small circles the radius \( R < r \), the radius of the Great circles, then, Angular velocity vector and frequency increases while Period \( T \), decreases.

This Precession in Material-Point is the analogous to Nutation of Earth and other Planets indicating the relation of Microcosm and the Macrocosm to the same laws of Mechanics.

From equation \( \mathbf{B} = r \, m \, v = m \, w \, r = m \, w \, r^2 \), \textbf{mass} \( m = \frac{\mathbf{B}}{w \, r^2 \, (1+\sqrt{5})} = \left[ \frac{1}{2\pi} \right] \frac{\mathbf{B}}{r} = \frac{1}{w} \frac{\mathbf{B}}{r} \)

\( = \frac{2E}{r} \) or \( m = \frac{2E}{r} \), and \( E = \frac{B}{2c} \ldots [\text{m] denoting the Unification of Energy Mass and Cave} \).

[m] is The mass of Material-Point related to Any cave, \( r \), and \( \pm \sigma \) its Principal Stresses.

All Energy-levels follow the Space-Grainy-relation \( f^2 \cdot n \cdot a^3 = k = \text{Quantum-of motion} \).

Applying above to Under Planck’s length (that what prior called Virtual Particle or Fields of Antiparticle pairs), \{ The Spin \( \equiv \) the Angular-Momentum-Vector \( \mathbf{B} \), in the Self rotating Material point \( [ + s^2 \leftrightarrow - s^2 ] \} \rightarrow \text{explains the Why Galaxies} \), and the clusters of Galaxies remain stable. In Caves of \( (\Theta \equiv +s^3) \), \( (\Theta \equiv -s^3) \), Emerge-Spin as the Automobile - Force is Vacuum-Energy which was Prior analyzed. The Gravity-length-cave \( r = 3,969.10^{-62} \)

and mass becomes \( m = \frac{1}{J} \). \( J = \frac{\pi r^4}{2} = 389,80218.10^{-248} = 3,898.10^{-246} \) Kg.

6c. **The Atoms Precession** :
Figure – 9 - : The Electron’s Nutation in Precession:

In (1) The Electron-motion creates a Magnetic-Field \( \vec{B} \), in which is Stored Work.

\{ Electron Velocity vector \( \vec{V}_e \) is composed of the \( \vec{V}_v \) Perpendicular- constituent which stores motion in circular-Helix-paths and the Parallel- constituent \( \vec{V}_p \) constituent which is Pushing the Energy-circles along a straight line \}.

In (2) The Angular Momentum-Vector \( \vec{B} \), and the Angular-Velocity-Vectors \( \vec{\omega} \), of Electron at Point P and Proton at Point O, are Perpendicular each other and forming the Herpolhode, OPT \( \perp \) OB, where Polhode is PS \( \perp \) OP, perpendicular to Ellipsoid.

In (3) The Change of Angular Momentum vector \( \vec{B} \), is Due to the change of \( \theta \), angle Nutation, and The Produced Work is Stored in the Nucleus-Electron-Orbit-Slim.

**Electron Precession** is the (change of \( \phi \)) of Angular velocity while **Electron-Nutation** is the (change of angle \( \theta \)).

Precession is the change in \( \phi \), while Nutation is the change in \( \theta \). For \( w_3 = \text{constant} \)

\[
\frac{d\phi}{dt} = \frac{d\psi}{dt} = \text{constant and angular velocity } \omega = \vec{k} \frac{d\phi}{dt} + \vec{k} \frac{d\psi}{dt} \quad \text{in} \quad \vec{k} \vec{k} \text{ Plane.}
\]

After some operations results the equation of motion under above restrictions as,

\[
J_1 \cdot \vec{u} \cdot \cos \theta - J_3 \cdot w_3 \cdot \vec{u} + s \cdot Q = 0 \quad \quad \text{(1)} \quad \text{where} \quad \vec{u} = \frac{d\phi}{dt} = \frac{dB}{dt}
\]

with solution \( \vec{u} = \frac{J_3 \cdot w_3}{2J_1 \cdot \cos \theta} \pm \sqrt{\left( \frac{J_3 \cdot w_3}{2J_1 \cdot \cos \theta} \right)^2 - \frac{sQ}{J_1 \cdot \cos \theta}} \) ... (2) Displacement, \( \vec{u} \),

is called → **The Regular Precession of the Rigid-Body** ← stores.

The under root terms are > 0 when \( \frac{sQ}{J_1 \cdot \cos \theta} \) is very small or when Angular velocity \( \omega \equiv w_3 \) where then , angular velocity axis is very closed to the Principal Ellipsoid axis.

The change of Angular-momentum is \( dB = M \cdot dt = [ \vec{s}_0 \cdot Q ] dt = s \cdot Q \cdot [\vec{k} \vec{k}] dt \) ............(3)

where Kinetic energy during a displacement \( 2s \), is not changing , while Angular-velocity vector \( \vec{\omega} \), is placed around \( \vec{B} \), for which Moment of Inertia Ellipsoid executes a circular Polhode. The moving Inertia is rolling on the steady cone , driving in Precession the Electron-Spin-axis. Since vectors \( \vec{B} \), \( \vec{\omega} \), are very closed each other and to symmetric axis \( \vec{k} \). **Polhode** are narrow closed loop-curves on Poisson-Plane around \( \vec{B} \) vector.

The Angular-momentum-vector \( \vec{B} \) rotates according to equation \( \frac{dB}{dt} = [\vec{u} \vec{B}] = u \vec{B} \cdot [\vec{k} \vec{k}] \)

in Gravitational Potential \( U_g = [ \text{mg}] \cdot \text{cos} \theta = -sQ \cdot [\vec{k} \vec{k}] \), so the change of \( \vec{B} \) is \( \frac{dB}{dt} = u = \frac{sQ \vec{B}}{J_3 \cdot w_3} \) and from 1- degree equation of motion , \( \vec{u} + w^2 \vec{u} = \vec{0} \), then

**Period of Nutation** \( T = \frac{2\pi}{u} = \frac{2\pi J_3 w}{sQ} \), and **Frequency** \( f_N = \frac{sQ}{2\pi J_3 w} \) ........ (4)

With Total Energy of Nutation \( E_N = \frac{J_1}{2} [w_1^2 + w_2^2] + \frac{J_3}{2} w_3^2 \) or in Euler angles

\[
E_N = \frac{J_1}{2} [\phi^2 + \phi^2 \sin^2 \theta] + \frac{J_3}{2} [\psi + \phi \cos \theta] \quad ... (5)
\]

**An Example**:

For Electron radius \( s = r_e = 5.82.10^{-16}\) m, 

Weight of Electron \( Q = m_e , g = 9.11.10^{-31} , 9.808 = 8.93.10^{-30} \) Kg, 

Moment of Inertia-Disk \( J_e = \frac{J_3}{2}[\pi a^4/2] = \pi/2[5.8.10^{-16}]^2 = 1.777591.10^{-61} \) m\(^4\),

Angular velocity \( w_e = \frac{v}{r_N} = \frac{c}{1836} = \frac{3.10^8}{1836} = 1.633.10^5 \) m/s because of masses analogy

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The-Electron-Nutation-frequency \( f_N = \frac{s Q}{2 \pi J_3 \omega} = \frac{5.821 \times 10^{-16}}{2 \pi \cdot 1.777591 \times 10^{-31}} \cdot \frac{1.63 \times 10^5}{s} = 2.839847 \times 10^{10} \text{ s}^{-1} \) ....(6)

From equation (5) is seen, The moving Electron \( [\Theta \text{ charge}] \) creates a Magnetic-field which Changes from Total-Kinetic-energy \( E = T_k + L \), where \( L = S = \text{Spin} \). What this means? \( \rightarrow \text{ Work is continually created as Resonance-Frequency} \ f_R = f_N \) Since in Universe exist only Motion, and Work \( \equiv \text{ Energy} \equiv \text{ Force} \times \text{ Displacement} \), therefore the continually-Moving Electron Carries this \( \rightarrow \) [Motion-Box]. How ??? To exist Work \( \equiv \text{ Energy} \) are needed Two things, The One is the Force to be confined in a [Motion-Box] and the Second is the Force which is Pushing this [Motion-Box with the confined motion]. In Photon are the \( n \), frequencies.

The moving Electron-vector is \( \bar{v_e} = \bar{v_{et}} + \bar{v_e} \rightarrow \), which is composed of Two-velocity components, the one is the Perpendicular \( \uparrow \) and the other is the Parallel \( \rightarrow \) to Motion Box where the First CARRIES Motion Into the [Motion-Box], and the Second PUSHES the Motion-Box, Figure -9- as

1. The [Motion Box] which carries, This Motion \( v \equiv \bar{v} \), are The Magnetic-field-lines which are circles in field, filled with motion \( \equiv \text{ transportation} \equiv \text{ Spinning} \equiv \text{ tension} \). The velocity-component \( \bar{v_{et}} \), being Perpendicular to the Magnetic - lines creates Energy-Circles and thus, Motion \( \equiv \text{ Work} \equiv \text{ Energy} \), is Carried in this Magnet-Box.

2. The Pushing velocity-Force on this [Magnet-Box] \( \equiv \) The Velocity-Vector-Force which is Perpendicular to the Magnetic-field-lines Plane, and which carries the [Magnet-Box] along a straight line with horizontal distance, the pitches, between Two consecutive circles \( \bar{v_e} \rightarrow \). The Resulting Helical motion is Energy Propagated. The difference between the Potential-Energy of the Orbit and that of Electron Nutation in Precession with the Lowest-Potential-Energy, is the Resonance-Frequency. The analogous is in Electrical Circuits where when A circuit is Driven to Oscillate at its natural frequency, \( f_N \), either by storing in it Electrical-Energy or by Charging its Capacitor as, F-10. The Cyclotron frequency \( f_N = \frac{s Q}{2 \pi J_3 \omega} = \frac{q B}{2 \pi m} \) is free of velocity. In Fig-9- is shown the Propagating Electromagnetic-Wave.

The [Magnetic-Fields] \( \equiv \) [Energy-Baskets] is the Way for Energy-Propagation as,

Strength-field \( \bar{B}_F = \frac{2 \pi m \omega}{q T} \), \( \Rightarrow \bar{B} = \frac{\pi \mu_0 \sigma}{4} \rightarrow \text{ Wave} \equiv \{[\epsilon E^2 + \mu B^2] = 2 \cdot \lambda c \cdot \sin \left(\frac{2 \pi c}{\lambda}\right)\}, \)

\( \bar{w} = 2 \pi \tau = \frac{2 \pi}{m} \), issuing that Tangent of Ellipsoid \( \rightarrow \bar{B} \perp \bar{w} \) Vector \( \leftarrow \) and Tangent of Ellipsoid \( \rightarrow \bar{w} \perp \bar{B} \) Vector. It is a relation between Angular and Momentum Ellipsoid.
In (1) , The Moving Electron of charge \( q \equiv \Theta \), mass \( m \), with the Orbit-Velocity-Vector \( \vec{v} \),

\[
\vec{v} = \sqrt{\frac{2}{m} [E - \left\{ \frac{k}{r} + \frac{L^2}{2m r^2} \right\}]}, \quad \text{Creates IN Orbit ,} \quad \vec{v}, \quad r
\]

the Varying Perpendicular Magnetic-Field \( \vec{B} \), which in time-turn Creates an Electric-field \( \vec{E} \), Perpendicular to \( \vec{B} \), with resultant force \( F \), acting on Electron.

Velocity \( \vec{v} \) is composed of \( \vec{v}_p \), Perpendicular to the Magnetic-circles \( O \perp \vec{B} \), and \( \vec{v}_v \), Parallel to the Magnetic-field-Vector \( B \) tending to , \( L \equiv S \equiv \text{Spin} \).

The resulting motion of Electron is the Helical-motion.

In (2) , The changing Electron-velocity-Vector, \( \vec{v} = \sqrt{\frac{2}{m} [E - \left\{ \frac{k}{r} + \frac{L^2}{2m r^2} \right\}]}, \quad \text{Creates the Perpendicular Magnetic-Field} \quad \vec{B} \), which Magnetic-lines are the Energy circles \( O \) in \( \vec{B} \), Due to the velocity-constituent \( \vec{v}_p \), Perpendicular to Magnetic-lines \( O \).

The velocity - constituent \( \vec{v}_v \) is Perpendicular to the , Plane of Circles - \( O \), and Pushes O-Plane along a straight line forming thus , the Helical motion of Electron.

Because of the Orbit- Magnetic-Field \( \vec{B} \), Property answers the Zeeman effect.

In (3) , The Moving Electron of charge \( q \equiv \Theta \), with the Orbit-Velocity-Vector \( \vec{v} \), as

\[
\vec{v} = \sqrt{\frac{2}{m} [E - \left\{ \frac{k}{r} + \frac{L^2}{2m r^2} \right\}]}, \quad \text{is forming angle} < 0 \quad \text{with} \quad \vec{B}, \quad \text{Vector , Creates IN}
\]

ORBIT \( r \), the Perpendicular Magnetic-Field \( \vec{B} \), which Magnetic-lines are the Energy circles \( O \) in \( \vec{B} \), Due to the velocity-constituent \( \vec{v}_p \), Perpendicular to Magnetic-circles \( O \).

The velocity - constituent \( \vec{v}_v \) is Perpendicular to the , Plane of Magnetic - Circles - \( O \), and Pushes the O-Plane along a straight line .i.e. Magnetic-Field is the Store of Energy.

The continuous change of direction of the Electron Orbit-Velocity-Vector \( \vec{v} \), related to \( L \equiv S \equiv \text{Spin} \), Creates the Base of Propagation of it in Hydrogen - Orbit by using the Electromagnetic-Wave E, B, as an Energy-Transported-Box .Because during motion is

Produced-Work , which is Conserved in Orbit , then , Orbit occupies Energy as frequency differing that of Energy-levels .i.e. Energy \( \equiv \text{motion} \) Propagates , travels, as Magnetic-Field \( \vec{B} \) which is the Box , and as Electric-Field \( \vec{E} \) which is The Thrust of the Box.

Since this frequency \( f_N = f_R = \frac{2,8398447.10^{10}}{s^{-1}} \) exists in all Atoms , it is The Resonance - frequency between All Atoms and Molecules in this Cosmos.

For Half-frequency \( f_R / 2 = 1,4199223.10^{10} \text{ s}^{-1} \), then Kinetic Energy is zero and Potential-Energy is , \( U = E = \hbar f = 6.62606957.10^{-34}.1,4199223.10^{10} = 9,4,10^{-24} \text{J} \)

\( = 5,8722.10^{10} \text{ eV} \), which agrees with Bohr-Magneton .

Because the Magnetic-field is created On-Orbit and Applied At-Nucleus with the same Effect then , exists LARMOR - Equation as , \( \omega_0 = \gamma \beta_0 / 2 \pi \) , and for the

Hydrogen at 1.5 T Magnet , \( \gamma = 2,675. \text{ 10}^8 \text{s/T} \), \( \beta_0 = 1.5 \text{T} \), then \( \omega_0 = 63,864 \text{ MHz} = 63,864.10^9 \text{ Hz} \), frequency \( f_N = \omega / 2 \pi = 1,016457.10^{10} \text{ s}^{-1} \) or is , The Communication-Tool , The Identity-Card between all Atoms relations.

From Orbit-equation , \( \vec{v} = \sqrt{\frac{2}{m} [E - \left\{ \frac{k}{r} + \frac{s^2}{2m r^2} \right\}]}, \) and for \( v = 0 \) then \( E = \left\{ \frac{k}{r} + \frac{s^2}{2m r^2} \right\} \) and

for \( r_p = \frac{L^2}{\text{[GM m^2]} = \frac{S^2}{m^2} \text{GM} \) then \( E = \left\{ \frac{\text{[GM m^2]}^2}{L^2} + \frac{s^2}{2m r^2} \right\} = \left[ \frac{\text{[GM m^2]}^2}{S^2} + \frac{\text{m}[\text{GMm}]}{2. \text{S}^2} \right] \), and

Energy \( E = \left[ \frac{\text{[GM m^2]}^2}{S^2} \right] \), \( \text{[2k+GMm]} = \frac{k_0}{2 \text{S}^2} \equiv \text{Constant and Halve-Spin-Inverse-Squared} \),

The Total-Energy for moving-caves is \( E_K = \frac{1}{4 \pi^2} \left[ \frac{4\pi^2}{c^2} + \frac{\text{au.c.S}^2}{2} \right] \) in Joules (1J = 1N.1m)

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i.e. Energy ≡ motion. And is transported in Caves as their Spin-Position, Ŝ, which thus, defines The Identity of Orbits in all Atoms and Molecules.

**THE ELECTRON SPIN - NUTATION - PRECESSION PROCESS**

Figure - 11 - The Effect of Gravity, \( \mathbf{g} \), on Electron-mass Originates Electron-Nutation

\[ \theta \], in Electron-Precession, \( \phi \), and changes Electron-Spin-Direction, \( \psi \).

The Produced-Energy is supplied into the nearest Precession-frequency System which is the classical Current-loop of masses, as \([ \text{T}, m_N, m_O \text{ Current-loop} ] \equiv \text{The Energy-Proton-Cantilever-Vector or the Hydrogen-Bracket N-O} \).

a). Spin is a Couple of Forces \([ + \mathbf{F}, - \mathbf{F} ] \) following the Vectors Rules. Figure-10-b). Electron \([ \text{of – Charge} ] \) moving in Orbit around the Nucleus creates a Magnetic Field tilted to Electron’s - Spin \([ M_N = S_O ] \), therefore it’s tilted axis precesses.

b). Nucleus-Spin-axis is tilted with Orbit’s-Spin-axis, but because the two free-Couple Vectors \([ M_N = S_N \text{ and } M_O = S_O ] \) may be resolved into component vectors and the Resultant \( M_T \equiv \text{the Diagonal (Magnitude) of the Parallelogram with sides equal to } S_N, S_O \text{, Changes} \), according to their rotation axis with an angle \( \theta \), At Nutation-Period, \( M_O \) is Swinging in circular-Magnetic field and angle \( \theta \), Decreases, so the Diagonal Spin-Resultant \( M_T = S_N + S_O \) Increases and the Produced Energy is supplied into the nearest Precession-frequency System which is the classical Current-loop of masses, as \([ \text{T}, m_N, m_O \text{ Current-loop} ] \equiv \text{The Energy-Proton-Cantilever-Vector or the Hydrogen-Bracket N-O} \).

c). Gravitation-Force through Gravity is continually acting on the Orbit-Electron-Spin. The tilted axis of Electron-Spin precesses by changing the Direction of N-O lever arm, from the Nutation of Precession in the Magnetic-field due to the Negative –, Charge, and from the tilted axis of Nucleus-Spin which continually precesses in the Magnetic field. The produced Energy as Resonance frequency \( f_R \) is added in N-O loop or in \( \rightarrow [\text{T}, m_N, m_O \text{ Current-Potential-loop } E = U(x)] \) as before.

d). In Hydrogen-Atom’s case, The transferred-Energy in Current-loop N-O, is that of Electron-motion with light velocity in the circular-Magnetic-field-lines which are Perpendicular to the Orbit. This Magnetic-field is related to \( m, q, f \text{ units} \).

The Direction \( x-x \), of the two Couples of Oscillation is that of the two masses as are \( m_N, m_O \text{ of Current-loop which is continually altered because of the Polhode curve} \). Since the Total Angular Momentum \( M_T = M_N + M_O \) where \( M_T = L = S = 1 \times w \), and is Swinging on the Precession-circle and w-Nib on Polhode curve, therefore the Particle & Wave Duality Photon, and Cosmic-Particles Origination.
Resultant \( M_T \), Resonates with the Quantum frequency \( f_R \) of the cave to form with \( \pm q \) Charges the Magnetic Field \( \vec{B}_R \). At Nutation - Period, \( M_O \) is Swinging and angle \( \theta \), Decreases or Increases, so the Diagonal-Resultant \( M_T \) Increases or Decreases and The Energy is transferred in \( \rightarrow [m_N, m_o] \text{Current-Potential-loop} \ U(x) \equiv \text{The-Proton-Vector-Bracket} \), since \( K_E = 0 \). The Bound states of the Hydrogen have Negative Energies because Proton and Electron can never become infinitely-distance.

Kinetic-Energy \( K_E \), is supplied in the form of a Rotating-Nucleus-Magnetic field IN ORBIT-RIM \( \text{N-O} \), which is applied for a short time in Plane \( \perp \) to the varied \( \vec{R} \) vector and which is rotating very near to the Resonance (precession) frequency of the Nucleus Protons. \( [m_N, m_o] \text{Current-loop Increases} \) its \( P_E = U(x) \).

This ORBIT-RIM is \( \rightarrow \text{the Nucleus-Orbit-Vector-Bracket} \rightarrow \text{Oriented in Spin axis} \). The Energy-Nucleus-Orbit-Bracket, of The-One-Proton-Atom issues and for the multi Proton and Electrons in Orbits and the varied vector \( \vec{R} \) as in (1a).

Remark-1 → Hydrogen Atom with One Nucleus of Spin \( \{+\frac{1}{2}\} \) and one Electron in Energy-Orbit of Spin \( \{-\frac{1}{2}\} \). Is a Nucleus-Orbit-Magnet \( \equiv \oplus \) Proton\(\oplus]\) Electron which ORIGINATES The-Constant-Resonance-frequency \( f_R \) between them, becoming from the Eternal-changeable-motion of the Electron around the Nucleus and from the Produced Variable – Magnetic - Orbital-Fields.

Since the Total-Spin in Hydrogen is measured and at the Nucleus-Position then, Protons Absorb Energy from The-Electron-Spin which is moving in its different directions, and Store it as a Resonance-frequency \( f_R \), in ORBIT-RIM \( \text{N-O} \). This Orbit-Rim which is \( [ \text{The} \cdot m_N, m_o \cdot \text{Current-loop} ] \), continually increases its Energy and so produces a Signal, \( f_R \), in The-Hydrogen-Atom, i.e.

Gravity \( g \), acting On The Varying-Velocity \( \dot{x} \) of the Orbiting-Electron Creates, The Nutation of Electron, which Work is Conserved as The-Electron-Magnetic-Field and magnetic moment \( \mu \), in a time \( T \), and as a Resonance-frequency \( f_R \).

When velocity \( \dot{x} = 0 \) then \( E = U(x) \), i.e. the Signal is the Increasing - Potential Energy in loop. \( \text{The} \cdot [\text{m}_N, \text{m}_o \cdot \text{Current-loop}] \) consists the Energy-Bond between Atoms and is the Communication-tool, The Resonance Signal, in all Universe.

Energy equation is \( \rightarrow E_{\text{loop}} = E_{\text{dipole}} + \mu \cdot [\nabla \vec{P}] \equiv E_{\text{dipole}} + \vec{B} \cdot [\nabla \vec{P}] \) ...(e) in which case, Of An-External-Magnetic-Field \( P \), the Electron - Spin is swigging around the Magnetic-Vector and this Motion, the Nutation, is transferred to the Nucleus.

The Produced-Work is The-Frequency \( f_N = \frac{sQ}{2\pi j_{3w}} \equiv f_R = 2,8398447.10^{10} \text{ s}^{-1} \).

In MRI, this is the Transverse-Precession, where B-Vector creates an RF Signal from the Precessing Protons, and Conserved Energy is the frequency \( f_N = f_R \).

Because of the Magnetic-field created On-Orbit and Applied at-Nucleus with the same Effect then, exists Larmor Equation as, \( \omega_0 = \gamma \cdot \beta_0 / 2\pi \), and for Hydrogen at 1.5 T Magnet, \( \gamma = 2,675 \cdot 10^8 \text{ /s}T \cdot \beta_0 = 1.5 \text{ T}, \) then an-frequency \( w = 63,864 \text{ MHz} = 63,864.10^9 \text{ Hz} \), frequency \( f_N = 2\pi \cdot w = 4,012575.10^{10} \text{ s}^{-1} \).

Remark – 2.

The Accumulation of Energy as (e) creates the [The-Proton–Electron-Vector-Bracket] which is the BONDING-FREQUENCY, \( f_N = [\frac{sQ}{2\pi j_{3w}}] \), and Happens in the Maximum Potential cave \( E = -U(x) \), and which is needed for any Two Atoms to Joint and create
the molecules. Resonance Phenomena in any Media (Mechanical, Electrical, Acoustic, Magnetic) is that, for Response to be the maximum at a Specific-frequency \( f_R \) and \textbf{requires more Energy Input} including that of frequency. Nucleus with Spin \( S \neq 0 \) can absorb and emit Electromagnetic Radiation and undergo, \textbf{Resonance}, when placed in a magnetic field. \textbf{This Uniform-Magnetic-field of Nucleus-Orbit} \( [ \text{p} \leftrightarrow \text{e}] \) \textbf{already exists in Protons} which Eternally becomes from the Swinging of the \textbf{Electron-Angular-velocity Cone}, with Spin-Vector \( \vec{S} \) in the axis of cone as Angular – Momentum - Vector, \textbf{the Polhode}, at a fixed Point of the Central-Cone-circle. Because of Gravity, \( g \), \textbf{SPIN} \( \vec{\phi} \), is under NUTATION \( \vec{\delta} \), and the Response is the PRECESSION \( \vec{\phi} \), or \( \text{THE} \rightarrow \text{ELECTRON-NUTATION} \rightarrow \) due to Gravity is applied for a short time in the Plane Perpendicular \( \perp \), to the variated Moment-Vector, \( |\vec{R}| \equiv |\vec{M}_T| = |\vec{M}_N|+|\vec{M}_O| \) and the Work produced is \textbf{Conserved} in \( \rightarrow \) Nucleus-Orbit \( [ \text{p} \leftrightarrow \text{e}] \) \equiv the [ Energy-Box]. \textbf{The Angular-velocity-cone}, \( \vec{\omega} \), is \textbf{Rolling with Spin-Vector} \( \vec{B} \) in the central cone. The Difference between the Potential-energy of the Orbit and that of the Electron-Nutation Precession with the lowest Potential energy, is the \textbf{Resonance -Frequency} \equiv \textbf{The Energy}. In figure 12, is shown the \textbf{Magnetic – Dipole-moment} of nucleus which is associated with the Orbital Angular Momentum \( |\vec{B}| \), \textbf{the Spin}, resulting to \( |\vec{R}| \equiv |\vec{M}_T| = |\vec{M}_N|+|\vec{M}_O| \)

When an External \textbf{Static-Magnetic-field} is present then \( \rightarrow \text{THE Spectral-lines} \leftarrow \text{Split into Multiple-closely-Spaced-lines} \), because of the \textbf{Released-Energy} in the \textbf{Magnetic-Field}, \textbf{Due to the Duality-Photon} as, \( \vec{v} [\frac{\sigma}{2\pi} + \frac{\sigma\phi}{2\pi}] \equiv \vec{v}.[ f_n + f_n ] \). Above Zeeman-effect, \textit{In Astrophysics}, is the trapping of Magnetic field \( \vec{B}_c \equiv \left[ \frac{2\pi m_T}{q_T} \right] f \), where frequencies are varicated from Suns. \textit{In Lasers}, is the cooled-velocity-trapping which is related to the Frequencies. \textit{In Electric-Dipole Spin}, and it is the controlling of the Magnetic moment \( \vec{u} = \vec{B} \) by flipping the orientation of the Magnetic - Moment.

As was calculated for the \textbf{Strength} of an \textbf{Magnetic-field} of 1 Tesla the Static-Moment = 1,174462.10^{-4} = 11,74462.10^{-5} eV. In the Absence of Electron, \( |\vec{M}_T| = |\vec{M}_N| = |\vec{M}_O| \) \textbf{The Spin} exists only as Nucleus-Magnetic-Field \( \vec{B}_L \). The Kinetic Rotational-Energy in a monad, is the Scalar Quantity, \( L = E \), while the Vectors of, \textbf{Angular-Momentum} \( \vec{B} = \vec{S} \), and that of \textbf{Angular-Velocity} \( \vec{\omega} \), are related in monads as \( \vec{B} . \vec{\omega} = 2L = J . w^3 \) \textbf{Analysis in [90]}. 7e.. \textbf{The Focus and the Signals in Orbits}:

\begin{figure}[h]
\begin{center}
\includegraphics[width=\textwidth]{diagram.png}
\end{center}
\caption{The Material, \textbf{LRC Circuit} on \textbf{Orbit}, on Focus-Planet-Sector \( [F\leftrightarrow P] \)}
\end{figure}

In the Undamped Planck's - Conservative -System, the Total-Energy in \textbf{Hydrogen-cave} is, \( -13.6 \text{ eV} \), corresponding to the Natural-frequency of the \textbf{Primary-Particle} with the less \textbf{Particle & Wave Duality Photon}, and \textbf{Cosmic-Particles Origination}.
Negative-Charge-frequency, which is The electron and which mass $m_e$, and frequency $f_e$ follow the minimum energy $g$. Electrons-equation of motion is $\dot{x} + w^2 x = 0$ with solution $4 \pi f_e^2 \cdot m_e = g$, where The Reaction to the Change of motion, Electron mass $m_e = \frac{g}{4 \pi f_e^2}$ and the Primary equation of Electron $\rightarrow w^2_e \cdot m_e = \pi g = \text{constant}$ ← … (m).

Hydrogen-cave is a Vacuum in where exist also the Lattice-Stationary-Spinning-Material Point, where Energy in Cave $a$ is equation $E = \frac{k}{a} + \frac{L^2}{2m a^2}$ and Unit-energy $k$ becomes from equation $a^3 f_n^2 \cdot k = 1$ and is $k a = \frac{1}{a^2 f_n^2}$, and from velocity $c = w = 2\pi f_\alpha$, then $f_n^2 = \frac{v^2}{c^2}$ or $k a = \frac{4\pi^2}{c^2}$ and Resonance - Energy $\rightarrow E = \frac{ka}{aa} + \frac{L^2}{2ma^2} = \frac{1}{a^2} \left[ \frac{4\pi^2}{c^2} + \frac{S^2}{2m} \right]$ …..(re).

A... The Gravity-System, It is Another Infinite ± Equilibrium-Rotating vectors $\vec{r}$, where for Stability $\vec{\phi}$, $\vec{r} = 0$, and which Gravity-System interacts with Hydrogen-Cave-System. The condition for Irrotational Energy is $\nabla \times \vec{B} = \vec{V} \times \vec{S} = 0$, or $\nabla \times \vec{B} = \vec{V} + 2\pi \vec{mf.a} = 0$, and $\vec{r} = \pm 2\pi m f \vec{a}$. Vector $\vec{r}$, occupies Both directions for Rotational - equilibrium, i.e. The vector $\vec{r} = \pm \vec{B} \equiv \vec{S}_n = 2\pi m f_n$, and $f_n = \frac{B}{2mn_{e}} \equiv \frac{E}{h}$, is the Stationary-Filling-Ocean of the Spinning-Gravity-Material Point, in the called Empty-Space, with frequency that of Material-Point $\rightarrow f_n = n f_1 = \frac{E}{h} = \frac{n \nu}{2\pi r} = \frac{n \sigma}{4\pi r} \left[ 1 + \sqrt{\frac{v}{v}} \right]$, and from $v = w = 2\pi f r$ then, $f_n = \nu / 2\pi r = \left( 1 + \sqrt{\frac{v}{v}} \right) \frac{\sigma}{2\pi r_n \nu}$, where $\nu = \sigma \cdot \Phi$, and Spin $S_n = B = \pi^2 \cdot f_n \cdot r^4$. $f_n = e$.

B... The Hydrogen-Cave-System. From the Nucleus -Planet velocity equations $K_E = \frac{mv^2}{2} = E - \frac{k}{r} + \frac{L^2}{2m r^2} = 0$, $4\pi f_e^2 \cdot m_e = g$, and for $E = \frac{\pi g}{r} + \frac{L^2}{2(g/4nf^2) \cdot r^2} = \frac{\pi}{r^2} \cdot [g^2 r + 2S^2 f^2] = 0$, then $g^2 r + 2S^2 f^2 = 0$ or $f^2 = \frac{g^2}{2L^2} \equiv \frac{r^2}{2B^2 w^2} = \frac{g^2}{8B^2 \pi^2 f^4}$, since $2L = B w$, then the Cave-Resonance-frequency of Nucleus-Planet is $\rightarrow f^4 = \frac{r^2 \cdot g^2}{8\pi^2 S_n^2} \ldots f.(c)$ where $r_c = \text{Nucleus –Planet-Segment}$, and $S_c$ is the Spin of cave, consisting the Cave-System. Communication between the two Systems happens with their Resonance-frequency, and when $f_n^4 \equiv \frac{\sigma}{2\pi r_n \nu}^4 \equiv \frac{r_c^4 \Phi^4}{8\pi^2 r_n \nu^4 S_c^2} \equiv \sigma^4 \Phi^4 \cdot [8\pi^2 S_n^2] \equiv \frac{r_c^4 \cdot g^2 \cdot 2\pi^2 \cdot r_n^4 \cdot \nu^4}{S_n^2} \cdot \frac{\sigma^4}{2\pi r_n \nu}^4 \equiv \frac{\pi^2 \cdot r^2 \cdot g^2}{2B^2 w^2} \equiv \frac{\pi^2 \cdot r_c^4 \cdot g^2}{8B^2 \pi^2 f^4}$, and Resonance frequency $f^4 \mathrm{Resonance} = \frac{g^2}{8\pi^2 r_c^4 B^2}$, and $f^2 \mathrm{Resonance} = \frac{g}{2\sqrt{2\pi r_n} B}$, or $f^2 \mathrm{Resonance} = \frac{g}{2\sqrt{2\pi r_n} B}$. (fr).

This Frequency-Path-way through the line-Series of the infinite Spins $\overline{B}$, which Spins are Oriented and Reoriented Spins, from The Two -Types of Material-Points, shows the way that Planet $P$, and Nucleus $N$, are continually communicating each other.

The Kinetic-energy in Planck’s System for any two masses $m_1, m_2$ is as,

Total Kinetic Energy $→ E = \frac{1}{2} m_1 v_1^2 + \frac{1}{2} m_2 v_2^2$, and because $v_1 = v_2 = v$, then $E = \frac{v^2}{2} [m_1 + m_2]$, and since $m_1 = \frac{F}{g1}$, $m_2 = \frac{F}{g2}$, $v = \vec{f}$, and for Unit Work $E = 1$, $E = \frac{v^2}{2} [m_1 + m_2]$ becomes,

Unit Work of force, $F$, between Two masses of constant Distance $r_c$ is Proportional to a Constant and Minimum Acceleration, $g$, the Layer, Stress $g = 9$, 8076925, and is

Particle & Wave Duality Photon, and Cosmic-Particles Origination.
inverse square to the distance as \( F = \frac{g}{r^2} \ldots (r) \), i.e. \( F \) is Newton’s law and Coulomb Laws

Gravitational-Constant Force \( G \) is Spread over a minimum - Surface, the Layer or Conductor or, a-Surface, or The-Permissible-Path, in-where exists Reaction and called Impedance \( G \) mass. The Surface-force, \( \sigma G \), forming the inner acceleration \( a \) of

Material-Points as Vector, \( r = \pm B \equiv \frac{B}{n} \) is acting on Spins \( B \), and all the masses of the universe, or is Action of \( G \) on \( \overrightarrow{g} \) on \( B \equiv \frac{S}{G} \) through \( f_{\text{Resonance}} \), Since \( f_{\text{Resonance}} = \sigma \Phi = G \), then \( \sigma = \frac{G}{\Phi^2} = \frac{G}{c^2} \), and \( \sigma \Phi = c^4 \), where \( \sigma \), is Stress \( \sigma_{\text{Res}} \) between all frequencies. Stress \( \sigma = \frac{G}{\Phi^2} = \frac{G}{c^2} \) .

A clear Magnetic-Resonance-Imaging is Possible in [ MRI ] and to the other Media - MB under a Common-Detector-Frequency. In the One degree of freedom Vibration of a mass, \( m \), and Stiffness, \( k \), in a distance \( a \), is for, \( w^2 = \frac{1}{m} \) the equation, \( m \ddot{x} + w^2 x = 0 \), with solution \( \rightarrow \) the Period \( T = 2\pi \sqrt{\frac{m}{k}} \), frequency \( f = \frac{1}{2\pi} \sqrt{\frac{k}{m}} \), and Energy \( h = f \).

From Orbit-equation \( \ddot{v} = \sqrt{\frac{2}{m} \left[ E - \frac{k}{r} + \frac{S^2}{2m^3r^4} \right]} \) and for \( v = c \) then, \( E = \frac{m^2c^2}{2} + k + \frac{L^2}{2ma^2} = hf_R \)

Hydrogen Diameter \( a = \frac{3}{4} \sqrt{\frac{1}{gh^2}} = \frac{3}{4} \sqrt{\frac{1}{gh^2}} = \frac{3}{4} \sqrt{\frac{[6.62606957 \cdot 10^{-34}]^2}{9.808 \cdot (13.61 \cdot 602180 \cdot 10^{-19})^3}} = 2,1127839.10^{-11} m \)

The constant Energy \( k \), in Orbit is \( k = \frac{L^2}{2ma} \) and depends on Total-mass-cave \( m = M_T \).

For Total mass \( M_T \) issues The Parallel Connections Resistors inverse law, as in Electricity. The Parallel RLC Circuit, with Impedance \( = \) Composite-Resistor of the R,L,C calculates the Impedance of the Parallel RLC circuit and the Current drawn from the Supply . The Complex

1. Impedance is \( Z_T = \sqrt{R_T^2 + \left[ L_T - C_T \right]^2} \), where \( (w_0)^2 = LC \)

2. Total-Resistor \( R_T = \left[ \frac{1}{m_1} + \frac{1}{m_2} + \frac{1}{m_3} + \ldots \frac{1}{m_n} \right] \), Total-Inductance \( L_T = \left[ \frac{1}{q_1} + \frac{1}{q_2} + \ldots \frac{1}{q_n} \right] \), \( w_0 \)

3. Total-Capacitance \( C_T = \frac{1}{C_T} = \left[ \frac{1}{n_1} + \frac{1}{n_2} + \ldots \frac{1}{n_n} \right] \), \( w_0 \), and supply the Current \( I_s = \frac{V}{Z_T} \) and

4. \( f_{\text{Reson}} = \frac{V}{4\pi^2ma^3} \) with Impedance \( = \) Resistor and \( w_0 = 1 \) System-Resistor unaffected.

Remarks:

1. From Light-velocity-equation \( \ddot{v} = \left[ \frac{G \Phi}{A} \right] = c \), Force \( \overrightarrow{c} \) and velocity vector \( \overrightarrow{c} \) are Aligned therefore Photon \( \left[ \overrightarrow{c} \right] \cdot f_n + \left[ \overrightarrow{c} \right] \cdot f_n \) = Particle + Wave, follows the Rectilinear motion.

In Planck’s length \( L_P \), The light velocity vector \( \overrightarrow{c} = \frac{G \Phi}{r \Phi} \) is Acting on cave, \( r = L_P \), finds the Impedance = mass \( m_g \), becomes the Centrifugal-Force \( f_g \) of Cave which is Equal to the Gravity \( g \), while vector \( \ddot{v} = \overrightarrow{e} \) Acting on a cave, \( r \neq L_P \), finds The-Impedance \( Z_c \) of the Velocity \( \overrightarrow{c} \), and becomes the minimum-Energy-cave in \( L_P \), which is \( E = r Z_c \overrightarrow{c} = h \), and \( r = \frac{h}{cZ_c} = 2,1127839.10^{-11} m \). From Kepler-second law of Areas, \( g r^2 \overrightarrow{f}_2 = 1 \), the frequency \( f = 3,2839982.10^{15} \) H and Energy \( E = h f = 13,6 eV \), which is that of Hydrogen cave.

2. From Electron-velocity-equation \( \ddot{v} = wr = 2\pi rf \) and from Kepler \( 4 \pi^2 f^2 \overrightarrow{e}, m_e = k = \pi g \) then \( v_e = r \sqrt{\frac{g}{m_e}} \), therefore Electron follows , Curvilinear motion and that of Gravity.

From Force \( G = \sigma A \left[ \frac{2\pi rf}{\phi} \right], A = \pi \sqrt{\frac{A}{\phi}} = \overrightarrow{\overrightarrow{v}}, \frac{A}{\phi} \), then is \( \rightarrow \) The moving \( \overrightarrow{c} \) in Storage \( \frac{A}{\phi} \)

Particle & Wave Duality Photon, and Cosmic-Particles Origination.
3. Since $G \equiv \sigma \Phi^3 \equiv \Phi^2, \{\sigma \Phi\} = 2\pi f_p \ r \equiv \bar{v} \equiv m \ a \equiv m \ g = \bar{c}$ ] and Nutation-Frequency

$$f_N = \frac{r^e Q_e}{2\pi f_{35w}} = 2,8398447 \times 10^{10} \ s^{-1} \ , \text{then} \ f_N = \frac{r^e \Phi \ Q_e}{2\pi \ f_{35G}} \ \text{related to} \ G.$$

**F. : THE NEW ATOMS –STRUCTURE .**

1f. The Structure of Atoms in Planck-Cave $L_p \equiv e^{-i\left(\frac{5\pi}{2}\right)10}$

**Figure - 13 - :** The Orbit-Electron-Spin is applied on the Nucleus-Proton-Spin. Spin is a Free-Vector of Electron and can be applied at Any-Point with the same effect. Couple $\equiv$ Moment $\equiv M = Fxd \rightarrow \text{Vector} \ , \text{and may be resolved into Component-vectors}$

Electron-Nutation-Vector $M_0$ is the Resolved Component-vector $M_N + M_0$ at Nucleus. Atom Structure is The Quantization - Process of frequency $f_{ph}$ and Gravity $g \ , \text{in Energy}$ Hydrogen Cave. Atom Cave is a Potential of $13,60 \ eV$ becoming from the Energy-Cave

Kepler equation, $a^3 \ f^2 \ g = 1$, or $a = \sqrt[2]{\frac{1}{g\ f^2}} = 2,1127839 \times 10^{-11} \ m \ , \text{in the Planck cave}$

$L_p \equiv e^{-i\left(\frac{5\pi}{2}\right)10} \equiv \sqrt{3}.\pi \cdot 1,616199 \times 10^{-35} \ m \ . \text{The why such, was prior referred in 6d} \ .$

Nucleus is held together by the Spin-paring of the Spins in Nucleus.

1… The Light velocity vector $\bar{v} = \bar{c}$ is Acting on cave , $r = L_p \ , \text{and finding Impedance}$

the mass $m_g$ , Becomes the Centrifugal-Force $F_g$ of Cave and is Equal to Gravity $g$ , while The

Light velocity vector $\bar{v} = \bar{c}$ Acting on an-cave , $r \neq L_p \ , \text{finds}$ The-Impedance $Z_c$ of the

Velocity $\bar{c}$ , and Becomes the minimum-Energy-cave in $L_p \ , \text{and Equal to} \ E \equiv r \ Z_c \ \bar{c} \ , \text{where}$

$E = \text{The Planck’s-Total-Energy} \ E_p = \hbar = 6,62606957 \times 10^{-34} \ J.s \ , \ r = \text{The min-Energy cave of}$

Hydrogen \ , $Z_c = \text{The Total Impedance in Universe} \equiv \text{Space + Anti-Space}$ from velocity motion

$\bar{c} = \text{The light-velocity in m/s} \ . \text{Equation becomes} \rightarrow \ r \ Z_c \ c = E = \hbar \leftarrow \ . \text{The Three}$

Elements $\equiv$ Digits of Material-Geometry are $\{\bigodot, \bigodot \leftrightarrow \bigodot, \bigodot\} \equiv \{+, 0, -\}$ and as before

for $\log x \ \text{x and Base} x = 10 \ : \ 10^\log_{10} 10 = 10^{10}$ is the Growth. Impedance is the Anti -

Growth or Anti-logarithms $10^{-10}$ of their g-Position so Antilog $^{-g/10} = 0, 1,0460975$

For the three dimensions Total-Impedance $Z_c = 0,10460975. \ (10^{-10})^3 = 1,046097.10^{-31}$ and

$r_n = \frac{h}{c Z_c} = \frac{[6,62606957 \times 10^{-34}]}{2,99798 \times 10^8 \times 1,0460975 \times 10^{-31}} = 2,1127839 \times 10^{-11} \ m \ , \text{and is the Hydrogen cave i.e.}$

The Quantization of $\text{Energy} \equiv \text{Angular-Momentum} \equiv r \ m \ v$ , which is produced from the

three Elements $r = \text{The Planet-Focus line} \ , \ m = \text{The masses} \ , \ v = \text{The velocity of mass and}$

Particle & Wave Duality Photon \ , and Cosmic-Particles Origination .
follow Kepler-second-law where for radius \( r \), sweeps out Equal-Areas in equal times and consequently **Energy-Quantization** becomes from equation \( a^2.f^2.k = 1 \) where \( k = \left[ \frac{4\pi^2}{G\cdot M} \right] \).

The Unit-Work occurs in Hydrogen cave following Kepler-first law in Orbits, \( 4\pi^2.r^2f^2 = k \), which \( k = \text{The Quantized Work} W = v^2 \left[ \frac{h}{2\pi} \right] \) or Work \( = k = 4\pi^2.r^2f^2 \) and being equal to the Unit-prior and so, \( k = 4\pi^2.r^2f^2 = \frac{1}{f^2r^2} \) which results to the Resonance frequency \( f_R \) as \( f_R = \frac{4}{4\pi^2m^3r^3} \) of cave \( r \), and from \( f_R \) the **Resonance Step-cave** \( \rightarrow a = \frac{3}{\sqrt{\frac{1}{gf^2}}} \) (1)

**Atom-Cave** is a Heap of Masses \( M_T \), *Protons Electrons and Neutrons*, and Charges \( Q_T \), *Protons and Electrons*, follow the Lorentz force equation \( F = q[E + v \times B] \) where \( E = 0 \) and Force is \( \vec{F} = q \cdot \vec{v} \times \vec{B}. \) The Created Magnetic-Field \( \vec{B}_P = \frac{2\pi M_T}{Q_T} f \), where in it **Energy** ≡ **motion** is Quantized, i.e. Magnetic-Field \( \vec{B}_P \) is the Store of Energy in motion, \( \vec{x} + w^2 \cdot x = 0 \) the Resonance Energy \( E_R \), becomes from **The Moving Electron in Orbit** of charge \( \vec{q} \equiv \bigcirc \) with the Orbit-Velocity-Vector \( \vec{v} = \sqrt{\frac{2}{m}[E - \frac{k}{r} + \frac{L^2}{2mr^2}]} = 0 \), and this because charge \( \vec{q} \) *Creates IN Orbit* \( r \), the Varying and Perpendicular Magnetic-Field \( \vec{B} \), which in time-turn *Creates* the Electric-field \( \vec{E} \perp \vec{B} \), with resultant force \( \vec{F} \) acting on Electron. **For c = 0 then**

In Orbit exists **Only-Potential-Energy** of Orbit, and \( E = \frac{k}{a} + \frac{L^2}{2ma^2} \), and using Kepler’s law for equal-areas \( k = \frac{L^2}{2m} \), and constant Planets relation \( \frac{T^2}{a^2} = k = \left[ \frac{4\pi^2}{G\cdot m} \right] = 2.97.10^{-19}(s^2/m^3) \) in Planck’s length \( a = \frac{1}{\sqrt{k.f^2}} \) then \( k = 1/a^3.f^2 \), and **Energy** \( E = \frac{1}{a^3.f^2} \left[ \frac{1}{a} \right] + \frac{L^2}{2ma^2} = \frac{1}{a^3.f^2} + \frac{L^2}{2ma^2} \) = \( \frac{1}{2a^2} \left[ \frac{4\pi^2}{c^2} + \frac{L^2}{2m} \right] \), or \( E = \frac{4}{a^2} \left[ \frac{4\pi^2}{c^2} + \frac{L^2}{2m} \right] \), \( a^2 = \left[ \frac{1}{E} \left[ \frac{4\pi^2}{c^2} + \frac{L^2}{2m} \right] \right. \) and **Stored in the Magnetic field** i.e. Exists only **Potential-energy L** and the **Orbit is that of Circle** .

2. **Electro-Mechanical** Equation, \( q \vec{B}_L = 2\pi m f \), exploited in Hydrogen-Atom creates the **Uniform Magnetic-field** \( \vec{B}_L \), which IGNORES, the velocities in (1) and Capacitance in Energy-levels (1-2). The Heap of masses and Charges FOLLOWS Permutation - Rules as the Neutral-quantities and Newton-Laws as well as the Vibrating equation, \( m \ddot{x} + w^2 x = 0 \).

3. Hydrogen - Cave is a **Uniform-Magnetic-field**, Because \( \vec{B}_L \), is Independent of the **Electron-velocity** \( v_e \) and of the **Cave-radius**, \( r \), therefore electron is not accelerated in the Magnetic-field, but its Strength is **Dependent on frequency**, \( f \), only. This demand formulates the Hydrogen-Energy-caves and the **Quantization** of Energy ≡ motion, beginning from the Nucleus and extended to Orbits-Planets occupying ,

the Resonance-Energy \( E_R = \frac{r}{a^2} \left[ \frac{4\pi^2}{c^2} + \frac{L^2}{2m} \right] = \frac{1}{a^2} \left[ \frac{4\pi^2}{c^2} + \frac{S^2}{2m} \right] \) ...(2) which is a **Signal**.

2f. **The Elements in the Atom cave** → { Masses – Charges – Caves }

Particle & Wave Duality Photon, and Cosmic-Particles Origination.
a-Proton $\oplus \rightarrow$ mass $m_p = 1.672.10^{-27}$ Kg $\rightarrow$ Charge $C_p = 1.602.10^{-19}$ C $\rightarrow$ d = 8.4.10^{-16} m

b-Electron $\ominus \rightarrow$ mass $m_e = 9.11.10^{-31}$ Kg $\rightarrow$ Charge $C_e = 1.602.10^{-19}$ C $\rightarrow$ d = 5.0.10^{-17} m
c-Neutron $[\oplus \leftrightarrow \ominus ] \rightarrow$ mass $m_n = 1.672.10^{-27}$ Kg $\rightarrow$ Charge $C_n = 0.0$ C $\rightarrow$ d = 1.7.10^{-15} m
d... Newton’s law for masses is the Force $\rightarrow F_N = \frac{m_1 m_2}{r^2}$, where d = r.
e... Coulomb law for Charges is the Force $\rightarrow F_C = C \frac{q_1 q_2}{r^2}$.
f – Kepler laws for Planets and Constant-Areas is, $4\pi^2 . m. f^2 = k . k.f^2 . a^3 = 1$
g – Magnetic-fields laws for Charges and Periods is, $T = \frac{2\pi . m . T}{q . B_F} = \frac{2\pi . m . T}{q . T} = \frac{[2\pi . m . T]}{Q_T}$
h – The United Newton-Coulomb Electro-Mechanical Equation, $q \bar{B}_L = 2\pi m f$, and the Resonance frequency $f^4 = \frac{1}{4\pi^2 m a^3}$, or $f = \frac{4}{\sqrt{4\pi^2 m a^3}}$ between Charges and masses.

The Total-energy for Unit-mass $E_T = K_E + P_E$, is from equation $\bar{x} = \sqrt{\frac{2}{m} \left[ E - \left( \frac{k}{a} + \frac{L^2}{2ma^2} \right) \right]} = c$ where for $K_E = 0, c = 0, E = \frac{m c^2}{2} + \left\{ \frac{k}{a} + \frac{L^2}{2ma^2} \right\} \leftrightarrow$ Energy becomes $E = \frac{k}{a} + \frac{L^2}{2ma^2}$
or, Above configuration of masses $m_L$, Charges $q_L$, in a Hydrogen cave $a$, Forms a Harmonic Oscillator with a Natural Frequency $f_R$ with the less Damping-factor (1/m).

The Quantum of a Magnetic-Field $\bar{B}_L$ in a cave, $a$, is the Resonance - Magnetic Frequency, $f_R$, depended on the Stiffness, the Damping 1/m, of the cave per unit Charge $q$, as the Electro-Mechanics equation $\rightarrow q . \bar{B}_L = \left[ 2\pi . m . L \right] . f_R \leftrightarrow$ where,
1... Resistor $R$, in Electric Circuit corresponds the analogous Mass, $m$, in Mechanics.
2... Inductor $L$, in Electric Circuit corresponds the analogous Energy, $f$, in Masses.
3... Capacitor $C$, in Electric Circuit corresponds the analogous Magnetic, $q$, in Planes.
4... Voltage $V$, in Electric Circuit corresponds the analogous Field-Strength $B_F$, in Fields.
5... The Parallel RLC-Electric-Circuits Create a Resonant Frequency stored in Magnetic Field $\bar{B}_F$, while the Charged Electrons are stored as Energy in Static-Electric-Field. Above configuration of $RLC$-Electric-Circuits, forms a Harmonic oscillator in the Magnetic-field $\bar{B}_F$ and the same for, Masses, Charges, Caves, as below,

1. ... Case – A – $\rightarrow$ 1-Proton $[\oplus ]$, 1-Electron $[\ominus ]$, 1-Newton $[\oplus \cup \ominus \ominus ] - [\oplus \leftrightarrow \ominus ]$ :

The Nucleus Total-Harmonic mass $M_T$ is $\rightarrow \frac{1}{M_T} = \frac{1}{m_F} + \frac{1}{m_m} + \frac{1}{m_e} = \frac{10^{27}}{1,672} + \frac{10^{27}}{1,672} + \frac{10^{31}}{9,11}$ $= \frac{10^{31}}{8360} + \frac{10^{31}}{9,11} = \frac{10^{31}}{9,100084}$, and the One -Total-mass $M_T = 9.100084.10^{-31}$ Kg ...(1)

The System Total- Harmonic-Charge $Q_T = q_P + q_e = 2.1.6022.10^{-19} = 3,2044. 10^{-19}$ C and the System-Resonance-Charge $Q_T = 3,2044. 10^{-19}$ C .......(2)

The frequency of the Closed-Nucleus-Orbit-System becomes from Kepler second Planetary law equation, $4 \pi^2 . m. f^2.o = k$. and constant law of Areas $1 = k . f^2 . a^3$. Their common $k$, is Constant-Energy $\rightarrow k = 4 \pi^2 . m . f^2.o = \frac{1}{f^2.o . a^3}$ or, $f^4 = \frac{1}{4\pi^2 . m . a^3}$ and $f = \frac{4}{\sqrt{4\pi^2 . m . a^3}}$ ...(f)

With this way, Impedance $\equiv$ Resistor and $w_0 = 1$, the Resistor in the System is unaffected.

Particle & Wave Duality Photon, and Cosmic-Particles Origination.
by the frequencies of Inductive and Capacitive Reactance and the Total-Resistance becomes as the above \( m = M_T = 9,100084.10^{-31} \text{ Kg} \). The Resonance-Cave-frequency is as (f) ,
\[
f = \frac{1}{\sqrt{4\pi^2 m a_H^2}} = \frac{1}{\sqrt{4\pi^2 9,100084.10^{-31} (2,1145016.10^{-11})}} = \sqrt{2,94439610^{60}} = 1,3099329.10^{15} \text{ H}(3)
\]
Coulomb-law issues between Nucleus and orbit diameter \( d = 10^{-10} \text{ m} \), while Newton's-law issues for all \( m \)asses between Nucleus and Nucleus-Orbit \( d = 10^{-14} \text{ m} \).

**The System** \( M_T = \text{masses}, Q_T = \text{Charges} \) creates a constant Magnetic-field
\[
\vec{B}_F = \left[ \frac{2\pi M_T}{Q_T} \right] \left( \frac{1}{3,2044.10^{-19}} \right) \text{ (Kg/Cs)} = 2,3373706.10^{4} \text{ Tesla} \) ...(4) i.e. \( \vec{B}_F = 23,373706 \text{ Kilo-Tesla} \) → the Strength of a Non - Magnetar Neutral star,

since 1Tesla = [N.s/C. m] = [ N/Ampere .m] = [Kg /C.s] =10^4 Gauss = 10^{-9} Mega-Tesla .

Resonance-Cave \( a = 3\sqrt{T^2/g} = 3\sqrt{1/g f^2} = 3\sqrt{1/g} [1,3099329.10^{15}]^2 = 3\sqrt{7,78342.10^{-33}}
\]
= 1,9817863.10^{-11} \text{ m} , and the Resonance - Energy \( E = \frac{1}{a^3} \left[ \frac{4\pi^2}{c^2} \frac{L^2}{2m} \right] \) , where

\( L = \text{the Spin S} = 5,691952. 10^{-34} \text{ (Kg/m}s) \), mass \( M_T = 9,100084.10^{-31} \text{ Kg of System} , \)
\( c = 2,998.10^{8} \text{ m/s} \), and \( E = [2,5461638.10^{21}] x [4,392086.10^{-16} + 1,780111.10^{-37}] = 1,118297.10^{6} \text{ J} + 4,5324541.10^{-16} \text{ J} \) ……(E)

i.e. Energy in Electron-Orbit is 1,118297.10^{7} \text{ J} , or 11,2 Million Joules ,

2.….. Case –B → 1-Proton \([\oplus]\) , 1-Electron \([\ominus]\):

**The Nucleus** Total-Harmonic mass \( \equiv M_T \) is \( \rightarrow \frac{1}{M_T} = \frac{1}{m_p} + \frac{1}{m_e} = \frac{10^{27}}{1672} + \frac{10^{31}}{9,105} = \frac{16729,1.10^{27}}{15,23192} \)
\( = 10^{31} \frac{9,105}{0,0009105} \) and \( M_T = 9,105044.10^{-31} \text{ Kg} \) ………..(1)

**The Nucleus-Orbit** Total-Harmonic-Charge → \( Q_T = q_p + q_e = 2,16022.10^{-19} = 3,2044.10^{-19} \text{ C} \) and the System-Resonance-Charge \( Q_T = 3,2044.10^{-19} \text{ C} \) ………..(2)

The frequency \( f = \frac{1}{\sqrt{4\pi^2 m a_H^2}} = \frac{1}{\sqrt{4\pi^2 9,100084.10^{-31} (2,1145016.10^{-11})}} = \sqrt{2,942807.10^{64}} = 1,3097561.10^{16} \text{ H} \).

The Magnetic-field-Strength \( \vec{B}_F = \left[ \frac{2\pi M_T}{Q_T} \right] \left( \frac{1}{3,2044.10^{-19}} \right) \left[ \frac{2\pi m}{q_+} \right] \text{ (Kg/Cs)} = 2,5424947.10^{5} \text{ Tesla} \equiv 0,25424947 \text{ Mega-Tesla} \) → the Strength of a Neutron-star

Energy in an Electron-cave where radius \( r_e = 5,82.10^{-16} \text{ m} \), follows Energy-equation
\( E = \frac{1}{a^3} \left[ \frac{4\pi^2}{c^2} \frac{L^2}{2m} \right] \) , where \( L = \text{the Spin S} = 5,691952. 10^{-34} \text{ (Kg/m}s) \), \( c = 2,998.10^{8} \text{ m/s} \).

mass \( M_T = 9,105044.10^{-31} \text{ Kg of System} , \) Energy is \( E = [2,9522561.10^{30}] \times [4,392086.10^{-16} + 1,779141.10^{-37}] = 1,2966562.10^{15} \text{ J} + 5,2524801.10^{-7} \text{ J} \) …….(E)

i.e. Energy in Electron-Orbit is 1,29,10^{15} \text{ J} , or 12,9 quadrillion Joules , and equal about 60 Megatons of TNT .

When an Electron of mass \( m_e = 7,2373149.10^{-32} \text{ kg} \) is found in above Magnetic-field then 50

Particle & Wave Duality Photon , and Cosmic-Particles Origination .
\[ f = 4 \sqrt{\frac{1}{4n^2a_H^3}} = 4 \sqrt{\frac{1}{4n^2 \times 7.237 \times 10^{-32}(2,1145016.10^{-11})^3}} = 4 \sqrt{37,022376 \times 10^{-60}} = 2.4663545.10^{15} \text{ H} \]

and Energy \( E = hf = 6.62607.10^{-34} \times 2.4663545.10^{10} = 1.634237.10^{-18} \text{ J} / (1.6.10^{-19}) = 10, 201146 \) eV, which is the Energy in \( n = 1 \) Energy-Level, or

From equation \( m_e = \frac{g}{4nf^2} \), \( f_e = E / h = [ -13.6 \text{ eV} / \text{h} ] \) then

\[ f = 4 \sqrt{\frac{E^2}{4 \pi^2 a_H^3 [\text{gh}^2]}} = 4 \sqrt{\frac{E^2}{\pi^2 a_H^3}} \]

3.……. Case –C. → 1-Proton \([\Phi]\) \( \equiv \) An Ion-nucleus:

**The Nucleus** Total-Harmonic mass \( \equiv M_T \) is \( \rightarrow \frac{1}{M_T} = \frac{1}{m_p} = 10^{27} \) and \( M_T = 1.67.10^{-27} \) Kg or \( M_T = 1.67.10^{-27} \) Kg / 1,6605886.10^{-27} amu = 1 amu ……..(1)

**The Nucleus-Orbit** Total-Harmonic-Charge → \( Q_T \equiv q_P = 1.6022.10^{-19} \) ……..(2)

The Resonance-Cave-frequency is \( f = 4 \sqrt{\frac{1}{4 \pi^2 a_H^3}} = 4 \sqrt{\frac{1}{4 \pi^2.1.672.10^{-27}.8(2,1127839.10^{-11})^3}} = 4 \sqrt{2.0051704.10^60} = 1.189975.10^{15} \text{ H} \) …(1). **The System** \( M_T = \) masses, \( Q_T = \) Charges creates a constant Magnetic-field \( \overline{B}_F = 2 \pi n M_T f_{Q_T} \) of Strength \( \overline{B}_F = \frac{2 \pi n M_T f_{Q_T}}{Q_T} \) as,

\[ \overline{B}_F = 4.1464883.10^7 \text{ Tesla} \] \( \rightarrow \) the Strength of a Non-magnetron neutron-Star.

Energy in an Proton-Cave Proton of radius \( r_p = 8.42.10^{-16} \text{ m} \), follows Energy-equation

\[ E = \frac{1}{3} \left[ \frac{4 \pi^2}{c^2} \frac{L^2}{2 m} \right] , \text{ where} \ L = \text{the Spin} \ S = 5.691952.10^{-34} \{ \text{Kg/m/s} \} , c = 2.998.10^8 \text{ m/s} . \]

mass \( M_T = 1.67.10^{-27} \) Kg of System, Energy is \( E = [ 1.4105087.10^{30} ] \) x[-]

[4,392086.10^{-16} +9,7000946.10^{-41}] = 6,1950755.10^{14} \text{ J} + 1.3682067.10^{-10} \text{ J}

For the Ion-Proton \( E = \frac{k}{a} + \frac{L^2}{2m a^2} = \left[ \frac{L}{2m} \right]^2 + \frac{L^2}{2m a^2} = \frac{L}{2m} [1 + \frac{L}{a}] \) where \( a_p \) is Proton-cave

\( L \) is the Spin \( S \), and \( m \) is the mass of Nucleus, Placing above quantities then Energy is

\[ E = \frac{5.691952.10^{-34}}{2.1.67.10^{-27}8.4.10^{-16}} \left[ 1 + \frac{5.691952.10^{-34}}{8.4.10^{-16}} \right] = 2.028782.10^8 + 1.3747296.10^{-10} \text{ Joule} . \]

\[ \text{i.e.} \] Energy of Charge-Proton is 0, 203.10^9 J, or 0,203 Giga-Joules and, \( \text{it is equal about to the reduced Planck energy} \).

**Remark : Cave** is composed of One mass in its Proton-cave with an **Magnetic-field Strength** \( \overline{B}_F = 4.1464883.10^7 \text{ Tesla} = 41,464883 \text{ Mega-Tesla} \), with a **Frequency** \( f_R = 6.32705.10^{15} \text{H} \). The fact that Atom’s-nucleus occupies such Energy as that of Neutron stars, consists the Atom as the strongest massive element in nature. This quantity consists the minimum **Quantum of Energy** in this cave and can be said is the **Quantum of Magnetic-Energy** in Atom.

This case is very interesting because it is the Quanta of Electron in microcosm and macrocosm i.e. the Spin of Electron is squeezing in the direction of the field - Space. **Since Energy exists on Magnetic-moment axis and Spin Precesses**, the highly magnetized vacuum must behave like a Prism that **Polarizes the light**, and this is happening because of the Two-Magnetic-fields in Atom. The Birefringence also split X-ray Photons into two.

**The Physical interpretation** is that, The Quantum of a Magnetic-Field \( \overline{B}_L \) in an Hydrogen cave \( a. \) is the Resonance-Magnetic-Frequency \( f_R \), which is depended on the value of Angular-momentum, of the 1st Quantum number, which is the Spin \( S \), of cave i.e. 51

**Particle & Wave Duality Photon**, and **Cosmic-Particles Origination**.
1. Charge $\vec{q}$ → Is the **Quantum** of the Efficient-Energy.

2. Photon → Is the **Quantum** of Electromagnetic Field $f_n = \frac{n}{\pi r^4}, B = \frac{(1+\sqrt{5})\sigma}{4\pi} = \frac{E}{h}$

3. $\bar{q}_{\text{Photon}} \rightarrow \frac{G}{\sqrt{2}r} = \frac{Gh}{\sqrt{2}E} = 3.13 \times 10^{-44}$, Is the **Quantum** of Material-points.

4. $\bar{q}_{\text{Electron}} \rightarrow \frac{G}{c\sqrt{2}} = 1.58 \times 10^{-19}$, Is the **Quantum** of the Plane-Magnetic-field.

**Figure-14**: The Analogous RLC-Electric-Circuit of Atom’s Structure and Mechanics

**Remarks**:

**The Case –A-** is composed of the three masses $m_p, m_n, m_e$, which consist a Plane on which vibration of Charges $Q_T$ is executed in two perpendicular directions $x, y$ **The Phase-Plane**, which is the velocity-Vector-Cartesian System, $x \perp \dot{x}$. The Total-energy for Unit-mass is $E_T = K_E + P_E = (\frac{1}{2}) \cdot \ddot{x}^2 + U(x) = \text{constant}$ and solving for $y = \dot{x}$ this Ordinate of the Phase Plane is given by Planar equation, $y = \dot{x} = \pm \sqrt{2[E - U(x)]}$, therefore Orbits can be, that of Circle and those of, $\infty$, eight shapes in $x, y$, Plane, as the linear-equation $\ddot{y} + w^2 y = 0$, of the $x \perp y$ Plane and which follows the **Lissajous Shapes**.

**The Case –B-** is composed of the two masses $m_p, m_e$ which consist a Vector on which the Vibration of Charge $Q_P$ is executed in the direction of Vector $\vec{PE}$. The **Resonance Frequency** $f = 1.3097561.10^{16}$ H, and The **Magnetic-field-Strength** $B_F = 9.3530401.10^5$ Tesla and are the Quantum of Energy-Space in Hydrogen cave $a$.

**The Case –C-** is composed of One mass in its Proton-cave with an **Magnetic-field Strength** $B_F = 4.1464883.10^7$ Tesla, with a **Frequency** $f_R = 6.32705.10^{14}$ H. The fact that Atom’s-nucleus occupies such Energy as that of Neutron stars, consists the Atom as the strongest massive element in nature. This quantity consists the minimum **Quantum of Energy** in this cave and can be said is the Quantum of Magnetic-Energy in Atom.

This case is very interesting because it is the Quanta of Electron in microcosm and macrocosm i.e. the Spin of Electron is squeezing in the direction of the field - Space. Since Energy is on Magnetic-moment axis and Spin Precesses, the highly magnetized vacuum must behave like a Prism that Polarizes the light. This happens because of the Two-Magnetic-fields in Atom. Birefringence also split X-ray Photons into two or when the opposite, to merge them together.

**4….. Case –D-** → 2-Proton $[\oplus]$, 2-Electron $[\ominus]$, 2-Neutron $[\oplus\ominus\ominus\ominus] - [\oplus\leftrightarrow\ominus]$: Particle & Wave Duality Photon, and Cosmic-Particles Origination.
The Nucleus Total-Harmonic mass \( M_T \) is → \( M_T = \frac{1}{m_p} + \frac{2}{m_n} + \frac{2}{m_e} = \frac{2.10^{27}}{1.672} + \frac{2.10^{27}}{1.672} + \frac{2.10^{31}}{9.11} = \frac{10^{31} + 10^{31} + 10^{31}}{405,105.10^{31}} = \frac{10^{31}}{4,550,553} \), and \( M_T = 4,5037834.10^{-31} \) Kg .....(1)

The Nucleus-Orbit Total-Harmonic-Charge → \( Q_T \) ≡ 2 \( q_p \) + 2 \( q_e \) = 2.1,6022.10^{-19} + 2.1,6022.10^{-19} = 6,4088.10^{-19} and System-Resonance-Charge \( Q_T = 6,4088.10^{-19} \) .....(2)

The frequency of the Closed-Nucleus-Orbit-System becomes from Kepler second Planetary law equation \( 4 \pi^2 m f^2_o = k \), and constant law of areas \( l = k \cdot f^2_o \cdot a^3 \). Their common \( k \), constant energy is \( k = 4 \pi^2 m f^2_o = \frac{1}{f^2_o \cdot a^3} \) or \( f^4 = \frac{1}{4\pi^2 m a^3} \) and \( f = \frac{1}{\sqrt{4\pi^2 m a^3}} \) becomes

\[
f = \frac{\left( \frac{1}{\sqrt{4\pi^2 m a^3}} \right)^4}{4\pi^2,4,5037834.10^{-31}(2,1145016.10^{-11})^3} = 4,594276,10^{60} = 1,5617663.10^{15} \text{H}
\]

The System \( M_T = \) masses \( , Q_T = \) Charges creates a constant Magnetic-field \( \overline{B}_F = \left[ \frac{2\pi M_T}{Q_T} \right] f \)

M-field \( \overline{B}_F = \left[ \frac{2\pi M_T}{Q_T} \right] f \) where \( E = \frac{1}{3} \left[ \frac{4\pi^2}{c^2} \cdot \frac{L^2}{2ma} \right] \) where \( L = \) the Spin \( S = 5.691952.10^{-34} \) [Kg/m/s] \( , \) mass \( M_T = 4,5037834.10^{-31} \) Kg of System \( , c = 2,998.10^9 \) m/s. \( E = \left[ 2,3463513.10^{16} \right] \times [-] = [4,392086.10^{-16} + 3,596788.10^{-37}] = 10,305376.10^0 J + 8,43933.10^{-21} J \) .....(E) i.e. Electron-Orbit-Energy is 10,30538 J = 6,432096,10^19 eV become from filled Helium-orbit.

5…. Case –E→ → 20-Proton \([\oplus]\) , 20-Electron \([\ominus]\) , 20-Newton \([\oplus\oplus\ominus]\) – \([\oplus\leftrightarrow \ominus]\) :

The Nucleus Total-Harmonic mass \( M_T \) is → \( M_T = \frac{20}{m_p} + \frac{20}{m_n} + \frac{20}{m_e} = 20.10^{27} + 20.10^{27} + 20.10^{31} \) = \[ \frac{10^{29}}{4,182} + \frac{10^{32}}{4,5553} \] = \[ \frac{10^{32}}{4,5550438} \], and \( M_T = 4,5000438.10^{-32} \) Kg .....(1)

The Nucleus-Orbit Total-Harmonic-Charge → \( Q_T \equiv 20.q_p + 20.q_e + 20.q_n = 32,044.10^{-19} + 32,044.10^{-19} \) C and the System-Resonance-Charge \( Q_T = 6,4044.10^{-18} \) C .....(2)

The frequency of the Closed-Nucleus-Orbit-System becomes from Kepler second Planetary law equation \( 4 \pi^2 m f^2_o = k \), and constant law of areas \( l = k \cdot f^2_o \cdot a^3 \). Their common \( k \), constant energy is \( k = 4 \pi^2 m f^2_o = \frac{1}{f^2_o \cdot a^3} \) or \( f^4 = \frac{1}{4\pi^2 m a^3} \) and \( f = \frac{1}{\sqrt{4\pi^2 m a^3}} \) becomes

\[
f = \frac{\left( \frac{1}{\sqrt{4\pi^2 m a^3}} \right)^4}{4\pi^2,4,5000438.10^{-32}(2,1127839.10^{-11})^3} = 58,8879210^{60} = 2,770171.10^{15} \text{H} \]

According to Planck \( E = h f = 6,62606957.10^{-34} \), \( 7,70171.10^{15} = 1,8355345.10^{-20} \) Joules

The System \( M_T = \) masses \( , Q_T = \) Charges creates a constant Magnetic-field \( \overline{B}_F = \left[ \frac{2\pi M_T}{Q_T} \right] f \)

M-field \( \overline{B}_F = \left[ \frac{2\pi M_T}{Q_T} \right] f = \left[ \frac{2\pi M_T}{Q_T} \right] \left[ \frac{2,770171.10^{15}}{6,4044.10^{-18}} \right] \) (Kg/Cs) = 1,2365715.10^2 Tesla .....(4)

\( \overline{B}_F = 0,123657 \text{ Kilo-Tesla} \rightarrow \text{the Strength of a Non-Magnetar-Star} \).

Particle & Wave Duality Photon , and Cosmic-Particles Origination.
The frequency and The Nucleus is Constant

The frequency is as \( f \), or, \( f^4 = \frac{1}{4\pi^2m^3} \) and \( f = 4 \left( \frac{1}{4\pi^2m^3} \right) \) ...(f)

With this way, Impedance \( \equiv \) Resistor and \( w_0 = 1 \), the Resistor in the System is unaffected by the frequencies of Inductive and Capacitive Reactance and the Total-Resistance becomes as the above \( m = M_T = 4.180.10^{-28} \) Kg. The Resonance-Cavity-frequency is as \( f \),

\[
f = 4 \left( \frac{1}{4\pi^2m^3a^3} \right) = 4 \left( \frac{1}{4\pi^2 \times 4.180.10^{-28} \times (2.112783910^{-11})^3} \right) = 4 \left( \frac{1}{0.267927.10^{60}} \right) = 7.19456.10^{14} \text{ Joules} \]

According to Planck \( E = hf = 6.62606957.10^{-34} \times 7.19456.10^{14} = 4.7678039.10^{-19} \) Joules

The System \( M_T \) = masses, \( Q_T \) = Charges creates a constant Magnetic-field \( B_F = \frac{2\pi M_T}{Q_T} f \)

\( M\)-field \( B_F = \frac{2\pi M_T}{Q_T} f = \frac{2\pi}{4.180.10^{-28}} \times 7.19456.10^{14} \times 4.7678039.10^{-19} \text{ Tesla} \)

i.e. Energy in Nucleus-Cave is equal to the, Solar-Constant, or to the Total Radiation received from the Sun by an square meter per second.

n... Case –N. \( \rightarrow \) n-Proton \( \{ \oplus \} \), n-Electron \( \{ \ominus \} \), n-Neutron \( \{ \oplus \cup \ominus \} \) \( \rightarrow \{ \oplus \leftrightarrow \ominus \} \):

From a Set of infinite rest, or, moving Units choosing Two of them, is consisted, and

Particle & Wave Duality Photon, and Cosmic-Particles Origination.
is found, the Mendeleyev Periodic table in Planck’s level $10^{-35} \text{ m}$ (this Property issues in all Geometrical caves and in a cave of, $10^{-62} \text{ m}$, which is the Gravity level in which Gravity - Field exists), and also all models of the atom as follows,

a... In Set $\equiv \{\text{Mould}\} \equiv \text{Space} \equiv \text{Cave} \rightarrow$ The minimum Number of Points in each Energy-Level is

<table>
<thead>
<tr>
<th>Point</th>
<th>E-Elements</th>
<th>Material-Point</th>
<th>Permutations</th>
<th>$m$-Cave</th>
<th>Shapes, are for</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line-sector</td>
<td>$m = 2$</td>
<td>4</td>
<td>2+8</td>
<td>10</td>
<td>S+ Lissajous-Figures</td>
</tr>
<tr>
<td>Plane</td>
<td>$m = 3$</td>
<td>6</td>
<td>18</td>
<td>28</td>
<td>Two-Spheres</td>
</tr>
<tr>
<td>Volume</td>
<td>$m = 4$</td>
<td>8</td>
<td>32</td>
<td>60</td>
<td>Three - Spheres</td>
</tr>
<tr>
<td>$m-$Space</td>
<td>$m = m$</td>
<td>2xm</td>
<td>$2xm^2$</td>
<td>$2m^2+2(m-1)^2+2$, m-Spaces-Volume</td>
<td></td>
</tr>
</tbody>
</table>

Photon was proved to be a Material-point in cave $r$, where its Inner Storage is the Stationary-Standing-wave the Electromagnetic-Wave $[E^2+H^2] = 2(2r)c.\sin 2\phi$ with $n$

Lobs representing the Normal mode vibration with frequencies $f_n = n.f_1 = \frac{E}{h} = \frac{nv}{4r} = \frac{n\sigma}{gr} [1+\sqrt{5}]$, and Outward the Storage is the Propagating Electromagnetic-Wave $\rightarrow \{[E^2+\mu B^2] = 2.\lambda c.\sin 2\phi \} \leftarrow$ where Particle $2r = n\lambda$, Cave $r$, is the Electromagnetic Energy-Storage, and Electromagnetic-Radiation E, B is the Wave Conveyer of Cave, $r$, with frequency $f = \text{Energy} E / \text{Planck-constant} h$, or $f = E / h$. (Figure - 3 - 4)

From relation Force $G = \sigma A = (2\pi f r)\frac{A}{\Phi} = w r = \bar{c} \frac{A}{\Phi}$, The Action of $G$ to $\bar{c}$ and Following relation $\sigma x \Phi^3 \equiv G$, and from Energy-force $F_g$ in $r = L_P$ Planck’s scale of mass $m_g = Jw^2$, where angular-velocity $w = \frac{c}{r}$ and, the 3-Dimensional Space of the two +, -, are $[2^3 = (\oplus \oplus \ominus)]$ then, Impedance $g_z$, of Space $\ln(3)$ and Anti-Space $\pi \sqrt{3}$, originates the Gravity as Centrifugal-Force $F_g = g = m_g \left(\frac{c^2}{r}\right) = m_g \left(\frac{c^2}{r}\right) = J \frac{w^2 c^2}{r} - g \frac{z}{2^3 \ln(3) \pi \sqrt{3}} = 4\sqrt{3}. \ln 3 \cdot \pi^2 r c^4 = 9,807,6754$, existing In-Out Atom.

i.e. Gravity $\bar{g}$, is The effect of $G$ force, on c light-velocity, in the 3-Dimensional Space and Anti-Space, $2^3$, In and Out the Planck-length $L_P = r$. Gravity existing in Hydrogen-Cave which is a Uniform-Magnetic-field, Because $B_{L_e}$, is Independent of the Electron-velocity $v_e$ and of the Cave-radius, $r$, therefore electron is not accelerated in the Uniform-Magnetic-Field, but its Strength is Dependent on frequency, $f$, only.

The Process for, $n$, equal Opposite-Elements for measuring Hydrogen-cave:

The Nucleus Total-Harmonic mass $\equiv M_T \rightarrow \frac{1}{M_T} = \frac{n}{m_p} + \frac{n}{m_n} + \frac{n}{m_e} = \frac{2n}{m_p} + \frac{n}{m_e}$, because $m_n = m_p$
The Nucleus-Orbit Total-Charge $\equiv Q_T \rightarrow n_q_p + n.q_e$, where $m_p$ masses, $q_T =$ charges

The frequency of, Nucleus-Orbit-System is $f_H = \frac{1}{4\pi^2 M_T (a_H)^3}$, where $a_H =$ Electron cave.
The constant Hydrogen-Uniform-Magnetic-field is \( B_{\text{H-UMF}} = \frac{2\pi M_T}{Q_T} f_H \) in Tesla.

The Resonance - Cave, is \( a_R = \sqrt{\frac{T^2}{g}} = \frac{1}{\sqrt{g}} \cdot f^2_H \) m, in Hydrogen-cave \( a_H \) in m.

The Energy in Hydrogen-cave is \( E = \frac{1}{2} \left( \frac{4\pi^2}{c^2} \frac{S^2_T}{2m} \right) = \frac{1}{2} \left( \frac{4\pi^2}{c^2} \frac{S^2_T}{2} + \frac{c a_H S_T}{2} \right) \) in Tesla.

The Electric Force between u-Quarks and d-Quarks in Protons is \( F = C \frac{q_1 q_2}{r^2} \) Newton.

3f... The Elements in the Proton-Neutral-caves → \{ Masses-Charges-Forces \}

![Diagram of the Atom-Cave and Nucleus-Cave]

Figure – 15. The Structure within the Hydrogen-Nucleus of, \( \oplus \) Proton, [\( \oplus \leftrightarrow \ominus \)] Neutron

Proton is consisted of Three-Primary-Opposite-Spaces \( \oplus \), \( \ominus \), \( \oplus \leftrightarrow \ominus \), having masses \( m_p \), Charges \( q_p \), and caves \( a_p = r \).

The elements in Proton are the Two u-Quarks and One d-Quark.

The total mass \( M_T \) in Proton follows, The Parallel Connections Resistors inverse law and

The Proton Total-Harmonic mass \( \equiv M_T \) is \( \frac{1}{M_T} = \frac{1}{m_u} + \frac{1}{m_u} + \frac{1}{m_d} \),

The System Total- Harmonic-Charge \( \equiv Q_T \equiv 2. q_u + q_d = (2/3)e - (1/3)e = \frac{1}{3} e = 1,6022.10^{-19} \) C, and the System-Resonance-Charge \( Q_T = 1, 6022.10^{-19} \) C ...

The Proton Total- Harmonic- Charge → \( Q_T \equiv 2. q_u + q_d \), and for the Resonance Frequency of the Unit-Cave is the Stationary-System becoming from Kepler second Planetary-law as equation, \( 4 \pi^2 \) m \( f^2_o = k \), and constant law of Areas \( 1 = k \cdot f^2_o \cdot a^3 \). Their common \( k \), is the Constant-Energy \( \rightarrow k = 4 \pi^2 \) m \( f^2_p = \frac{1}{f^2_o a^3} \) or, \( f^4_p = \frac{1}{4\pi^2 m_a^3} \) and \( f_p = \sqrt{\frac{1}{4\pi^2 m_a^3}} \)

The measured magnitudes are as follows,

a-Proton \( \oplus \rightarrow \) mass \( m_p = 1,672.10^{-27} \) Kg → Charge \( C_p = 1,602.10^{-19} \) C → \( a = 8,410^{-16} \) m

b-Electron \( \ominus \rightarrow \) mass \( m_e = 9,11.10^{-31} \) Kg → Charge \( C_e = 1,602.10^{-19} \) C → \( a = 5,010^{-17} \) m

c-Neutron \( \oplus \leftrightarrow \ominus \) → mass \( m_n = 1,672.10^{-27} \) Kg → Charge \( C_n = 0,0 \) C → \( a = 1,710^{-15} \) m

d-u-Quark → from equal masses \( m_p = 2.m_u + m_d = 3.m_u = 1,672.10^{-27} \) Kg and Quark masses \( m_u = m_d = m_p / 3 = 5,573.10^{-28} \) Kg, and \( \frac{1}{M_T} = \frac{1}{m_u} + \frac{1}{m_u} + \frac{1}{m_d} = \frac{3}{m_p} + \frac{23}{m_p} = \frac{9}{m_p} \) and Proton

Particle & Wave Duality Photon, and Cosmic-Particles Origination.
Resonance mass \( M_T = \frac{m_p}{9} = 1,857777.10^{-28} \text{ Kg} \approx 16,7267 \text{ mEv/c}^2 \) ….(m)

For Proton issues \( q_p = 2.2e + 2.3e = 1.2e \) and the Stability of forces is axial.

Electron-Charge \( C_e = 1.602, 10^{-19} \text{ C} \), while \( C_{eq} = 2.3e = 2.3e = 1.602.10^{-19} \text{ C} \)

\( C_{eq} = -\frac{1}{2} e = -\frac{1}{2} e = 1.602.10^{-19} \text{ C} \), and from

\( Q_T \equiv 2.2e + 2.3e \), then Proton Resonance charge \( Q_T = \frac{3.2e}{3} = 1.602.10^{-19} \text{ C} \) ….(c)

Proton-Resonance frequency \( f_p = \sqrt[4]{\frac{1}{4}} \sqrt[4]{(4\pi^2 m_a^2)} = \sqrt[4]{\frac{1}{4}} \sqrt[4]{(4\pi^2 5.73.10^{-26}(8.4.10^{-16})^3)} = 5.262411.10^7 \text{ H} \)

Using the United Newton-Coulomb Electro-Mechanical Equation, \( qB = 2\pi.m \ f \), the Proton

Magnetic-field \( B_F = \frac{2\pi.m \ f}{Q_T} \)

which is the Strength of a Magnetar, i.e. A type of Neutron-Star having an extremely Powerful Magnetic-field, and Electric-Forces to be over Ten-Thousands-Newton.

The Electric Force between the u-Quarks and d-Quarks in Proton is from Coulomb law

\[ F_{ud-p} = C \frac{q_u^2}{r^2} = 8.9875.10^9(\text{Nm/2c})^2 \frac{2}{9}[1.602.10^{-19} \text{ C}]^2 \frac{1}{(10^{-16})^2} = 1.997222.10^6 \text{ N} \ldots \text{(Fp)} \]

and The Electric Force between the u-Quarks and d-Quarks in Neutron is

\[ F_{ud-n} = C \frac{q_u^2}{r^2} = 8.9875.10^9(\text{Nm/2c})^2 \frac{2}{9}[1.602.10^{-19} \text{ C}]^2 \frac{1}{(10^{-16})^2} = -1.997222.10^6 \text{ N} \ldots \text{(Fn)} \]

i.e. Forces between the Opposites Equilibrium-Linearly \( \rightarrow \text{[d-u-d]} \rightarrow \text{or} \rightarrow \text{[u-d-u]} \)

For the Neutral-cave issues \( q_n = 2.2q + 2.3e = -2.1e + 2.3e = 0.e \), and the Stability of forces is axial as in Proton and this because the Dynamic-Strip-Polygon doesn’t close.

Remarks:
1. Gravitational force \( G \equiv \sigma A \equiv \frac{2\pi r f}{\Phi} \)

\[ G \equiv \Phi^2 \]

\[ (\sigma \Phi)\equiv 2\pi \ f \ w \ r \ = \text{ m g} = \text{ c} = \frac{2 \ B \ f}{\ r^2} \]

i.e. \( G \) is Related to \( \rightarrow \text{motion= work W} \), Spaces \( r \), Anti-Spaces \( 1/r \), Stresses \( \sigma \), Areas \( A \), Caves \( a \),

\( \rightarrow \text{Periods T} \), Frequencies \( f \), Angular-waves \( w \), Angular-Momentum \( B \),

\( \rightarrow \text{Spin B} \equiv S \), velocities \( v \), Light-velocity \( c \), Impedances \( Z_n \), Masses \( m \),

\( \rightarrow \text{Gravity g} \), Charges \( q \), Electromagnetic - Fields \( E \), \( M \), Hydrogen H,

\( \rightarrow \text{Atoms} \), Molecules, Golden-Ratio \( \Phi \), All-Universe, Markos 9/4/2020.

4f. The Energy of The-Primary-Particles-caves:

The Total - Energy of an Elementary-Particle \( \equiv \text{Intrinsic Rotational + Kinetic Energy} \),

From rotational Energy \( B = r \ m \ \nu = S = \text{Spin} \)

then, \( m = \frac{B}{r} = \text{w} \ r \ w = \text{S} \ r \) \ldots ..(1)

Centripetal-Energy \( E_K = \frac{m}{r} \frac{v}{r} = \frac{\frac{S}{r}}{r} \)

\[ \frac{\text{w} \ r \ S}{r \ w} = \frac{w S}{r} = \frac{2 \pi r}{\ r} \]

\[ \text{v} \ r \] \ldots ..(2)

From Unit-Area-Energy \( f^2 a = \pi \), then \( f = \frac{\text{w} \ \pi}{\ 3} \ldots \)(3) and \( E_K = \frac{\text{w} \ \pi}{\ 3} \ r \) \ldots \( 4 \)

and or Energy from caves \( \rightarrow E_K = \ k \ \ r + \text{r}^2 \)

\[ \text{r}^2 \frac{S}{2} \]

\( \text{r}^2 \frac{S}{2} \) \ldots \( 5 \)

1. Neutrinos \( \nu \), \( m = 3.11.10^{-6} \text{MeV/c}^2 \times 1.8.10^{-28} = 5.598.10^{-34} \text{ Kg} \)

The Spin is, \( S_\nu = 5.691952.10^{-24} \{ \text{Kg/m/s} \}, a_\nu = 7.0.10^{-21} \text{ m} \), \( f_\nu = [E_{\nu K} = mc^2] / h = \)

\[ 57 \]

Particle & Wave Duality Photon , and Cosmic-Particles Origination.
Since 

\[ \text{From cave } r = 7.10^{-21} \text{ m and } f = 2 \sqrt{\frac{1}{g_{\text{a}^2}}} = 2 \left( \frac{9,8078}{(7.10^{-21})^3} \right) = 5,347345.10^{30} \text{ H then ,} \]

\[ \text{E}_{\text{yK}} = h. f_{\text{y}} = 6,62607.10^{-34} J s. [5,347.10^{30}] / (1.6022.10^{-19} eV) = 2,211458.10^{14} eV \]

Using \[ \text{E}_{\text{yK}} = \frac{k}{2} \frac{\sigma^2}{m_{\text{r}}^2} + \frac{\sigma \phi}{2} \frac{
u}{m_{\text{r}}} = 2,919,695,120 \times 10^{-34} \frac{(5.691952.10^{34})^2}{(7.10^{-18})^2} = 15,412 eV + 2,528774,10^{17} eV = 252,8774, [10^{15}] \text{ TeV } \rightarrow \text{The Total Energy of the Sun striking Earth-face per second.} \]

2. **Electron**, e, \[ m_{\text{e}} = 0 \text{, } 511 MeV = 0, 511.10^{-6} \text{ eV } , \{1.80.10^{-27}\} = 9,198.10^{-34} \text{ Kg} \]

\[ a_{\text{e}} = 5.0.10^{-18} \text{ m} \text{, Charge } C_{\text{e}} = 1,602.10^{-19} \text{ C} \text{, Spin } S_{\text{e}} = \frac{1}{2} = 2.845976.10^{-34} \text{ [Kg/m/s]}, \]

\[ \text{From cave } r = 5.10^{-18} \text{ m and } f = 2 \sqrt{\frac{1}{g_{\text{a}^2}}} = 2 \left( \frac{9,8078}{(5.10^{-18})^3} \right) = 2,801114.10^{26} \text{ H then ,} \]

Using \[ \text{E}_{\text{eK}} = \frac{k}{2} \frac{\sigma^2}{m_{\text{r}}^2} + \frac{\sigma \phi}{2} \frac{
u}{m_{\text{r}}} = 2,919,695,120 \times 10^{-34} \frac{(5.691952.10^{34})^2}{(7.10^{-18})^2} = 15,412 eV + 2,111843.10^{10} \text{ J} \]

\[ = 51,43 eV \text{ + } 1.32.10^{19} \text{ eV } \rightarrow \text{The Energy of 133 gr to fall 1 meter against gravity.} \]

3. **Gamma-ray**, γ, is the **Photon-Energy** \[ \text{E} = \bar{\nu} \left[ \frac{\sigma}{2\pi r} \gamma + \frac{\sigma \phi}{2\pi r} \right] \equiv \bar{\nu} \left[ \frac{f_{\text{n}}}{f_{\text{e}}} \right], \text{with Spin } = 1 \]

and is an **Energy-Storage** \[ \equiv \left( \Psi \rightarrow \Psi' \rightarrow \Psi'' \right) \equiv \text{Particle } \left[ \bar{\nu} \left[ \frac{f_{\text{n}}}{f_{\text{e}}} \right] \rightarrow \bar{\nu} = \lambda = \frac{\phi}{\pi} \right] \rightarrow \text{and is an Stationary-Standing-Wave } \rightarrow \text{[E } = \left[ \text{EM-R} \equiv f_{\text{e}} = f_{\text{n}} = \frac{\nu}{m_{\text{e}}} = w^2 \right] = 2.02 \gamma \text{.sin } 2[\phi \equiv \frac{\bar{\nu}}{\phi}] \]

\[ \text{2. Energy-Motion } M = \left( \bar{\nu} - \text{Vector} \right) = \text{Wave } \left[ \bar{\nu} \left[ f_{\text{n}} \right] \right] = \left[ f_{\text{e}} = \left( \text{E}^2 + \text{H}^2 \right) = \frac{n \phi}{2\pi r^2} = \frac{\eta \phi}{\pi r^2} \right] \]

\[ \text{i.e. a Propagating Wave } \left[ W = \text{EM-R } \equiv [\eta \phi^2 + \text{H}^2] = 2.02 \gamma \text{.sin } 2[\phi \equiv \frac{\bar{\nu}}{\phi}] \right] \]

Energy under Planck-scale \[ \text{E = } \left[ \Phi \frac{\sigma}{4\pi r^2} \right] \text{. B } \equiv \left[ \frac{B_l^2}{2 \pi r} \right] \text{, where } B_{\text{p}} = 5,691952.10^{-34} \text{ [Kg/m/s]}, \]

\[ \bar{\nu}_\text{Photon} = \frac{G}{\sqrt{2}} = \frac{G_{\text{h}}}{\sqrt{2} \cdot \text{E}} = \left[ \frac{6,676923.10^{-11}}{6,662606.975.10^{-34}} \right] = 3,127 10^{-44} \text{ C} \]. i.e.

The Energy in Photon is **Dependent** on Gravitational G and frequency \[ f_{\text{p} } \text{ of Storages} \].

Issues \[ \rightarrow 1 \text{eV} = 1,6022.10^{-19} \text{ J } \leftarrow 10^{-3} eV = 1,6022.10^{-16} \text{ J } , 10^{-6} eV = 1,6022.10^{-13} \text{ J } , 10^{-7} eV = 1,6022.10^{-12} \text{ J } , 10^{-9} eV = 1,6022.10^{-10} \text{ J } , 10^{-12} eV = 1,6022.10^{-7} \text{ J } \text{ and from } f = \frac{E}{h} \text{ then ,} \]

\[ f_{\text{e}} = 1,6022.10^{-19} / [6,662606.975.10^{-34}] = 2.481802.10^{14} \text{ H} \]

\[ f_{\text{g}} = 2.481802.10^{17} \text{ H} \text{, } f_{\text{e}} = 2.481802.10^{20} \text{ H} \text{, } f_{\text{g}} = 2.481802.10^{21} \text{ H} \text{, } f_{\text{g}} = 2.481802.10^{23} \text{ H} \]

The Total-Energy of an Electron-Charge, q, in a Voltage V, is \[ E = h f = q V \], where \[ f_{\text{e}} = 2 \frac{1}{\sqrt{3 \lambda}} \]

\[ \text{Voltage } V = \frac{h f}{q} = \frac{h c}{q \lambda} = \frac{6,662606.975.10^{-34} \times 29,979.10^8}{6,62010^{-19}} = 12,398.10^{-7} \frac{1}{\lambda} \text{ eV} = 12,398 \text{ eV for } \lambda = 10^{-7} \text{m} \]

or \[ V = \frac{h f}{q} = \frac{6,662606.975.10^{-34} \times 2 \sqrt{1 / a^3}}{1.60210^{-19}} = 4,136123,210^{-15} \text{ eV} = 4,136123,210^{-15} \text{ eV} = 12,398 \text{ eV} \]

i.e. The Voltage of a cave a, is dependent on \[ \lambda = 2 \lambda \]

In cave \[ 10^{-13} \text{ m exists min-energy ,and from } g = f^2 \text{a}^3 \], or \[ f_{\text{y}} = 2 \sqrt{\frac{1}{\sqrt{3 \lambda}}} = \frac{9,8078}{(10^{-39})^3} = 9,903.10^{-14} \text{ H} \]

Max-Energy is \[ E = h f_{\text{g}} = 6,662606.975.10^{-34} \times 9,903.10^{-14} / 1.6.10^{-19} = 4,095543.10^5 \text{ eV} \]

Since G Effects on \[ \text{c velocity through eq. } \rightarrow \text{E = h } f_{\text{g}} = c \left[ f_{\text{n}} + f_{\text{e}} \right] \text{ then } f_{\text{n}} + f_{\text{e}} = \frac{E}{c} = f_{\text{y}} \]

or Energy \[ \text{E Photon} = 1 eV = 12,4 eV + 1,6 \text{.10}^{-16} \text{ eV} \text{ and for } E 10^n eV \text{ , then Photon-Energy is } \]

\[ \text{E Photon} = n eV = 12,4 eV + 1,6 \text{.10}^{-16} \text{ eV} \]
Space, or in cave \( a_y = 1.10^{-13} \) m where issues \( f_y = 5, 6.10^{19} \) H.

**X-ray**, \( X \), is of \( \overline{E}_{\text{Photon}} = 2_eV = 5,203.10^{-14} \) eV, \( f_x = 5,605.10^{19} \) H and \( a_x = 1.10^{-14} \) m

From above is seen the How Duality-Photon-Energy is working, \( E = \overline{c} \cdot [\sqrt{f_n} + f_n] \) and from

**Stress \( \rightarrow \) \( \sigma = [\frac{2\pi r}{\Phi}] \cdot f_n = [\frac{2\pi r}{\Phi}] \cdot (f_n + f_n) = [\frac{2\pi r}{\Phi}] \cdot \overline{f_n} + [\frac{2\pi r}{\Phi}] \cdot f_n \equiv \text{Storage + Information}**

and it is The Way of Energy-Storage and Stress-Information in Nature. In Quaternion with Real and Imaginary Part, Energy Acts only on the Resultant-Direction-End-Points Carrying Energy from One-Edge to another Edge, and shows Cosmic-Particles-Origination.

**THE PHOTON’S ELECTROMAGNETIC - SPECTRUM**

Photon-ray, \( f_{ph} \rightarrow > a_{ph} = 1.10^{-13} m > 1.10^{[14+n]} m \), \( f_{ph} = \frac{E}{c} = f_y \)

\( \overline{E}_{ph=n,eV} = 12.4 eV + 1,7444 \cdot 10^{-n-16} eV \), where \( n = 1, 2, 3, \ldots n \)

Gamma-ray, \( \gamma \rightarrow [1.10^{-10} m > a_{ph} = 1.10^{-12} m > 1.10^{[14+n]} m \), \( f_{\gamma} = 1.774.10^{19} H > 10^{19+n\infty} \)

\( \overline{E}_{\gamma,eV} = 1,7444 \cdot 10^{-[14-16]} eV \), in \( r_2 = 10^{-12} m \), \( \overline{f}_{\gamma} \rightarrow 10^{20} H \)

**X-ray**, \( X \), \( \rightarrow [1.10^{-8} m > a_{x} = 1.10^{-9} m > 1.10^{-10} m \), \( f_{x} = 1.774.10^{18} H \equiv 10^{18} H \)

\( \overline{E}_{X,eV} = 1,7444 \cdot 10^{-[12-14]} eV \), in \( r_2 = 10^{-10} m \), \( \overline{f}_{X} \rightarrow 10^{18} H \)

Ultraviolet, \( \rightarrow [1.10^{-6} m > a_{x} = 1.10^{-8} m > 1.10^{-10} m \), \( f_{X} = 1.774.10^{17} H \equiv 10^{17} H \)

\( \overline{E}_{X,eV} = 1,7444 \cdot 10^{-[10-12]} eV \), in \( r_2 = 10^{-8} m \), \( f_X \rightarrow 10^{16} H \)

i.e. Electromagnetic-Spectrum \( \equiv \) Photon in all its frequencies.

**Remark**: For Neutral-caves issues \( q_n = 0.e \), and the Stability of Forces is Axial as in Proton and this because the Dynamic-Strip-Polygon closes Linearly. This Property issues on Markos [ STPL ] Six-Triple-Points-Line where Spaces and Anti-Spaces Equilibrium [91].

**SUMMARY**

1... Force \( G \), Gravitational-Constant-Force \( G \), becomes as Stress \( \equiv \) Force/Area \( \equiv g \), as equation \( G = gK_B = g [g_{kB} k_B] = \frac{T_2p}{a^3} \cdot [g_{lk} k_L] = \frac{T_2p}{a^3} \cdot [g_{lk} k_L] = 9,8076925 \cdot 6,8116.10^{-12} \equiv 6,68056.10^{-11} \frac{m^3}{Ns^2} \), and Effects on Gravity - Stress \( \rightarrow g \equiv 9,8076925 \frac{kg}{cm^2} \) [73]. From the Beyond-Planck-length force \( F = \sigma . A \) =The Glue-Bond \( \equiv \) Stress x Area \( \equiv \frac{2\pi r_f}{\Phi} \cdot A = w r \cdot \overline{A} \equiv \overline{v} \cdot \overline{A} \), then \( F = G = \sigma . A \) \( \equiv \frac{2\pi r_f}{\Phi} \cdot \overline{A} \cdot \overline{A} \equiv \sigma . \Phi^3 \equiv \Phi^2 \cdot [\sigma \Phi] = 2\pi r_f \cdot \frac{2\pi B}{\pi c} \equiv w r \equiv \overline{v} \equiv m g \equiv \overline{c} \)

i.e. Force \( G \) is converted From an axial force \( \overline{F} \equiv \) motion, on a Surface \( A \equiv \) Space, to Stress \( \sigma \), in a cave - \( r \) as frequency \( f_p \) and as Angular-velocity \( \overline{w} \) and Angular-momentum \( \overline{B} \), everywhere as velocity \( \overline{v} \) and in Planck-scale-Length \( P_L \), as light-velocity \( \overline{c} \) and Gravity \( \overline{g} \). Because velocity \( \overline{c} \) carries the motion in Photon-Boxes and every where, and Photons, are related to \( G \) through stresses \( \sigma \), \( G = \sigma . \Phi^3 \equiv [\sigma . \Phi] \Phi^2 \equiv \Phi^2 \cdot [2\pi r_f] r \equiv \frac{2\pi B}{\pi c} \) r f, carries also the Golden-ratio-Pattern in all microcosm and macrocosm as \( \rightarrow \sigma = \frac{2\pi r_f}{\Phi} \cdot f_n \)

2...Dual-Photon \( \overline{v} = \overline{c} \cdot [\sqrt{f_n} + f_n] \), is Particle + Wave \( \equiv \) Energy moving with light-velocity and its Duality exists in frequency. The Material-Points travel with velocities \( n \cdot \overline{c} \), and are as \( \overline{v}_m = n \cdot \overline{c} \cdot (\sqrt{f_n} + f_n) \equiv \frac{G}{\Phi^3 \cdot L_p} \cdot (\sqrt{f_n} + f_n) \), where \( \sqrt{f_n} \) is the Stationary Storage and \( \{ f_n \} \) Travels as an Propagating Electromagnetic-Radiation where motion \( \equiv \) Energy \( \equiv \) Wave as Electric-Force and is altered to the , Space \( \equiv \) Magnetic force as \( \overline{E = \overline{B} \cdot \overline{c}} \).

Particle & Wave Duality Photon, and Cosmic-Particles Origination.
Since \( G \equiv \sigma.\Phi^3 \equiv \Phi^2 [\ c^\circ] \) then \( \rightarrow \) The only \textbf{Force} creating velocities is \textbf{Force - G}.

3. \textbf{Light Velocity} \( \bar{v} = \bar{c} = \frac{F \Phi}{A} = \left(\frac{G \Phi}{A = b}\right) = \left[\frac{6.673692.10^{-11},1.6180339887}{36.10^{-20}}\right] = 2.9995163. 10^8 \text{ m/s} \)

And is a Constant-Light-velocity \( \bar{c} = \frac{G}{\Phi^2 L_p} \), because all constituents are constant.

Since \( G \equiv \sigma.\Phi^3 \equiv \Phi^2 [\ c^\circ] \) then \( \rightarrow \) The only \textbf{Force} creating velocities in loops is \( G \).

4. \textbf{Gravity} \( \vec{g} \). The \textbf{Light velocity vector} \( \bar{v} = \bar{c} \) is \textbf{Acting on cave} , \( r = L_p \) , and finding \textbf{Impedance} \( m_G \) , becomes the \textbf{Centrifugal-Force} \( F_k \) of the \textbf{Cave} and it is Equal to the \textbf{Gravity} \( g \), as \( \text{Gravity} \rightarrow \bar{g} = 4 \sqrt{3} \ln(3). \pi^2 L_p c^4 = 9 . 807654 \text{ m/s} \)

Since \( G \equiv \sigma.\Phi^3 \equiv \Phi^2 [\ m \ \vec{g}] \) then \( \rightarrow \) The only \textbf{Force} creating Gravity and masses is \( G \).

5. \textbf{Hydrogen cave} \( H \). The \textbf{Light velocity vector} \( \bar{v} = \bar{c} \) acting on \textbf{an-cave} , \( r \neq L_p \) , finds The-Impedance \( \bar{Z}_c \) from \textbf{Velocity} \( \bar{c} \), and becomes the minimum-Energy - cave in \( L_p \), equal to \( E \equiv r \bar{Z}_c \bar{c} = \hbar \), and is the \textbf{Hydrogen cave} \( L_H = r = \frac{\hbar}{c \bar{Z}_c} = 2.1127839.10^{-11} \text{ m} \)

which is the min-cave in Planck’s - length with the max-Energy \( \hbar \). From the \textbf{Unit-Stress-Gravity} \( g \) as \( k = E = \frac{T^2}{r^2} = g = \frac{1}{r^2} \), then \( g \ r \ ^3 \ f_p^2 = 1 \), which is the Kepler second and constant Unit-law for areas , and in this min - \( L_H \) frequency \( f = 3.2839982.10^{15} \text{ H} \), which is the \textbf{Hydrogen} cave occupying \textbf{Energy} \( \rightarrow \ E = \hbar f = 13 . 6 \text{ eV} \).

Since \( G \equiv \sigma.\Phi^3 \equiv \Phi^2 [w \ r] \) then \( \rightarrow \) The only \textbf{Force} creating Caves and Periods is \( G \).

6. \textbf{Electron cave} \( e \). The Natural-frequency \( f \) in Planck’s - length for the \textbf{Primary-Particle} occupying the less \textbf{Negative-charge-frequency} , is the \textbf{Electron} , and is from equation

\[
\text{solution } \frac{w_n}{2\pi} = f_e = \frac{1}{2\pi} \sqrt{\frac{k}{m}}, \text{ or } 4 \pi^2 f_e^2 e^2 m_e = k = \pi g \text{ and } \text{m}_e = \frac{g}{4\pi f_e^2}, \text{ where } f_e = 3, 283998.10^{15}/\text{s} \text{, Light velocity } \bar{c} \text{, is acting on Electron-Unit-Charge } \bar{q} \leftarrow \text{ or } \text{G} = c \sqrt{2} \bar{q}, \text{ and then Electron-Charge is } \bar{q}_{\text{Electron}} = \frac{e}{\sqrt{2}c^2} = 1.574.10^{-19} \text{ C} \text{.}
\]

Since \( G \equiv \sigma.\Phi^3 \equiv \Phi^2 [\sigma \Phi] \) then \( \rightarrow \) The only \textbf{Force} creating velocities and Charges is \( G \).

7. \textbf{Electromagnetism} \( E \), \( B \) Using the \textbf{United Newton-Coulomb Electro-Mechanical}\n
\textbf{Equation} , \( q \bar{B}_L = 2\pi.m \ f \), \text{then} \text{The Proton-Uniform-Magnetic-field } \bar{B}_F = \left[\frac{2\pi.m}{Q_T}\right] \ f = 1.502766.10^{11} \text{ Tesla} \). The \textbf{Light} Proton-Resonance frequency \( f_p = 4 \sqrt{\frac{1}{4\pi^2 m.a^3}} = 5.26241.10^{17} \text{ H} \), and \textbf{Energy} \( \text{equation } E = \frac{1}{a} \left[\frac{4\pi^2 c^6 + L^2}{2m}\right] \text{ where } L = \text{the Spin } S = 5.691952. \text{ 10}^{-34} \{\text{Kg}/\text{m/s}\} \).

Since \( G \equiv \sigma.\Phi^3 \equiv \Phi^2 [\frac{2S=B}{\pi r^3}] \) then \( \rightarrow \) The only \textbf{Force} creating Spins and EM-Fields is \( G \).

8. \textbf{Weak Forces} in \textbf{Proton and Neutron caves} . The \textbf{Electric Force} between the \textbf{u-Quarks} and \textbf{d-Quarks} in Protons and Neutrons becomes from Coulomb law for charges as in \textbf{Uniform Magnetic-field} \( B_F = \left[\frac{2\pi.m}{Q_T}\right] \ f = 2\pi.1.85777.10^{-835262409.10^{17}} \text{ (Kg/Cs) } = 3.83389.10^{9} \text{ Tesla in where Uniform MF} \), the cyclotron frequency is independent of the particle speed and radius \( \text{Force } F_c = C \left[\frac{1}{r^2} \left(\frac{9}{2} h^2 \bar{c} \bar{c} \right) \left[1,602.10^{-19} C\right]^2 \frac{1}{(10^{-15})^2} = 51,25679 \text{ N} \)

Particle & Wave Duality Photon , and Cosmic-Particles Origination .

Volume-6 | Issue-10 | Oct, 2020
\[
x[1Nm = 6.2415 \times 10^{18} \text{ eV}] = 3,199125.10^{20} \text{ eV}
\]

Since \( G \equiv \sigma \Phi^3 \equiv \Phi^2 \left( \frac{2B_p}{\pi r^2} \right) \) then \( \rightarrow \) The only Force creating Caves and EM-Fields is \( G \).

9… **Strong Forces in Hydrogen-cave.** From cave \( r_H = \frac{\hbar}{cz_c} = \frac{Gq_a}{4\pi A_z c} = 2.1127839.10^{-11} \text{ m} \) and from Unit-Energy, \( g \cdot r^3 \cdot E^2 = 1 \), the frequency \( f = 3.2881322.10^{15} \text{ Hz} \), then the Hydrogen cave-Energy \( L = h \cdot f_N = 6.62607.10^{-34} \cdot 3.2881322.10^{15} J / 1.6.10^{-19} = 13.6 \text{ eV} \). In case of **1-Proton** \( [\Theta] \equiv \text{An Ion-nucleus} \), then Total-Harmonic-mass \( M_T = 1.67.10^{-27} \text{ Kg} \). Total-Harmonic-Charge \( Q_T = 1.6022.10^{-19} \text{ C} \), The Resonance-Cave-frequency \( f \), is

\[
f = \frac{4}{\sqrt{4\pi^2 m_a r^2}} \cdot 1.189975.10^{15} \text{ Hz} \]

The System \( M_T = \text{masses} \), \( Q_T = \text{charges} \) creates a constant Uniform-Magnetic-field of Strength \( B_E = \frac{[2\pi M_T]}{Q_T} f = 7.7929983.10^7 \Gamma \) Tesla which is \( \rightarrow \) **The Strength of a Non-magnetton Neutron-Star**.

**Proton** is consisted of Two Up-Quark \( q_u \), and One Down-Quark \( q_d \), with masses
\( m_u = m_d = m_p / 3 = 5, 573.10^{-28} \text{ Kg} \), and the Resonance mass \( M_T = \frac{m_p}{9} = 1.857777.10^{-28} \text{ Kg} \), and charges \( C_{qu} = \frac{2}{3} e + = \frac{2}{3} 1.602.10^{-19} \text{ C} \), \( C_{qd} = - \frac{1}{3} e = \frac{1}{3} 1.602.10^{-19} \text{ C} \), with Resonance charge \( Q_T = \frac{q_p}{3} = 1.602.10^{-19} \text{ C} \), and for Proton-Ion \( q_p = 2.2 q_u + q_d = 2 \cdot \frac{2}{3} e + \frac{1}{3} = e \). The Proton-Resonance frequency for **Uniform MF** is

\[
f_p = \left( \frac{4}{\sqrt{4\pi^2 m_a r^2}} \right) = 5.26241.10^{17} \Gamma \text{ Hz}, \text{ and a Magnetic-field-Strength } B_E = \frac{[2\pi m_r]}{Q_T} f = (\text{Kg/ Cs})
\]

\( = 65.7.10^9 \) Tesla, i.e. A **Strong-Nuclear-Force** with the **Strength of a Magnetar**.

The Electric Force between the \( u \)-Quarks and \( d \)-Quarks in Proton is from Coulomb law
\( E_{U-d} = C \cdot \frac{q_a}{r^2} = 1.9972.10^{-7} \text{ N} \), which is the Energy per Proton in CERN-LHC, 2015.

Since \( G \equiv \sigma \Phi^3 \equiv \Phi^2 \left( \frac{2B_p}{\pi r^2} \right) \) then \( \rightarrow \) The only Force creating Sub-Caves and EM-Fields is \( G \).

i.e. In Universe exists **ONLY ONE FORCE** , that of Newton-Gravitational-constant-Force \( G \) which , is following the Material-Geometry-Pattern and Cauchy – Euler – Lagrange – Kepler –Newton – Coulomb , Laws of Mechanics such in microcosm as in macrocosm. The Gravitational force \( G \equiv \sigma \Phi^3 \equiv \Phi^2 \left( \frac{2B_p}{\pi r^2} \right) \) then \( \rightarrow \) The interest of Future-Technologies because Storage can be **Properly-Prepared**, issuing

\[
F_{\text{photon}} = \frac{[\Theta \rightarrow \Phi]}{r^2} = \frac{[\sigma \Phi] r^2}{r^2} = \frac{\sigma}{r} = \frac{2\pi E}{\Phi} = \frac{|w|}{|\Phi|} = \frac{2L}{\Phi B} = \frac{c}{r B}, \text{ in the same Box } B_E \text{ .}
\]

When a Photon travels through an Static-Magnetic-field then \( \rightarrow \) The Spectral-lines \( \leftarrow \) **Split into Multiple-closely-Spaced-lines** , because of the Released-Energy , \( f_n \), into Magnetic-Field, a Phenomenon happening such in Inorganic as in Organic Chemistry .

Because Photon is related to stress \( \sigma \) as ,
\( \bar{V} \left( \frac{\sigma}{2\pi} \cdot \frac{\sigma \Phi}{2\pi r} \right) \equiv \bar{V} \left( \frac{f_n}{f_n} + f_n \right) = \bar{V} \left( \frac{\sigma \Phi^2}{2\pi r} \right) \) and
\( \sigma \equiv \frac{2\pi f_r^2}{\Phi^2} \), \( f_n = \frac{2\pi f_n r}{\Phi^2} = \frac{w}{\Phi} \frac{1}{\Phi^2} = \frac{2}{\Phi^2} \equiv \frac{\bar{C}}{\Phi^2} \), dependent on Position and velocity,

It is a Way , of Information from , \( f_n \), and from Storage , \( \bar{f_n} \), in Nature .
In order that a Material-Point A, moves to another Material-Point B, a Force \( F \) must Push Point A to Point B. This happens to Coulomb-law of Charges and Forces, and also to the Magnets where The \( \oplus \) Charge moves to the \( \ominus \) Charge. These Charges are Breakages from the Collision of any Two-Opposite -Velocity-Vectors into an Equilibrium Physical Velocity-Whirl, where The Thrust on Charges is the Circular-Position of these Charges, \(+ , 0 , -\), on the [STPL mechanism ] and where exists \( \pm \) Charge \( \equiv |s| \equiv |\vec{v}|^2 \). [91]

![Diagram of the New Energy-Atom-Cave Pattern](image)

**Figure-16:** The New Energy-Atom-Cave Pattern. In minimum Energy-Space, \( p \leftrightarrow e \):

**5f.. The New Electromagnetic-Structure of Atom.**

From the Set of infinite Rest, \([+], [-, +]\) or moving Units \( \equiv \) Charges, the electrons \([- , ]\), and choosing Two of them in each Orbit for Stability, is found Mendeleyev - System and the following New-Proposition of Atom-Structure as follows,

1. Hydrogen-Cave becomes from Gravity, \( g \), entering the minimum cave a of \( g.a \cdot f^2_p = 1 \) relation, with the minimum Energy \(-13.6 \text{ eV}\). The Presence of a Proton-Positive-Charge \( \vec{q}_p = \oplus \) creates in cave a the UMF \( \equiv \) Uniform-Magnetic-Field \( \vec{B}_p \), [The-Material-Space] as equation \( \vec{q}_p \cdot \vec{B}_p = 2\pi m_p f_e \), which is the Storage of Energy in Hydrogen-Cave.

In this UMF, Charges \( \vec{q} \), Orbiting in a Plane Normal to \( \vec{B}_p \), their cyclotron-frequency \( f_n \) is independent of the Particles-speed and radius allowing the acceleration of Charged Particles as are the, Electrons \( \rightarrow \vec{v}_e = 2\pi f_e \) and, Dual-Photons \( \rightarrow \{ \vec{c}. f_n + \vec{c}. f_n \} \).

2. The Presence of a Negative-Electron-Charge \( \vec{q}_e = \ominus \) in the Uniform-Magnetic-field -\( \vec{B}_p \), experiences a Force, \( \text{The-Lorentz-Force} \), when entering the Magnetic-field and since it occupies the constant-energy, \( \vec{q}_e = \frac{G}{c^2 \sqrt{2}} = 1.59.10^{-19} \text{ C} \), then follows a Complete-circle The-Material-Space is \( \vec{B}_p \) and thus defines the Number of the Material-Points in Spaces as well as the Material-number Zero which is now included.

The presence of Photons with this Dual frequency \( \{ \vec{c}. f_n + \vec{c}. f_n \} \), Storage + Energy allows The Work \( \equiv \) Energy produced by Electrons, be Stored in Photons – Storages.

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Particle & Wave Duality Photon, and Cosmic-Particles Origination.
3. The Heap of Masses \( m = M_T \) follow Newton laws, The Charges \([\oplus, \pm \vec{q}_p, \ominus]\) follow the Coulomb law, The Zero-Electron Charges \([\oplus \leftrightarrow \ominus] \equiv \pm 0\) the Material-Geometry Rules, the Arrangements, Positions \( n \), the Material-Geometry Rules of Combinations and Permutations as follows,

a. The Three Elements \( \equiv \) Digits of Material-Geometry are \( \{\oplus, [\oplus \leftrightarrow \ominus], \ominus\} \equiv [+ , 0 , -] \) The Positive, The Zero, The Negative with their Global meaning.

b. The Permutation, arrangement, Per-two of the only Two-Elements is \( P_1^2 = 2 \), and these are the two as \([\oplus, \ominus]\) and \([\ominus, \ominus]\). The number of Permutation with Repetition of the Two Elements in \( n = 2 \) which is the Sub-Spaces as \( P_{\text{Mold}}^n \equiv \text{RP}_2^2 = 2 \), and this because Material Geometry numbers do Not begin with zero \([\oplus \leftrightarrow \ominus]\), as in E-Geometry.

c. The Material-Spaces for 1- Point \( \equiv 2 \) Elements, A Vector \( \equiv 4 \) Elements, A Plane \( \equiv 6 \) Elements, A Volume \( \equiv 8 \) Elements, A Space1volume \( \equiv 10 \) Elements, A Space2volume \( \equiv 12 \) Elements, A Space-n-volume \( \equiv 2 \) Elements in Regular Solids, Analysis in [63]

d. The number of Permutation with Repetition of the Two-Elements in the n-Spaces and in the Two Sub-Spaces is \( P_1^2 \cdot \text{RP}_2^2 = 2 \), \( n^2 \equiv \) The Number of Electrons in Each-Space, A relation defining the number of Electrons in Orbits and The-Mendeleyev-Atoms-Table. Nature follows the Quantum-Space-Positions logic for each element agreeing with M-G, which is the Objective reality such in Space as in motion which is equal \( \equiv \) Energy.

e. The number of Permutation of the n-Spaces and of Repetition in the 2-Sub-Spaces of the Two-Elements \([\oplus, \ominus]\) is equal to \( P_1^2 \cdot \text{RP}_2^2 + P_1^4 \cdot \text{RP}_2^{n-1} + P_1^6 \cdot \text{RP}_2^{n-2} + \ldots \equiv 2 [n^2 + (n-1)^2 + (n-2)^2 + \ldots] \), \( \text{Onion Summation} \), \( \sum n \left[ \frac{n(n+1)(2n+1)}{6} \right] = 2, 10, 28, 60, 110 \), denoting thus the Total-number of Positions in Hydrogen-Caves as an Additional-whole.

f. In Fig-16, The Elements \( \rightarrow \) Proton \( \equiv \oplus \), Electron \( \equiv \ominus \), is The-Energy-Part of Atom, while Neutron \( \equiv [\oplus \leftrightarrow \ominus] \), is The-Space-Part of Atoms as \( 0 \equiv [\oplus \leftrightarrow r \rightarrow \ominus] \), which both consist, The Energy-Space- Universe - Model. Markos 3/12/2019.

The Structure of Atom - Figure -13 :

In (1) is, The Point-Space-Cave with One-Charge-mass-Nucleus in Hydrogen-Cave, and Charge - Orbit-Position-Elements \( m = 0 \), consists the Proton-Ion of hydrogen-cave of Uniform-Magnetic-field-Strength \( = 4.1464883 \text{ Mega-Tesla} \) of Energy is \( 2.03 \times 10^8 \) J and with the Cyclotron-Frequency \( f_R = 1, 189676.10^{15} \) H.

In (2) is, The Vector-Space-Cave \( m = 1 \), with Two-Nucleus-masses of One-Charge and with \( 2m^2 = 2 \) Permitted-Orbit-Positions, per 2 Electrons for Stability, \( \rightarrow \) consists the first, 3, Perpendicular-Plane-Permitted-Positions in Cave, for the \( \rightarrow \text{Lissajous} - \) Eight - Shapes. This happens because of the Linear-Vibrations \( [\ddot{x} + \omega^2 x = 0] \) of The three-masses, which Occur on the Two Perpendicular each other, Line-Vectors of, \( x \perp y \), in Plane above Shapes which are for,

a. Difference of Phase \( \phi_p = 90^\circ \) emission is \( \rightarrow \) The Eight-Shapes \( \ominus \).

b. Difference of Phase \( \phi_p = 0^\circ \) emission is \( \rightarrow \) The Ellipse-Shapes \( \varnothing \).

c. Difference of Phase \( \phi_p = 45^\circ \) emission is \( \rightarrow \) The Double-Saddle-Shapes \( \mathcal{B} \), \( \mathcal{C} \).

For One-Nucleus-mass and One-Orbit-mass is produced the Atom-Nucleus-Orbit-Hook + Plane +, Prior [ANOH], which accumulates the Nutation-frequency used for the Atoms.

Particle & Wave Duality Photon, and Cosmic-Particles Origination.
Bonding. For any two masses in Nucleus and one mass on Orbit, three masses problem, issues the \( x \perp y \), Plane giving the Transverse Electromagnetic waves.

In (2) is, The Plane-Space-Cave \( m = 2 \), with \([2+1] = 3\)-Nucleus-masses of 2-Charges and with \( 2m^2 = 8 \) Permitted-Orbit-Positions, per 2 Electrons for Stability → consists the Second Onion Plane-Energy-Volume, Enveloping the Priors, Vector-Space-Cave - m + Plane + Vector + Point +, Prior [ANOH], and For the \( n \)-Proton \([\oplus]\), \( n \)-Electron \([\ominus]\), \( n \)-Neutron \([\uplus \ominus \ominus \ominus] \), issues the logic for Total number of Positions in the Hydrogen-Caves.

Onion Summation, Issues under the condition of the Three-masses which consist a Plane.

In (3) is, The Volume-Space-Cave \( m = 3 \), with \([14x2] = 28\)-Nucleus-masses of 11-Charges and \( 2m^2 = 18 \) Permitted-Orbit-Positions, per 2 Electrons for Stability → consists the Third Onion Space-Energy-Volume, enveloping the Priors, Vector-Space-Cave - m + Volume + Plane + Vector + Point +, Prior [ANOH], and for the Total Positions cage-number is filled with the Permutation number with Repetition of the Two-Elements in the n-Spaces and the Two Sub-Spaces which is \( \mathbf{P}^n \text{RP}^n = 2 \), \( n^2 \), → 28, referring and all the Prior.

In (3) is, The \( m^{th} \)-Volume-Space-Cave with \( m = m \), with \( \sum^m n \), \( m \)-Nucleus-masses of \( M/2 \) Charges and with \( 2m^2 \) Permitted-Orbit-Positions, per 2 Electrons for Stability, and consists the \( \{ m^{th} \)-Onion-Space-Energy-Volume - Cave \}, enveloping all the Priors → Volume + Plane + Vector + Point +, P- [ANOH] ↔ with the Three-Elements Space \( \oplus \), Anti-Space \( \ominus \), Material-Point \( \oplus \leftrightarrow r \rightarrow \ominus \), of Material-Geometry.

Because Magnetic field \( \mathbf{B_F} \) is Independent of the Electron-velocity, \( v_e \), and of the Cave radius \( r \), therefore the rotating Electrons are not accelerated in Magnetic-Field, but their Strength is Dependent on frequency \( f \), and of Charge \( q \) only. Because of this Velocity-lag allows the in Hydrogen-Storage without Inverse Impedance which exists in M-Point. Above Property makes the Hydrogen-Cave a Uniform-Magnetic-field, \( \mathbf{B_F} \).

Photon was proved to be a Material-point in cave \( r \), where its Inner Storage is the Stationary-Standing-wave the Electromagnetic - Wave \([E^2+H^2] = 2(2r)c.\sin 2\phi \{ \phi = \frac{\mathbf{B}}{\mathbf{E}} \} \) with \( n \)-Lobes representing the Normal mode vibration with frequencies \( f_n = n.f_1 = \frac{\Phi}{h} = \frac{n.v}{4r} \) \( \left[ 1+\sqrt{5} \right] = \frac{2n^2}{n^2r^4} \), and Outward the Storage is the Electromagnetic-Wave

\[
\rightarrow \{ \varepsilon E^2 + jB^2 \} = 2.\lambda.c.\sin 2\phi \{ \phi = \frac{\mathbf{B}}{\mathbf{E}} \} \left( f \right) \left( \phi \right) \left( r \right)
\]

Is the Electromagnetic Energy - Storage, and Electromagnetic Radiation, \( E \), \( B \), is the Wave Conveyer of Cave \( r \), with frequency \( f = \) Energy / Planck-constant \( h \), or \( f = E / h \) which Duality-Photon-velocity is \( \mathbf{\vec{v}} = \mathbf{\vec{c}} = \left[ \frac{\sigma}{2nr} + \frac{\sigma \Phi}{3} \right] = \mathbf{\vec{c}} \left[ \frac{f_n}{f_n} + f_n \right] \) .........(f-v)

From Force-relation \( G = \sigma A = (2\pi f r) \frac{A_F}{\Phi} \), \( w = r = \mathbf{\vec{c}} = \frac{A_F}{\Phi} \), i.e. Action of \( G \) → on \( \mathbf{\vec{c}} \) and, following relation \( \sigma \times \Phi^3 \equiv G \), from Energy-force \( F_g \) in, \( r = L_p \), Planck’s scale of mass \( m = J.w^2 \), where angular-velocity \( w = \frac{c}{r} \) and, from 3-Dimensional \([2^3 = (\oplus \leftrightarrow \ominus)]^3\) Impedance \( g_Z \), of Space, ln(3), and Anti-Space, \( \pi \sqrt{3} \), then the Centrifugal-Force is \( F_g = \mathbf{\vec{g}} = m.g \left[ \frac{c^2}{r^2} \right] = m_g \left[ \frac{c^2}{r^2} \right] = J w^2 c^2 \mathbf{\vec{g}} Z = \left[ \frac{\pi n^2}{2} \right]. \left[ \frac{c^2}{r^2} \right]. \left[ 2^3 \right]. \left[ \ln(3) \right]. \left( \pi \sqrt{3} \right) \right] \)

\[
4\sqrt{3}.\ln 3 .\pi n^2 \mathbf{\vec{c}}^4 = 9,8076754 \ m/s , \text{which is a dForce acting on} \ r = L_p \text{ mass}.
\]

Particle & Wave Duality Photon, and Cosmic-Particles Origination.
i.e. Gravity $\vec{g}$, is the effect of $\mathbf{G}$ Force, on light-velocity $\vec{c}$, in the 3-Dimensional Impedance of Space $\ln(3)$ and Anti-Space $\pi\sqrt{3}$ in $2^3$, Planck-length $L_p = r$, .......(g)

A wide analysis of what is Impedance in Propagating-Photon $\vec{v} = \lambda_n f_n = \vec{c} \cdot \left[ \frac{\sigma}{2\pi r} + \frac{\sigma\phi}{2\pi r} \right]$ = Energy $= \vec{c} \cdot \left[ \frac{f_n}{\lambda} \right] + \vec{c} \cdot f_n$, in Material-Geometry [57-58].

**G ... THE GRAVITATION CONSTANT $G$.**

1g. The Gravitation Constant $G$ and Photon:

![Figure 17](image)

**Figure – 17.** The Newton’s Universal Laws in Primary-Material-Points:

Above, is consisted of Two-Primary-Opposite-Spaces, (+)→(−), The Poles with Infinite points for Parallel-lines such that $\mathbf{G}$ is a **Uniform-Pointy-Force**. The STPL - Mechanism is for constructing the Elementary Particles while the Material - Point, Photon and Photon - Charge, Light velocity $c$, Gravity $g$, Electrons $e$ and $e$- Charge, Hydrogen cave by the Gravitational constant $G$.

In universe **exists Only-One-Force**, The **Gravitational-force $G$**, which is constant in all universe, therefore being constant, becomes from an Conservative –System. In Mechanics, a force $\mathbf{F}$ produces the Work $\mathbf{W}$, when it removes the point of its action from a Position, $A$, to another Position, $B$, as Work equation, $\mathbf{W} = \mathbf{F} ds$, where $ds = d\mathbf{r} = \mathbf{r} - \mathbf{r}_0$. This right definition automatically defines that All this work in universe, which is **Space and Energy**, has been produced by this Unique force $\mathbf{G}$ only.

Gravitational force $G = \sigma \Phi^3 = \Phi^3 \cdot \left[ \frac{\sigma}{\pi r^2} \right] = 2\pi \sigma r \equiv w \equiv \vec{v} \equiv m a = m g = \vec{c}$

It was prior proved, that one of the smallest **Energy-Unit of Space** is that of Planck’s length, and is an **Energy-cave**, and this because from (s) Space $s = 0$ and Type-$k = 1$. Energy which motion is kept in Massive-Box-$B_p$ called Photon or **Energy-Storage**.

The velocity of Photon is $\vec{v} \cdot \left[ \frac{\sigma}{2\pi r} + \frac{\sigma\phi}{2\pi r} \right] = \vec{v} \cdot \left[ \frac{f_n}{\lambda} + f_n \right]$, i.e. a Dual motion as,

1. **Energy-Storage** $S \equiv \left( \bigoplus \bigotimes \right) \rightarrow$ Particle $[ \vec{v} \cdot \left[ \frac{f_n}{\lambda} \right] ] \rightarrow [ \vec{v} = \vec{c} = \lambda \cdot \frac{f_n}{\phi} ] \rightarrow$ i.e. a **Stationary Standing Wave** $\rightarrow [S \equiv \{ EM-R \equiv f_1 = n, f_2, f_3, f_D, f_n = w^2 \}]$,

2. **Energy-Motion** $M \equiv \vec{v} - \text{Vector} \rightarrow$ Wave $[ \vec{v} \cdot f_n ] \equiv \{ f_1 = \left( E^2 + H^2 \right) - n \cdot \frac{\Phi_\sigma}{2\pi r} = \frac{B}{\pi^2 r^2} \} \rightarrow$ i.e. a **Propagating Wave** $\{ W \equiv EM-R \equiv \{ eE^2 + \mu B^2 \} = 2.4\lambda c \sin \varphi \}$. 

Particle & Wave Duality Photon, and Cosmic-Particles Origination.
In both cases carry the in box Golden-ratio-frequency $\Phi$, Everywhere and Anywhere such in microcosm and as in macrocosm.

Gravitational force $G$, in order to communicate with another velocity-vector $\vec{v}$ which is axial also, is needed to have a reaction to this motion, i.e. Gravitational-Energy $G$ is acting on Stress $\vec{g} \to \vec{g}$, through the Waves $f_n \to [\text{on Material-Point Unit Spin $S \approx g$}]$. Force $G$ is spread in a layer—a field which is the Stable -Ocean -Spins $S$, becoming from the Periodic motion, and thus communicates through stress $\vec{g}$ on Spins $\vec{S}$ as Stress in all inter.

It was proved that The Electron-Spin is $\to \frac{S}{2} = 1$, $4603748.10^{-34}$ Joules $\leftarrow$ which is the same to the Material-Point-Periodic-motion-Spin. From the Bonded Tack - Geometry, 1. A Charged-Particle $\ni$ is a Particle with an electric-charge $+$ or $\ominus$, which produces an Electric-field $\vec{E}$, which exerts a Force $\vec{F}$ on other charged Particles $\vec{e}$. Positive charges $+\vec{e}$ accelerate in the $\ni$ Direction of the Field $\vec{E}$, and Negative charges $-\vec{e}$ accelerate in the Opposite $\ni$ Direction to that of the field $\vec{E}$.

2. A moving Charged-Particle $\ni$ or $\ominus$, produces a Magnetic-field $\vec{B}$, which exerts a Force $\vec{F}$ on other moving charges $\vec{e}$. The Force $\vec{F}$ of these charges is always $\perp$, perpendicular to the Direction of their Velocity-vector, therefore the Velocity-magnitude does not change, and the direction only of the Velocity-vector changes.

3. An accelerated-Charged-Particle $\ni$ or $\ominus$, produces an Electro-Magnetic-Wave $\vec{E} \perp \vec{B}$ Perpendicular each other, which are Electric and Magnetic fields travelling through empty Space with the speed of light, $c$, and which is as a Charged-Particle oscillating about an fixed equilibrium Position. This oscillation frequency, $f$, is the same to the E-M-Wave and which wavelength is $\lambda = c / f = c / T$. The E-M-Waves transport Energy through Space, and may be delivered any distance away from the Source. This repelling force becomes from the beyond the Standing-Wave structure at the Two nodes of the wavelength.

4. Accelerated-Charges produce, Changing Electric and Magnetic-fields alternately, which leads to the Propagating-Electromagnetic-Waves. In Zero-Periodic-motion $\{ \ni \to d \ni \ominus \} = 0$ of a Distance, $d$, the motion as Pressure CANNOT act instantly between the two Stationary constitutes, unless a Mean, $d$, is mediated to transfer the Pressure of the $\ni$ constituent, to the $\ominus$ constituent. This Mean is a Stationary-Primary-Material-Point $[\ni \ni \ominus \ominus]$ which is a Standing-Wave-structure becoming from $\{ \ni . \ominus \}$ Charges at the Two nodes of the cave’s wavelength, Producing an Constructive wave - interference, $\ni \ni \ominus$, or, $\ominus \ominus \ni$, and or Producing an Destructive wave - interference $\{ \ni \to d \ni \ominus \}$ where $d$ = the nodes distance in wavelength $\lambda = c / f$. Because $\ni$ charge exerts a Force against $\ominus$ charge with Zero-Periodic motion and which two constituents equidistant, $d = n.[\ni \ni \ominus \ominus \ni \ni \ominus \ominus]$, $n = 1, 2, \ldots r$, then the two Charges create an Electric and an Magnetic field Perpendicular each other $\ni \ni \ominus \ominus$ which is the Electric-Force and the Magnetic-Force of the Standing wave structure.

This is the Way of Particles and Forces creation [91]. Moreover, There is Not Vacuum, instead exist the Infinite - Material-Points created from the Periodic excitation and which are Spinning in Opposite -Pairs for Stability. The Un bonded-Force, $G$, or Gravitational-constant $G$, was shown to be the Electric-Field-lines, i.e. The SPACE is a Huge-Electrostatic-Magnet from the Infinite-Dipole-Opposite-Primary-Charges which is THE-ENERGY- PART, of the Two-Primary-Points $\ni \ni$ to $\ominus \ominus$, [82-86]

2g. The Electron and Photon charges:

Particle & Wave Duality Photon, and Cosmic-Particles Origination.
**Figure 18.** Conservation of motion $\equiv$ Energy in the Primary-Material-Point-Field-lines:

Photon $\equiv$ Energy $\equiv$ motion / $T \equiv \left(\frac{v}{2\pi}\right)$. $[\sigma + \sigma \Phi] = \vec{v} \cdot \left[\frac{\sigma}{2\pi} + \frac{\sigma\Phi}{2\pi}\right] = \vec{v} \cdot \left[\vec{f}_n + f_n\right] = $ Moving - Storage $\rightarrow [\vec{v}\vec{f}_n] \leftrightarrow$ Moving-Frequency $\rightarrow [\vec{v}f_n] \leftrightarrow \equiv$ Material-Point i.e.

The Energy produced in Photon-Cave is consisted of Two-moving-Storages, which travel. The Stationary-Charged-Particle is from equation, $g \cdot f^3 \cdot \pi^3 = 1$, where $\pi$ is the Closed Space, $\pi g$ is the Stationary-Electric-Lines, and $f_1 = \frac{2}{\sqrt{8}^{-1} \pi^3}$, the motion $= \text{the Stress}$ in the Two and Opposite-Spaces, $[, \{+\to \{-\}]$, or in the consisted Poles, with Infinite Points and Parallel-lines such as $G$ which is as An-Uniform-Pointy-Force. Electrons can be Spinning clockwise or anti-clockwise and Propagate on a Spiral trajectory. A true definition of what is Electric-Charge and Electricity based on above follows.

In [1] **The Stationary-Electron-Charge**

Becomes from E-equation $q \equiv \frac{m_e c^2}{2} = \frac{g}{4 \pi f^2} \left[\frac{c^2}{2}\right] = \frac{g c^4}{8 \pi f^2}$

while for Photon is directly from $G = F = \sigma - A = (2\pi f)\hat{A} = \frac{w r}{\Phi} = \vec{v} \vec{A} = \sigma \Phi^3$, which is a straight-line-Voltage. Since Energy is produced from motion, which is the continuous removal of $[\{+\to \{-\}]$ and because it occurs in Closed-loops, The Electric-Field-lines are Straight-lines, in Space $\Phi$ and Energy-Field $\sigma$ and when these Pass from $g$ ocean then continue to be Straight-lines, and this because Total-work $W = F_s = \left[ F_{\perp}s\right] = 0 = h f = 0$.

**The Geometry of cave** (Tack-Geometry) controls the Electric-field and the Stability from $g$ while equilibrium from, $g F \pi^3 = 1$, and created from the two opposite Angular Momentum vectors, $M_u, M_d$, at distance, $r$, and thus is created the $\textbf{E-Spin}$ as $2S = M_u \times \{\{+\to \{-\}]$, and is acting on $[\{+\to \{-\}]$ axis i.e. **The Stationary-Electron - Charge is the Storage of** $r \equiv L_p$, cave in-where the **Space and Anti-space**, as $\pi g$, and as Stationary-Electric-Lines are creating Potential-Energy $P_E$, with such Geometry that, to exist from the linear-motion are stored in the form of Dipole-Rotation with a changing-Spin, $S$, and of frequency $f = 1/T$ in the min-cave. Here is cleared that frequency $f_n = B/(\pi r^4)$ of Electron is Energy as angular velocity vector motion in $r$ cave, and this is because in cave exists the Natural-Frequency $f_n = \sqrt{\frac{E}{m}}$, of cave in Electric-Field-lines $E = g \pi$. Photon Frequency becomes from the

Particle & Wave Duality Photon, and Cosmic-Particles Origination.
Isochronous motion \( w = \frac{2\pi}{T} = \frac{B}{4r} = 2\pi f \) which Amplitude is Independent of motion, and its velocity \( \vec{v} = \left[\frac{G\Phi}{A}\right] \), is Dependent on Impedance \( Z_p \) of Space-Anti Space \( A \).

In [2] the Electrostatic Unit of Charge \( q_p \), the Quantum of All, which when concentrated at Point \( \{+\} \) and placed at a unit distance from an equal and Opposite concentrated quantity \( \{-\} \), is the Pulling with a Unit-force. Mass \( m_e \) is the reaction to this Inner motion of \( \{\{+\} \rightarrow \{-\}\} \) and consists the Granular-Storage of Energy motion, which is vibration in a closed loop, and it is a measurable Physical-quantity denoting the Geometry of Electron in \( r \) cave, and Periodic motion. The Geometry of the Periodic motion issues the same such as for Electron and for Material point with different cave and one-frequency as \( f_e = \frac{(1+\sqrt{5})}{4\pi r} \), and \( \vec{v} = \left[\frac{G\Phi}{A}\right] \). Because \( \vec{v} = \frac{G\Phi}{A r^2} = \frac{2\pi f}{\sqrt{\pi r^2}} \), Electric-current is then The flow of the Electric-Charges and which is the moving-quantity of Charges. Since Electrons and Electric Charges exists in, \( g \pi \) loop-level, therefore IS the Property that controls all interactions between Bodies through these Electrical-forces.

In [2] The-Stationary-Photon-Charge is the case of Material point with Periodic Orbital motion where issues the Tack-Geometry i.e. the tracks of the Electric-lines Pattern are closed loops and not straight-lines, and also because of the Voltage between the ends, is created the motion as an Eternal rotation of the \( \{\} \) constituent towards \( \{\} \) constituent, [ The opposite issues for Rotational motion where in the Moving-Photon-Tank and because of Stress, \( \sigma \), is created the Centrifugal-Force \( F_f \). and \( \vec{v} = \left[\frac{G\Phi}{A}\right] \). Because \( \vec{v} = \frac{G\Phi}{A r^2} = \frac{2\pi f}{\sqrt{\pi r^2}} \), so, Stress \( \sigma = 0 \rightarrow \sigma \), and \( \vec{B} = \) Angular-Momentum = AM independent of \( \sigma \). \( \rightarrow \) AM, and Spin is equal to \( AM / \text{Unit-Area} = AM / \pi \), and because of the Closed One-way loops, Spin is either Positive or Negative and is \( \rightarrow \) Electric-Charge \( \vec{E} = \pm AM / \pi = E-Spin = \pm Electron \). Above Spin disappears the ERP Paradox because is extended and actually is filling up the entire universe. These Stationary-Particles are permanently entangled, with Wave packets becoming from M-P-Photons, which Orientate and Re-orientate their Spins.

In [3] the The-Moving-Photon-Charge is consisted of the above Energy-Storage, the \( g \) in min-cave, occupying All Properties of the Stationary-Electron-Charge and additionally the Kinetic-energy \( E = \frac{m_e v_e^2}{2} = g. v_e^2 / 8\pi \), \( f_e^2 = \vec{q}_e V = h. f_e \), and \( g. v_e^2 = 8\pi h. f_e^3 \) or \( [v_e^2/f_e^3] = 8\pi h / g = \text{constant} \), or \( v_e^2 / f_e^3 = k \), and \( v_e^2. T_e^3 = k = \frac{f_e^2}{f_e} = f^3 \left(\frac{T}{\lambda}\right)^2 = f^3 \left[\frac{1}{\lambda f^2}\right]^2 = k \)

i.e. The Electron-velocity squared to the Electron’s - cube Frequency is constant following the Orbit-Unit-Energy equation \( k = f_e^2 a^3 \), and equal to the Inverse \( f \) squared to the Electron’s-cube Frequency in wavelength \( \lambda \) interchanged and keeping light-velocity \( c \) without any other Force acting on them.

This Kinetic-Energy creates angular velocity \( \omega = 2E/B = \frac{m_e v_e^2}{B} \) and the Inwards transverse Electromagnetic-Waves, \( E \perp M \), travelling with \( v_e \), inner velocity as \( E = A. \sin[kx-wt] \) and as \( M = A. \sin[kx-wt] \), and \( E = M = A. \{1 - \sin wt\} \), since \( \sin kx = 0 \).

i.e. The Moving-Electron-Charge is The Electromagnetic-Wave, \( E \perp M \), which carries the Stationary-Electron-Charge, and which is THE STORAGE of \( g \), in min-cave, in-where the Potential-Energy \( P_E \), as linear-motion in \( g \equiv r \) cave is stored in the form of Dipole-rotation, Angular-momentum due to curved motion, with Spin \( S \), directed from \( \{-\} \) \( \rightarrow \{+\} \) and to G-Primary-Direction of frequency \( f = 1/T \), and which is the Source in cave \( r \).

3g. The Material-Geometry and Physics in Chemistry

Particle & Wave Duality Photon, and Cosmic-Particles Origination.

- [1] The Material Point P of Two Units
- [2] Two Material Points Vector P-P and the Material Vector P-P with Four Units
- [3] The Euclidean Plane P-P of Three Non-Linear Points
- [4] The Euclidean Solid P-P-P of Four Non-Linear Points

The Four Material-Points Spaces

1. L-Equilateral Triangle P-P-P is Formulated from the Three Zero-Points P = (+) + (+) = 0 and the Six Units
2. L-Equilibrium of the Six Units (+) and (-) on Triangle P-P-P is Obtained Only on the Regular Hexagon
3. L-Equilibrium for Two Points P = [+] - [-] Plane P-P with Four Points
4. L-Equilibrium for Three Points P = [+] - [-] Plane P-P with Regular Hexagon for Plane P-P-P
5. L-Equilibrium for Four Points P = [+] - [-] Plane P-P with Regular Solid-Triangle F-F-F Four Points = 8 Units in Solid-Space or 2, 4, 6, 8

The Four Material-Points Spaces

- [1] The Material Point P of Two Units
- [2] Two Material Points Vector P-P and The Material Vector P-P with Four Units
- [3] The Euclidean Plane P-P of Three Non-Linear Points
- [4] The Euclidean Solid P-P-P of Four Non-Linear Points


- [1] The Material Point P of Two Units
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The corresponding to the Material-Geometry-Units are for:
1. One-Point → Two-Units, [⊕],[⊖] with Dimension as, the Material-Vector ⊕ → ⊖
2. Two-Points → Four-Units, [⊕],[⊖] with One Dimension as, the Material-Line
3. Three-Points → Six-Units, [⊕],[⊖] with Two Dimension as, the Material-Plane
4. Four-Points → Eight-Units, [⊕],[⊖] with Three Dimension as, the Material-Volume

Keeping the Property of Edge-points to be the Vector ⊕ → ⊖ then Bond is the Potential to the Unique-Steady-Stable-Regular Material-Geometry-Formations.

In (2-3-4-5). All Units in Vectors follow Quaternion \( q = [s+vi] = \overline{AB} \) Properties i.e.
- \([⊕] \) → the Positive constituent of Quaternion at, A point
- \([⊖] \) → the Negative constituent of Quaternion at, B point

In Euclidean-Geometry E-vector \( \overline{AB} \) carries Point \( \text{A to Point} \ B \) as, Vector \( A → B \)
In Material-Geometry M-vector \( \overline{AB} \) carries Energy, \( ⊕ \), from Point \( A \) to \( ⊖ \). Energy of Point \( B \) as, \( ⊕ \) moves to \( ⊖ \), which is The Periodic - Pattern.

Velocity \( \overline{v} \) = The rate of change in \( \overline{AB} \), Therefore Units are Formatted according to the Steady-Material-Geometry-Formations which are:

The Line-Vector in cave, r, which is the Simplest with Double number of 4-Units
The Plane-Regular-Triangle in Orbits, is the most Stable Shape of 6-Plane-Units
The Volume-Regular-Tetrahedron in Space is the most Stable Shape of 8-Volume Units, the Cube, which are Crystals. The Regular n-Hedron are for all others.

Particle & Wave Duality Photon, and Cosmic-Particles Origination.
This is the Why The Glue-Bond ,Potential is the Bond, between the 6-Units formulates the Regular-Hexagon as the First Steady- Plane - Formulation in nature as in Fig-18-

4g. The Elements needed in Cave for Black-Hole-Genesis.

Both motions, Periodic and Rotational, exist as the Mean between the Two Primary-Opposite in PNS ≡ Primary-Neutral-Space. This Mean is the Ocean of the, Two kinds of Spins created from the inner motion in Material-points both Oriented by the acceleration g, created from Rotational-motion and which g, continually effects on Spins through which force G, Flows to all Energy structures.

From \( r_{\text{min}} = 1.07.10^{-7} \, \text{m} \) and \( f^2_{\text{p}} = \frac{1}{r^2} \) then \( f_{\text{min}} = 2.839844.10^{10} \, \text{H} \), and Bonding Energy \( L = h.f_{\text{N}} = 6.62607.10^{-34} \). 2.839847.10^{10} J / 1.6.10^{-19} = 1.176063.10^{-6} \, \text{eV} \) or in Joule = 1.8817009. 10^{-23} J = (Kg.m2/s²). Hydrogen cave was found \( a_{\text{H}} = 2.11450164.10^{-11} \, \text{m} \) and from Orbit-Quantum-Energy \( f^2_{\text{H}} = \frac{1}{g.r^3} = \frac{9.8076754.(2.1127839.10^{-11})^2}{6.62607.10^{-34}} \) = 10,811069.10^{30}.

\( f_{\text{H}} = 3,288019.10^{15} \, \text{H} \), while Nutation-Frequency \( f_{\text{N}} = \frac{sQ}{2\pi J_3w} = 2.839847.10^{10} \, \text{s}^{-1} = f_{\text{min}} \)

Energy in caves \( E = \left( \frac{1}{2} + \frac{L^2}{2m r^2} \right) \equiv \left( \frac{\pi \text{g}}{r} + \frac{L^2}{2(\frac{g}{4\pi\sigma f_{\text{r}}}r)^2} \right) = \frac{\pi \text{g}}{r} \) [ g²r + 2L²²²]...(1) It was proved that the magnitude \( \vec{L} = \vec{a} \times \vec{v} = \text{Constant} \) for all central motions. For circular orbits gravitational force \( G_E \) equals the centripetal force \( C_F = G_E \) and \( m.v^2 / R = [G.m \, p.m \, \sigma] / R^2 \) and velocity \( v = \sqrt{GM/R} \). Substituting the expression into the formula for Kinetic - Energy then, \( K = \frac{m.v^2}{2} = \frac{mGM}{2. \, R} \) , or \( K = (1/2) \, (P_E) = - \frac{P_E}{2} \) and \( - P_E = 2.K_E \) \( \rightarrow \) (2).

The Total-energy \( E = K_E + P_E = K_E - 2.K_E = - K_E \) , i.e. The Potential - Energy \( P_E = \text{Always -Negative and Twice the Kinetic-Energy While The Total - Energy E , of an Central-Orbiting-System is Negative} \).The ratio \( L / E \equiv (-P_E / -P_E) = (2.K_E)/(3.K_E) \equiv -2/3 \)

Placing (2) in Energy-equation \( E = \left( \frac{1}{r} \left( \frac{4\pi^2}{c^2} \frac{s^2}{2m^2} \right) \right) = \frac{1}{9a^2mc} \) [36πmc²+2c²E²] then becomes

\[ 2c^2.E^2 - 9mc^2r^2.E + 36\pi mc^2 = 0 \], which is an 2nd degree Equation with solution \( r^2 = \frac{\pm \sqrt{36mc^2c^2-36.8mc^2c^2}^2}{4c^2} \) \( \ldots \ldots \ldots (3) \)

Since E must always be Negative then \( mc^2r^4-8mc^2r^4 < 0 \), or \( r^4 - 8r^4 < 0 \), and from \( r^4 < 8r^2 \rightarrow r^2 < \sqrt{2.2\pi} \) then \( r < 2, \, 980856 \) m \( \ldots \ldots \ldots \ldots (4) \)

From Unit-energy relation \( g \, a^2 = 1 \), then \( f = \frac{2}{g.a^2} = 1 \) \( \sqrt{\frac{1}{(2.980856).10^{-19}}} =6.14453.10^{10} \, \text{H} \) i.e. a frequency corresponding to Energy \( E = h.f = 6.62606957.10^{-34}.6.14453.10^{10} / 1.6022.10^{-19} \)

\[ \approx 2.541136 .10^{-49} \, \text{eV} \) in a cave \( a = \sqrt{\frac{1}{g^2a^2}} = 2.98086 < 3m \).

The kicked-Energy is \( \vec{B}.f_n = E \equiv \frac{\pi G \Phi B}{4\pi G} =1.463748.10^{-34}.6.14453.10^{10} = 8.97332.10^{-28} \) [Kg.m2/s = Kg.m2], and from \( \cos \frac{G \Phi}{A} \equiv \frac{G \Phi}{e^{\frac{G \Phi}{A}}} \) , where \( A = \sqrt{e^{\frac{G \Phi}{A}}} \) then are

The \( \rightarrow \) Anti-Space + Space-Positions.

i.e. as soon as \( \rightarrow A = \{ \text{The Space +Anti-Space Positions in Universe } \} \), become Inadequate for Energy-Storage \( A = e^{-i(\frac{1}{2})}b = 0, 207879576.b =1.507.10^{-7} \, \text{m} \), then \( \text{Motion=} \) Energy

\[ 70 \]

Particle & Wave Duality Photon , and Cosmic-Particles Origination .
is filling the minimum cave \( r \), and with the necessary-velocity-vectors \( \rightarrow \) Burst Into another cave \( a \rightarrow A \) of \( L_p \), connected to \( G \), and which is an overflow of the energy in.

Space + Anti-Space Positions [58]. The needed storages become from \( E \equiv \vec{v} \cdot [f_n \pm f_n] \).

The Black Holes :

Black Holes Follow Kepler laws, where, On any moving Particle when Tangentially colliding or under any angle \( \phi \), with a Material-Point executing Circular motion, then the Total Energy is \( E \), and the Particles follows constant Elliptical Energy - Orbits on the same semi major axis as equation, \( 1 = c \cdot f_n \cdot a^3 \), and of the same constant Energy.

Semi major axis, \( a \), is related to energy as \( \rightarrow \), \( a = G \cdot M \cdot m / 2E \), and for ellipse (a b axis)

\[
\frac{b^2}{(ma)^2} = \frac{q}{(ma)} \quad \text{and Spin} \quad |S| = \beta^{\frac{1}{2}} = \frac{-m \cdot q \cdot \left[ \frac{b^2}{a} \right]}{\beta} \quad \text{or} \quad B = \frac{\sqrt{m \cdot a \cdot q^2}}{\beta} \quad \text{for} \ a = b
\]

i.e. for very large Energies, semi major axis tends to a Negative-Energy-Point, which is the beginning of the Black hole such as in microcosm and macrocosm. **For axis** \( a \rightarrow \pm 0 \), then \( f_n \rightarrow \infty \), or \( E = \infty \), which is a Black-hole. [61]

In Black-holes where exists the Rotation-Energy, the Spin, velocities follow Quantization of Unit-velocity as \( v = 2\pi \cdot f \cdot |n / c|2f_1 = n \cdot a \cdot c \). From prior relations in B-Holes-Energy is found the Spin, \( S \equiv B \), using equation of kicked-Energy as \( \rightarrow \), \( f_n = E \equiv \frac{\sigma \cdot B}{4 \cdot \pi \cdot n} \) \( \rightarrow \) for \( r_n \).

Angular-Momentum \( B = \frac{2L}{\omega} = \frac{2L}{2\pi \cdot m} = \frac{\pi^2 r^4 \cdot f}{m^2} \), and vector \( B = a \cdot m \), becomes \( B = a \cdot m \), \( v = 2,1127839.10^{-11} m. \cdot 7,237315.10^{-32} kg \). 299798 \( 10^8 \cdot 4,5841758.10^{-34} / \pi \), and Spin

\( S/2 = 1,4603748.10^{-34} \) which is the E-Spin. From cave-relation, a cave, as \( d = a = \frac{3}{\sqrt{9,808 f_{3m^2}}} \)

\[
\Delta = \frac{1}{a} = 3, 3858078.10^{-10} m. \text{The Black-Hole-gravity-equation related to the Inner-Quantum-velocity} \quad \vec{v} = c, \quad \text{and to its} \ n, \text{lobes is the frequency squared as}, \ f^2 = \frac{k}{ma^3} = \frac{\pi g}{a \cdot \left[ \frac{n}{\pi a} \right]} = \frac{4\pi^2 r^6 \cdot f}{ga^2} = \frac{w^3}{a^3} = \frac{v^3}{a^3}, \quad \text{and} \quad f_n = \frac{c}{a^3} = \frac{n \cdot \pi \cdot c}{a^3} \rightarrow \text{Energy Increases}.
\]

**Constant-Force** \( G = \sigma \cdot \Phi^3 \equiv \Phi^2 \cdot \left[ \frac{\sigma \Phi}{\pi \cdot r^2} \right] \equiv 2 \\pi \cdot f \), \( r \equiv w \cdot r \equiv \vec{v} \equiv m \cdot a \equiv m \cdot g = \vec{c} = \frac{2B}{\pi \cdot r^2} \)

**Energy of Photons** = motion / \( T \equiv \left( \frac{1}{\sqrt{2\pi}} \right) \cdot \left[ \frac{\sigma + \Phi}{\pi r^2} \right] \equiv \text{velocity} \rightarrow \vec{v} \cdot \left[ \frac{\sigma}{\pi r^2} + \frac{\Phi}{2\pi r^2} \right] \equiv \vec{v} \cdot \left[ f_n \pm f_n \right]

For Black-Holes, the Total-Energy \( L = \vec{B} \cdot \vec{w} = \frac{1}{2} w \times \pi \sqrt{2} \cdot \frac{1}{2}\cdot \pi r^2 = 2 \pi \cdot r^4 \cdot f^2 = r \cdot m \cdot v \), and mass \( m = \frac{2\pi^2 r^4 \cdot f^2}{2 \pi r^2} \cdot \left[ \pi r^2 \right] \), while Angular-Momentum \( B = r \cdot m \cdot v = \frac{\pi r^2 \cdot \pi r^2 \cdot 2}{2} \) or \( B_E = 2 \pi \cdot r^4 \cdot f^2 = 2 \pi (\pi r^3 \cdot f^2 \rightarrow \text{i.e. Velocity in Black-Holes is Related to Cave} \), \( r^3 \), and Energy \( f^2 \) times of light velocity.

The Produced Work relation, \( W = 2L = \vec{B} \cdot \vec{w} = J \cdot w^2 \), and being as Centripetal-Force

\[
F_G \equiv \left[ \frac{v^2}{r} \right] \cdot J \cdot w^2 = \frac{v^2}{r} \left[ \frac{\pi r^2}{2} \right] \cdot \frac{\pi r^2}{2} = \frac{\pi r^4}{2}, \quad \text{which Generally represent}.
\]

The Black-Hole-Gravity-equation Related to the Inner Quantum-velocity \( \vec{v} \) to its \( n \), lobes.

For gravity \( g \approx \sigma = \frac{\text{Force}}{\text{Area}} \rightarrow \) Mass = Gravity-Acceleration and Impedance \( s \), then

\[
g_G = s \left[ \frac{\pi r^4}{2} \right] = \left[ \frac{3,1415926(\sqrt{5}+1) \cdot 87.10^{-35}}{2\pi 99793458} \right] e^3 = 6,044981.10^{-35} \cdot 80,776078.10^{32} \cdot 20,085536 = 9,8076925, \quad \text{is a constant}.
\]

Particle & Wave Duality Photon, and Cosmic-Particles Origination.
Moreover, from the Primary equation of Electron $\rightarrow \mathbf{w_e}^2 \cdot m_e = \pi q = \text{constant} \equiv \text{Energy}$
≡ [meter of area * meter of force] ≡ Electrons on Orbits, on Traces and also from the Unit-Space ≡ Massive -United-Unit-Space $\equiv \rightarrow [+\mathbf{v}, \mathbf{s}]^\rightarrow$ The Nucleus is jointed through the Neutral Material-Points [ (+) [→] (-) ] with the, Strong-force $\rightarrow \mathbf{S}_f = h n \phi \equiv h \{[S \equiv \mathbf{B}_p \equiv \text{EM-R} \equiv f_1 = n, f_2, f_3, f_D, f_n = w^2]) \equiv h n \frac{(1 + \sqrt{5})}{4 \pi^2} \equiv \frac{h}{4 \pi^2} \cos \frac{\pi}{3}, \text{Increasing-Energy} ....(mg)$

From relation Force $G = \sigma A = [2\pi^r] \frac{A}{\phi} = w \cdot r \equiv \mathbf{c} \cdot \{\frac{A}{\phi}\}, \text{i.e. Action of } G \rightarrow \text{on } \mathbf{c}$ and , following relation $\sigma \cdot \mathbf{c} \cdot \Phi^3 \equiv G$, from Energy-force $\mathbf{F}_g \equiv \frac{w}{r}$, Planck’s scale of mass $m_g = J.w^2$, where angular-velocity $w = \mathbf{c} \cdot \frac{r}{r}$, and from the 3-Dimensional $[2^2 = (\oplus \equiv \Theta) \equiv \text{Impedance } g_z, \text{of Space ln}(3), \text{and Anti-Space } \pi \sqrt{3}$, then the Centrifugal-Force $\mathbf{F}_g$ is , $F_g = \frac{m_g}{r} \left[\frac{c^2}{r}ight] = J w^2 \cdot \frac{c^2}{r} \cdot g_z = \left[\frac{\pi^4}{2}\right].\left[\frac{c^2}{r}\right].\left[2^3 \cdot \text{ln}(3), \pi \sqrt{3}\right] = 4 \cdot \sqrt{3} \cdot \text{ln} 3 \cdot \pi^2 \cdot r \cdot c^4$, and $F_g = \mathbf{g} = 4. \sqrt{3} \cdot 1.0986122886681. \pi^2 \cdot 1.616199. 10^{-35}. [2.99793458. 10^{-2}]^4 = 9.8076754$ which agrees with the Prior.

5g... Applications :

![Diagram](image-url)

**Figure – 20-**: The Wave-Particle Duality of Photon as Wave and as Particle:

The equation of Photon is $\rightarrow \{ \mathbf{c} \cdot \{f_n + \mathbf{c} \cdot \mathbf{f}_n\}\} \rightarrow \text{i.e. Dual Frequencies}$, The Wave $[f_1 = (E^2 + H^2) = n \frac{(1+\sqrt{5})}{4\pi^2} = \frac{2 \cdot B}{\pi^2}]$ - Particle $[\mathbf{v} = \mathbf{c} = \lambda \cdot \frac{f}{\phi}] \rightarrow \text{Duality}$

In Revolving or Rotational motion , which is the opposite of prior, in the Moving Photon being a Material-point, the Box $B_p$ with fix-ends and the Inward-cave, $r$, which is the Energy-Storage $B_p$, is the Outward cave, $r$, as an Electromagnetic-Radiation of wavelength $\lambda = ct = c / f_p$, which carries, Pushes, the Storage $B_p$.

In Fig-20- Compton-effect is shown the Why Golden-ratio-frequency $f_p = \frac{\sigma r}{\pi B} = \frac{n \cdot \sigma \cdot \Phi}{2 \pi r}$ exists in nature from the micro to the macro scale and is a Pressure everywhere in all the Energy structures. Energy as motion defines In-Box, the minimum Resonance-Golden-ratio frequency $f_R = f_1$, which follows Kepler constant for microcosm and frequency $f_R$ defines in Outer-Box the Electromagnetic Radiation which is the Conveyer, the carrier of the Energy-Cave, $r$, The Reality is the Energy-Space United-universe of one Force which produces Work $\equiv \text{Force \times Space}$, and which is conserved as motion in all Space-Boxes. Potential-Energy $\equiv \mathbf{P}_F \text{ stored}$ in Material-point is the Electric-Field $\mathbf{E} = g \cdot \pi$, in where
[⊕ moves to ⊙] and thus from Geometry-Shape are created the two opposite Angular - momentum vectors and from Dipole the Spin S = ½ in r cave filling the whole universe.

In Periodic-Orbital-motion issues Tack-Geometry i.e. the tracks of the Electric lines are Pattern of closed-loops-Pairs, starting Clock-wise and Anti-clockwise from the ⊕ Spring not as straight-lines because of the voltage between ends of Spaces, and the created motion as an Eternal rotation of the {Θ} constituent towards {⊙} constituent. In both cases Angular momentum ⃗B, is equal to ± Spin S. Material Points, Segments etc. consisting the Physical Structures. In the finite-Space of Material-point, cave r, is stored the Work as frequencies, Because Stress σ > 0, Spin = Angular momentum ⃗B, is equal to AM / Unit-Area = AM / π, and frequency f_n = \( \frac{B}{\pi r^4} \) so Spin is either Positive or Negative and equal to the Electric-Charge

\[ \bar{E} = \pm AM / \pi. \]

The Spin becomes from the ↑→↓ Antiparallel Angular - Momentum-vectors ⃗B, which is equal to the Golden-ratio, Spin of cave r, the Spinning-Stationary M-point with Fundamental frequency f_1 of equation → W = \[ \left( \frac{4\pi^3}{3} \right) f_1 = \left( \frac{1 + \sqrt{5}}{3} \right) \frac{2L}{\bar{B}} = \bar{B} \bar{w} = J \bar{w}^2. \]

This Stationary–Energy-Storage is as Coulomb Electrical-Force where the Electrical-Force

\[ F_{\text{electron}} = k_c \frac{Q_1 Q_2}{d^2} = \left[ \Theta < \Theta \right] = k_c \frac{2w}{|e|} = k_c \left( 4\pi^2 \right) \frac{\sigma}{2r^2} = k_c \frac{2c}{r^2} \Phi \]

in Box \( B_e \), and for Photon

\[ F_{\text{photon}} = \left[ \Theta < \Theta \right] \frac{\sigma}{r^2} = \left| \frac{2\pi f}{\Phi} \right| = \left( \frac{2L}{\Phi} \right) \Phi = \left( \frac{c}{\Phi} \right) \Phi \]

Angular-momentum \( \equiv \) Spin \( \equiv \) \( \bar{B} = \frac{\pi r^4}{4} \left[ 1 + \sqrt{5} \right] = \frac{\pi r^4 \Phi}{2} = \left[ \frac{\pi r^4 c}{2} \right], \) as Orbit-Forces.

Above relation agrees with Laplace-equations for Incompressibility and Irrotationality where \( \nabla x \vec{q} = \vec{r} x + \vec{v} y = 0, \) and \( \nabla x \vec{v} = \vec{v} x - \vec{r} y = 0, \) meaning that Space, \( \vec{r}, \) and Energy, \( \vec{v} = \) motion are Interchanged → Because from the first relation the Magnetic-field-Space \( \vec{r}_x \) creates the Electric-field-Energy \( \vec{v}_y, \) and from the second → Energy \( \vec{v}_x \) Pushes the Space \( \vec{r}_x \).

From Electron-Orbit-equation \( 4 \pi^2 f^2 \sigma, m_e = k = \pi g, \) or \( 4 \pi^2 f^2 \sigma, m_e = g, k = \pi g, \) they denote \( \Theta \) Space \( \equiv \) Electric-field-in-where exist Electric-lines i.e. the tracks of Electron-motion of the \( \Theta \) Anti-space. The Right Momentum vector AM \( \equiv \uparrow \) is the Produced Work and stored in Magnetic-field as motion while left-vector AM \( \equiv \downarrow \) is the Produced Work and stored in the opposite Magnetic field as motion and both consist the Dipole \( \Theta \Theta, \) Tack-Geometry.

The Chains of Stationary-Periodic-Spins are Pointy-vibrating in Orbit LRC-Circuit with its frequencies \( f_1 = \left( \frac{1 + \sqrt{5}}{4\pi r} \right) \sigma \times \bar{B} = \left( \sigma \Phi \pi r \right) f = \bar{B} \left( \frac{\pi r^4 \Phi}{2} \right) \bar{B}, \) filling up the entire universe.

Stationary-Electron-Charge \( \equiv \Theta, \) with Orbit-Velocity-Vector \( \vec{v} = \left( \frac{2}{m} \left[ E - \left( \frac{k}{r} + \frac{L^2}{2m r^2} \right) \right] \right) \]

occupies Zero Kinetic-energy between \( Q_1, Q_2 \) therefore, \( K_E = \frac{mv^2}{2} = E - \left( \frac{k}{r} + \frac{L^2}{2m r^2} \right) = 0 \)

or \( E = \left( \frac{k}{r} + \frac{L^2}{2m r^2} \right) = \frac{2\pi g}{r} + \frac{S^2}{2(g/4\pi r)^2} = \frac{2\pi g}{r} \left[ g^2 r + S^2 f^2 \right]. \) (s) Equation (s) issues for Spinning Points and Atoms-Stationary-nucleus and is the Strong-Force between Nucleus-Protons.

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Figure – 21. The Newton’s Universal Laws in Atoms and in Onion - Structures.

The Slit-Focus-Atom structure with the three Hydrogen – Orbitals.
The Neutral Material-Points [ (+) [↔] (-)] with the **Strong –Nuclear - Force**

\[
S_F = h f_n = h . \{ \{ S = B_p = EM-R = f_1=N , f_2 , f_3 , f_D , f_n \} \} = h . n \left( \frac{(1+\sqrt{5})\sigma}{4\pi} \right) = h . n . B \hat{r}^2.
\]

are so because \( f_n = \frac{\sigma^2 \Phi^2}{2\pi c} \). and it is the DNA of all Energy-Structures.

In Fig-21- , The Vector-Space-Cave \( m = 1 \), with Two-Nucleus-masses of One-Charge and with \( 2m^2 = 2 \) Permitted-Orbit-Positions , per 2 Electrons for Stability, consists the first , 3 , Perpendicular-Plane-Permitted-Positions in Cave , for the → **Lissajous – Eight - Shapes**.
The Linear-Vibrations \( \{ x + w^2 x = 0 \} \) of the 3-masses , Occur on the Two Perpendicular each other , Line-Vectors of , \( x \perp y \) Plane , as above Shapes which for ,

a.. Difference of Phase \( d_{\phi} = 90^\circ \) emission is → The Eight-Shapes \( \odot \) on Nucleus .
b.. Difference of Phase \( d_{\phi} = 0^\circ \) emission is → The Ellipse-Shapes \( \propto \), after 1st curve.
c.. Difference of Phase \( d_{\phi} = 45^\circ \) emission is → The Double-Saddle-Shapes \( \mathbb{S} \), \( \odot \), on the two , One Proton and One Neutron-Nucleus . Circular-motion happens after

the Lissajous-Shapes on Elements \( 2m^2 = 2.4 = 8 \) region which is the Helium cave .

**Light velocity vector** \( \vec{v} = \vec{c} \) Acting on an-cave , \( \vec{r} \neq \vec{L}_P \) , faces-to the Impedance \( \mathbb{Z}_c \) from
Velocity \( \vec{c} \), and Becomes the minimum-Energy-cave in \( \vec{L}_P \), and Equal to \( \vec{E} = \vec{r} \mathbb{Z}_c \vec{c} \), and

\[
\gamma_H = \frac{h}{c \mathbb{Z}_c} = \frac{6.62606957 \times 10^{-34}}{2.99798 \times 10^8 \times 1.0460975 \times 10^{-31}} = 2.1127839 \times 10^{-11} \text{ m}, \text{ which is the Hydrogen cave.}
\]
In-a- Is shown the structure of Graphene (Regular Hexagon of E-geometry) in a higher Level. In-b-d Is shown the Regular Hexagon structure with Nucleus, Core, to be the Torsional missing link of Cluster, and this because Core is a Cave.

In-c- Is shown the Hexagon structure becoming from the Triangle, times, two Units each point and is equal to Six units, or (3 vertex x 2 units = 6 Units), for any compound Cluster. In-c-d Hexagon shape is because in Photos is included the Projective Plane of Graphene only.

The Plane Directions, for the Steady - Triangle Shapes, of 3 x 2 = 6 (+) elements, is the Regular-Hexagon-Plane-Bonding. The Hydrogen-Light-Photon-cave 2,114501610−11 m as well the Inverse Electromagnetic-Radiation Show the above, Photos in 3-D. The Plane Bonding of Atoms follows The Stability of Material-Geometry [86].

6g... The Atoms Bonding:

a., Because the motion of Atoms in a Conservative System is expressed in terms of the Lagrange’s generalized coordinates, so are and their Bonding. It happens on Slit-Vectors { Bracket-Orbit-Hook } which occupy the Unit-Energy-Space frequency in order that the Electron-Hook ⊙, to Joint with the Bracket-Proton ⊕. For this to happen is needed a common equation for the different [ Bracket-Orbit-Hook = 2r ] as → \( \sqrt{r + w^2} \), r = 0

where \( w = 2\pi f_1 \) as above frequency, \( 2r = \Delta \) is the amplitude of vibration, and then

\[
T = 2\pi \sqrt{\frac{m}{k}} \text{ and Natural } f_1 = T^{-1} = \frac{2}{2\pi} \sqrt{\frac{k}{m}} = \frac{1}{2\pi} \sqrt{\frac{g}{\Delta}} \text{ in cave } 2r = \Delta = \frac{g}{k} \ldots (1)
\]

From Orbit-relation \( a = \frac{1}{\sqrt{g \cdot f^2}} \), and \( f_1 = E / h = 13.6 \text{ eV/h} = \text{Energy-Space-frequency} = 3.28393.10^{15} / s \), the Unit-Energy-Hydro-cave \( a = 2,1127839.10^{-11} \text{ m} = 2r \ldots (1a) \)

From E-Orbit equations \( 1 = k.f_1^2.a^1 \), \( 4\pi f^2.e \cdot m_e = k = \pi g \), then \( m_e = \frac{g}{4\pi f^2 e} \ldots (2) \)

Because motions of masses happen under the same circumstances then from \( (1) \), \( (2) \)

\[
\frac{g}{4\pi^2 \Delta} = \frac{g}{4\pi^2 m} \text{ and } \Delta = \frac{m_e}{\pi} \text{, for any mass } m_e = \Delta.\pi \text{. Exists also } 4\pi^2 f^2.m = k \ldots (a)
\]

From Orbit-frequency \( f^2 = \frac{1}{4\pi^2} \left( \frac{k}{m} \right) = \frac{1}{k.a^2} \) and \( k^2 = \frac{4\pi^2 m}{a^2} \) then \( k = 2 \sqrt[4]{\frac{m}{a^2}} \ldots (b) \)

From \( k = \frac{4\pi^2 mf^2}{1} = \frac{1}{a^3} \) then \( f^4 = \frac{1}{4\pi^4 m.a^3} \) and \( f^2 = \frac{1}{2\pi} \sqrt{\frac{1}{m.a^2}} \text{ or } f = \sqrt[4]{\frac{1}{4\pi^2 m.a^3}} \ldots (c) \)

The Resultant Harmonic-mean mass \( M_T \) as is \( \frac{1}{M_T} = \left[ \frac{1}{m_1} + \frac{1}{m_2} + \frac{1}{m_3} + \frac{1}{m_4} \right] \), because follows The Parallel Connections Resistors inverse law as in Electricity and it is thus the Best Vector which Fits Harmonic to Galileo Center of masses \( m_1 \) in molecules.

b. Example: Water structure \( H_2O \).

1. Hydrogen mass \( \rightarrow m_H = 1,67355.10^{-27} \text{ Kg} \)
2. Oxygen mass \( \rightarrow m_O = 26,5663.10^{-27} \text{ Kg} \)
3. As in Electricity issues, The Parallel Connections Resistors \( \frac{1}{R_T} = \left[ \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \ldots \right] \)

The Harmonic-Mean-Mass on the Center of the 3 masses is \( \frac{1}{m_{2+1}} = \left[ \frac{1}{m_1} + \frac{1}{m_2} + \frac{1}{m_3} \right] \)

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Particle & Wave Duality Photon, and Cosmic-Particles Origination.

\[ \left( \frac{10^{27}}{26,566} + \frac{10^{27}}{1,67355} + \frac{10^{27}}{1,67355} \right) = \frac{1}{m_{2+1}} = \frac{10^{27}}{0.811223}, \text{ or } m_{3T} = 8,112232 \times 10^{-28} \text{ Kg} \]

4. From eq.(c) \( f_{3T} = \frac{4}{\pi} \sqrt{\frac{1}{4\pi^2 m_{3T} a^3}} = \frac{4}{\pi} \sqrt{\frac{1}{4\pi^2 8.1122 \times 10^{-28} 9.45418 \times 10^{-33}}} = 4 \sqrt{3,3027653 \times 10^{56}} = 1,3480916.10^{14} /s, \text{ which is the Resonance-frequency of H}_2\text{O Molecules.} \]

5. From cave-relation, \( a \), \( a \), as \( a = d = \frac{3}{\sqrt{0.808 f_{3M}^2}} = \frac{3}{\sqrt{5.6102298 \times 10^{-30}}} = a = 1.77688867 \times 10^{-10} \text{ m}, \text{ then Bracket-length } \Delta = 2a = 3, 5537772 \times 10^{-10} \text{ m} \)

i.e. On Oxygen Slit-Nucleus, (4-2 = 2) the TWO [Bracket-Orbit-Hooks] \( \equiv \Delta = 2a = 3, 5537772 \times 10^{-10} \text{ m} \) are ORBIT-VECTORS, and Fixed at Plane angle > 90\(^\circ\), and are the Vector’s Negative Electron-edges, \( \ominus \). Joint with an Positive Proton \( \oplus \). of the Hydrogen-Nucleus. Ring \( O \leftrightarrow O \) happens on the Water \( \text{P P P} \)

Molecule-Structure as, \( [\text{H}\oplus] \leftrightarrow \ominus \leftrightarrow O \rightarrow \ominus \leftrightarrow [\ominus \text{H}] \equiv \text{OH}_2 \).

Bracket-Orbit-Hooks \( \Delta = 2a \), follow above Mean-Harmonic-equation of motion. The Above property of Bracket-Hooks shows the deep relation between Material Geometry and that of all Nature, Physics.

**Figure – 23**: The One HYDROGEN-SLIT is The First – Nucleus-Bracket-Bond
The One HYDROGEN-ORBIT is the First PROTON-ORBIT-HOOK on the Helium -Atom-Nucleus-Bracket and exist, Two –Slit -Directions. The One Helium-Atom-Orbit is for, Two Proton-Hook-Directions (90 -180\(^\circ\)) so the Two Points-Hooks (H – H) > can Bond from Square bonding to any Rhombus Shapes.
Figure – 24 - : On The Lithium-Atom with the Three of angle 120° -Plane Directions of the Orbit-Hooks can Bond , on Plane Directions , in Steady – Triangle - Shape which is The Regular-Hexagon-Plane-Bonding .

The size of Atom-Carbon :
The classical way of measuring depends on Avogadro´s number concerning atomic mass and Carbon-density 
\[ C_L = \frac{\text{mass of molas} (\text{gm})}{\text{Density} \left( \frac{\text{gr}}{\text{cm}^3} \right) \text{Avogadro} - N} = \frac{12 \text{ gr}}{2.1(\text{gr/cm})3.022141.10^{23}} = 9.454184.10^{-24} \text{ cm}^3 \]
and 
\[ C_L = 2.11.10^{-8} \text{ cm} = 2.11.10^{-10} \text{ m} = 10.[2,11450164.10^{-11} \text{ m}] = 10.[ \text{ Hydrogen-cave} ] \]

It was prior found that Bracket-length 
\[ B_L = \Delta = 2a = 3.5537772 . 10^{-10} \text{ m} \]

Above relations 
\[ C_L = 10. \text{H}_L = B_L \text{ allows the Strong Carbon-Hydrogen Bonds .} \]

Energy of Photons = motion / T \[ \equiv \left( \frac{\sigma + \sigma \Phi}{2\pi r} \right) \]
\[ \equiv \text{velocity} \rightarrow \vec{v}. \left[ \frac{\sigma}{2\pi r} \frac{\sigma \Phi}{2\pi r} \right] \equiv \vec{v}. \left[ \frac{\vec{f}_n}{\vec{f}_n} + \frac{\vec{f}_n}{\vec{f}_n} \right] \]
7g... The Greatest Energy-Pressure-Level :

Figure – 25 - : The [+ ] Spaces , [- ] Anti-Spaces , [+ ] Sub-Spaces in a circle ( R , OA )

The Material-Geometry explanation of Pascal’s-Triangle

Stress \[ \sigma = \frac{\text{Force}}{\text{Area}} \]

Sound Pressure SP, is the Pressure measured within the wave relative to the surrounding air Pressure. The SP , like other kinds of Pressure , is commonly measured in units of Pascal’s (Pa) = \[ \frac{N}{m^2} = \frac{Kg}{ms^2} = \frac{J}{m^2} \]

with minimum SP , equal to Quantum \[ p_0 = 2.10^{-5} \text{ Pa} \equiv 0 \text{ dB} \] the Decibel .

The equation of Sound-Pressure-Level , SPL , is
\[ L_{SP} = 20\log_{10}(\frac{P}{P_0}) \text{ dB} \]

where \[ P = \text{Pressure} \]
\[ L_{SP_0} = 0 \text{ dB} \] corresponds at frequency \[ f_s = 1 \text{ kHz} \] .

The Sound-Intensity-Level , SIL is ,
\[ L_{SI} = 10\log_{10}(\frac{I}{I_0}) \text{ dB} \]

where Intensity \[ I = \frac{P^2}{Z_0} \]

and Impedance \[ Z_0 = 400 \text{ Ns/m}^3 \]

The greatest SP, cannot be exceeded the average air pressure which is 101325 Pa and fixed
\[ SPL \text{ is } L_{SP} = 20\log_{10}(\frac{101325}{0.0002}) = 194 \text{ dB} \]

In Material Geometry Photon-frequency \[ f_{ph} = \left[ \frac{\sigma}{2\pi r} + \frac{\sigma \Phi}{2\pi r} \right] \] which is related to the Stress ,

\[ \sigma = \text{Force/Area} \]

and is the Energy-Pressure-Level , EPL , of the Wave + Particle Photon ,

Particle & Wave Duality Photon , and Cosmic-Particles Origination .
for its frequency. The greatest EPL for the two opposite-elements \( \{ \bigoplus, \bigodot \} \) in space is their Permutation \( P_{1S}^2 = 2 \) and for anti-space \( P_{1AS}^2 = 2 \) or for both \( P_{1S+A}^2 = 2 \). Because [9], the circumscribed-regular-polygons in a circle \((R, OA)\) denote the spaces and anti-spaces \([\{ \bigoplus \leftrightarrow \bigodot \}]\), and inscribed-regular-polygons of the circle denote the sub-spaces and because [63], the regular-polygons denote the structure of material-geometry to be as,

A Point \( \rightarrow n = 1 \), \( m = 2 \), \( \{ S \equiv \bigoplus \leftrightarrow \bigodot \equiv A \} \rightarrow S = \text{Space}, A = \text{Anti-Space} \)

Line-sector \( \rightarrow n = 2 \), \( m = 4 \), \( \{ S \leftrightarrow A \} \rightarrow S = \text{Space}, A = \text{Anti-Space} \)

Plane-triangle \( \rightarrow n = 3 \), \( m = 6 \), \( \{ S \ A \ S \} \rightarrow S = \text{Space}, A = \text{Anti-Space} \)

A Volume \( \rightarrow n = 4 \), \( m = 8 \), \( \{ S \ A \ S \} \rightarrow S = \text{Space}, A = \text{Anti-Space} \)

And because \( \text{Regular-Hexagon} \) is of \( 3 \times 2 \) = 6 Vertices on Plane-Triangle +

\( \text{Regular-Octagon} \) is of \( 4 \times 2 \) = 8 Vertices on Volume-Tetrahedron then,

Regular-heptagon-anti-heptagon is of, \( 7 \times 2 \) = 14 Vertices [63-P70].

regular-heptagon between the two-regions, Plane-Volume, needs more Pressure, and consists the upper - largest energy-level with permutation, the number of Permutation with repetition of the Seventh - element as, \( R P^2_n \equiv n^2 \rightarrow P^2_2 = 7^2 = 49 \), and

The greatest EPL is \( \rightarrow P_{1S+A}^2 \times P_2^2 = 4 \times 49 = 196 = L_EP = 196 \) dB ....(s2)

Remarks:

1… The Stress \( \sigma \) is executed on all Surfaces, either in Planes or on Surfaces of Volumes, and consists the exclusive-meter of measurements, in dB, in all nature.

2… Stress \( \sigma \), occupies minimum and maximum limits, \( 0 \approx 196 \) dB, differing 2 Units which can be changed by altering the Base of Pressure from 101325 \( \rightarrow 102389 \) Pa.

3… Minimum and Maximum limits, \( 0 \approx 194 \approx 196 \) dB, become from \( L_EP = [p_N^2]_3 = 194 \) dB

4… Stress \( \sigma \), occupies minimum and maximum because is related to frequency and velocity

\[ f_{ph} = \left( \frac{\sigma}{2\pi r} + \frac{\sigma \Phi}{2\pi r} \right) \equiv \frac{\sigma + \sigma \Phi}{2\pi r} = \frac{\sigma \Phi}{2\pi r} = \frac{\sigma \phi}{2\pi r} \], or \( \sigma \equiv \frac{f_{ph} 2\pi r}{\Phi^2} \equiv \frac{w_r}{\Phi^2} \equiv \frac{v}{\Phi^2} \equiv \frac{c}{\Phi^2} \)

And is the Stress-Way of Photon-Storages \( \overline{f_n} \equiv \frac{\sigma}{2\pi r} \), and Photon-Information \( f_n \equiv \frac{\sigma \Phi}{2\pi r} \)

From force \( G \equiv \sigma \Phi^3 \equiv \Phi^3 \{ \{ \sigma \Phi \} \equiv \left[ \frac{2B}{\pi r} \right] \equiv 2\pi r f_p \equiv w r \equiv \overline{v} \equiv m a = m g = \overline{c} \] then Stress \( \{ \sigma \Phi \} \equiv \left[ \frac{2B}{\pi r} \right] \equiv 2\pi f_p r \equiv w r \equiv \overline{v} \equiv m a = m g = \overline{c} \] is dependent on Total-Prior.

5… As soon as \( \rightarrow A = \text{The Space} + \text{Anti-Space Positions in Universe} \), become Inadequate for an min-Energy-Storage \( A = e^{-i(\frac{3}{7})b} \) \( = 0.207879576. b = 1.507.10^{-7} \) m, then Motion \( \equiv \text{Energy} \) is first filling The minimum cave, \( r \), and with the necessary Velocity-Vectors \( \rightarrow \text{Burst Into another cave} \ a > A = 1.507.10^{-7} \) m in \( L_p \), connected to \( G \), and which

78

Particle & Wave Duality Photon, and Cosmic-Particles Origination.

Volume-6 | Issue-10 | Oct, 2020
Is an Overflow of the Energy in the, Space +Anti-Space Positions [58]. From relation
\[ E_{Ph} \equiv \bar{c} \cdot \left\{ \left[ \overline{f_1} + f_n \right] \right\} \] seen the Storages and from
\[ \vec{q}_{\text{Photon}} \equiv \frac{\bar{c} \cdot \sigma \Phi}{2\pi r} \equiv \frac{\overline{w} \cdot \sigma \Phi}{2\pi} \] the Stresses.

8g.. The size, the In-Positions, of Cosmic Particles: [Part of article 91]

1. The Three Elements \( \equiv \) Digits of Material-Geometry are, \( \{ \Theta, [\Theta \leftrightarrow \Theta], \Theta \} \equiv \{ +, 0, - \} \)

The Permutation, arrangement, of the Two-Elements \( P_1^2 \equiv 2 \), i.e. the \( \rightarrow [\Theta, \Theta] \cdot [\Theta, \Theta] \)

The Three-Elements in Space need \( P_1^3 \equiv (3.1), (3.2) = 6 \) Positions and the same for

Three-Elements in Anti-Space need \( P_1^3 \equiv (3.1), (3.2) = 6 \) Positions, and Total Places \( \rightarrow P_1^3 \).

2. The Light velocity vector \( \vec{v} = \bar{c} \) Acting on on-cave \( r \neq L_p \), and finding Impedance the mass \( m_g \), becomes the Centrifugal-Force \( F_g \) of Cave and is Equal to Gravity \( g \), while The

Light velocity vector \( \vec{v} = \bar{c} \) Acting on an-cave \( r = L_p \), as that is STPL-Common circle

then finds The-Impedance \( Z_c \) of the Velocity \( \bar{c} \), and becomes the minimum-Energy-cave in \( 2r \) and Equal to \( E \equiv r \cdot Z_c \cdot \bar{c} \) ....(1) where, \( E \) = The Planck’s-Total-Energy \( E_p = h = 6.62606957 \cdot 10^{-34} \) J.s , \( r = \) The min-Energy cave of Common-circle, \( Z_c = \) The Total Impedance in Universe \( \equiv \) Space + Anti-Space from velocity motion, \( \bar{c} = \) The light-velocity in m/s . Equation (1) becomes \( \rightarrow r \cdot Z_c \cdot \bar{c} = h \) ....(1a) \{ From 3f.. Page 55 \}

The Three Elements \( \equiv \) Digits of Material-Geometry are \( \{ \Theta, [\Theta \leftrightarrow \Theta], \Theta \} \equiv \{ +, 0, - \} \) and as before for \( \log x \) and Base \( x = 10 \) then \( \log_{10} 10 = 10^{10} \) is the Growth, Impedance is the Anti-Growth or Anti-logarithms \( 10^{-10} \) of their g-Position so Antilog \( \log_{10} 10^{-10} = 0.10460975 \)

For the three dimensions Total-Impedance \( Z_c = 0.10460975(10^{-10})^3 = 1.046097.10^{-31} \) and

\[ r_H = \frac{h}{c^n} = \frac{[6.62606957 \cdot 10^{-34}]}{2.9798.10^8.1.0460975.10^{-31}} = 2.1127839.10^{-11} \] m , and is the Hydrogen cave i.e.

\( L_H = r = \frac{h}{c^n} = 2.1127839.10^{-11} \) m is the min-cave in Planck’s-cave with max-Energy \( h \).

3. It was shown that The [Magnetic-Fields] \( \equiv \) [Energy-Baskets] is the Way for Energy Propagation because Strength-field \( \vec{B} = \left[ \frac{2 \pi m}{q \tau} \right], f \equiv \vec{B} = \pi r^2 \cdot \Phi \) \rightarrow Wave \( \equiv \{ E^2 + \mu B^2 \} \]

\[ = 2. \lambda_c. \sin \left( \frac{2 \pi n}{A} \right), \] \( \vec{w} = 2 \pi f = \frac{2 \pi}{m} \) , issuing that Tangent of Ellipsoid \( \vec{B} \perp \vec{w} \) Vector, and the Tangent of Ellipsoid \( \rightarrow \vec{w} \perp \vec{B} \) Vector. Also the Moving Electron of charge \( q = \Theta \), with the Orbit-Velocity-Vector \( \vec{v} \), as \( \vec{v} = \sqrt{\frac{2}{m}} \{ E - \{ \frac{k}{r} + \frac{1}{2m \cdot r^2} \} \} \), is forming angle \( \theta \) with \( \vec{B} \) Vector, Creates IN ORBIT \( r \), the Perpendicular Magnetic-Field \( \vec{B} \), which Magnetic-lines are the Energy circles \( O \) in \( B \), Due to the velocity-constituent \( \vec{V}_p \), and are

Particle & Wave Duality Photon, and Cosmic-Particles Origination.
Perpendicular to Magnetic-circles \( \mathbf{O} \), i.e. The Magnetic-field \( \mathbf{B}_F = \left[ \frac{2\pi m e}{q e} \right] \). …(1)

It has been shown [82] that in a cave, say Hydrogen cave, Electron-Spin is the Angular momentum-vector \( \mathbf{B} \) which rotates according to equation \( \frac{dB}{dt} = [\mathbf{uB}] = uB \left[ \mathbf{B} \right] \) in the Gravitational Potential \( U_g = [ mg] \cdot s \cdot \cos \theta = - sQ \left[ \mathbf{B} \right] \), so the change of \( \mathbf{B} \) is \( \frac{dB}{dt} = u = \frac{sQ}{B} = \frac{sQ}{j_3 \omega_3} \) and from 1-degree equation of motion, \( u \), \( \mathbf{u} + w^2 u = 0 \), then Period of Nutation \( T = \frac{2\pi}{u} = \frac{2\pi J_3 w}{sQ} \), and N-Frequency \( f_N = \frac{sQ}{2\pi J_3 w} \) …(n) where, \( s \) = amplitude of vibration and \( Q = \text{mass} \cdot \mathbf{g} \). In the case of Null-Potential in a cave, equation (n) is, \( f_N = \frac{sQ + \mathbf{r} F}{2\pi J_3 w} = \frac{\mathbf{r} F}{\pi^2 r^4 \nu} \), or \( \mathbf{F} = \left[ \frac{sQ}{\nu} \right] \) and from Lorentz-force \( \mathbf{F} = \mathbf{q} \cdot \mathbf{v} \times \mathbf{B} \) and the Magnetic field \( \nu v = m \nu = m r w \)

\[ \mathbf{B}_F = \frac{m \pi e}{2} \cdot f = \left[ \frac{2\pi m e}{q e} \right] \cdot f \] and so, \( \mathbf{F} = \mathbf{q} \cdot \mathbf{v} \times \left[ \frac{2\pi m e}{q e} \right] \cdot f = 2\pi \cdot \mathbf{q} \cdot \mathbf{v} \left[ \frac{m}{mg} \right] \cdot f = \frac{\mathbf{q} \cdot \mathbf{v} \times \mathbf{F}}{r} \) or \( \frac{2\pi \mathbf{q}}{g} \)

M-Force \( M = \frac{\mathbf{q} \cdot \mathbf{v} \times \mathbf{B}_F}{r} \) …(3) and \( B = \frac{\pi^2 r^4 \nu}{2\pi J_3 w} = 1,065127.10^{41} T \), half Plank-M-Field

Nutation-Force \( F = q \cdot \mathbf{B} = 1,062.10^{-19}, [2,979,789,10^8], 1,065,10^{41} = \mathbf{5,116,10}^{30} \) Newton. Equation (3) relates the Inside existing force \( F \), which becomes from Charge \( Q^+ \) only, from Spin \( S \) and, of from \( r \), cave, and in SP3L Mechanism creates the Six-Forces of Nature , i.e.

In the same cave \( m \) Charge \( Q^+ \), creates the Magnetic field \( \mathbf{B}_F \), in where gravity \( g \), acts on Charge mass \( m \) and creates the Nutation-frequency \( f_N \), and the Inertial-Force \( F \).

The Hydrogen cave \( L = r = \frac{h}{c \zeta} = 2,1127839.10^{-11} m \) is the min-cave in Planck’s-cave with max-Energy \( h \). The cave with [Anti-Space + Space-Positions] is 0,707106781.10^{-20} m and is the Border-line between the , Weak and Strong Forces , because in cave exist the maximum Space-Positions . Placing the above \( r \) Nucleus-Cave in charge \( Q^+ \) then.

\[ \mathbf{q} \cdot \mathbf{w} = \frac{g \mathbf{s}}{2\pi r^2} = 9,8076754,5,691952.10^{-34} \cdot 2\pi \cdot 10^{-20} \] \[ \frac{10^{12}}{J / 1,062.10^{-19} \cdot 10^{19}} = 8,8850576.10^{31} \text{J} / 1,062.10^{-19} \cdot 10^{31} \text{eV} = 5,546.10^{25} \text{eV} \]

or Border-line W-S Forces \( \rightarrow \mathbf{q} \) Weak-Strong \( \equiv 5,546,10^{16} \) GeV −

From Magnetic-field \( \mathbf{B}_F = \left[ \frac{2\pi m e}{q e} \right] \cdot f = \left[ \frac{2\pi m e}{q e} \right] \cdot \frac{F}{\pi^2 r^2 \nu} \cdot \left[ \frac{2\pi m e \cdot f}{\pi^2 r^2 \nu} \right] \) is \( F = \mathbf{q} \cdot \mathbf{v} \times \mathbf{B}_F = 2\pi \cdot \mathbf{q} \mathbf{v} \cdot \frac{f}{g} \)

which is equal to the Nutation-force \( F = \frac{\mathbf{q} \cdot \mathbf{v} \times \mathbf{F}}{r} \) and , therefore \( \rightarrow \) M-Force \( \mathbf{Q} = \frac{g \mathbf{s}}{2\pi r^2} \) are the Potential-Energy-Forces in caves \( r \), from which become all known Forces ,

a). Gravitational-force as \( \mathbf{F}_g = m \cdot g \) The min-Quantum-Energy \( E = 1,1745 \) eV

b). Strong - force as \( \mathbf{F}_s \) \( r = \left[ \frac{g \mathbf{s}}{2\pi r^2} \right] = 2.8.10^4 \) N for , \( 10^{-14} < d < 10^{-16} \) m ,
c). Electric-force. as \( \mathbf{F}_e = q^+ \cdot E \) = 2.8.10^3 N for , \( 10^{-8} < d < 10^{+8} \) m ,
d). Magnetic-force as \( \mathbf{F}_m = \mathbf{c} \cdot q^+ \cdot B_F \) = 2.8.10^2 N for , \( 10^{-8} < d < 10^{+8} \) m ,
e). Weak - force as \( \mathbf{F}_w \) \( r = \left[ \frac{g \mathbf{s}}{2\pi r^2} \right] = 2.8.10^{-2} \) N \( r \) \( \text{for} \), \( 10^{-17} < d < 10^{-19} \) m ,
f). Strong - force as \( \mathbf{F}_s \) \( r = \left[ \frac{g \mathbf{s}}{2\pi r^2} \right] = 2.8.10^4 \) N for, \( 10^{-14} < d < 10^{-16} \) m ,
g). X–Strong-force as \( \mathbf{F}_s \) \( r = \left[ \frac{g \mathbf{s}}{2\pi r^2} \right] = 2.8.10^{10} \) N \( \text{for} \), \( 10^{-17} < d < 10^{-20} \) m ,

Conclusions :

Particle & Wave Duality Photon , and Cosmic-Particles Origination .
1. The Total Impedance $Z_e$, is either Growth or Anti-Growth depending on the velocity $c$
Energy, and the Number of Element=Positions, $h$. Neutrino-cave is $a_v=7,0.10^{-21}$ m
2. The Total Impedance $Z_e=1,0469075.10^{-31}$m, for the Three elements $[+, 0, -] \equiv \oplus, \ominus, \odot$,
$\equiv$ Breakages $\{ s^2 \equiv \pm \text{ Charge} , -s^2 \equiv \pm \text{ Charge} , 2s^2 \equiv 0 \text{ Charge} \}$ issues in STPL - Line Common circle , $2r$ , which is the Physical-Rotor for the Cosmic-Particles origination .
3. The Duality-Photon Energy is $\rightarrow \{ \mathbf{c} \cdot \left[ \frac{\mathbf{f}}{m} \right] + \mathbf{c} \cdot \mathbf{f} \} \leftarrow \rightarrow \text{Particle} \pm \text{Wave} \leftarrow \text{and is NOT becoming from STPL Mechanism , BUT from prior as a Material-Point}. \{91\}$
From Voltage $V = \frac{hf}{q} = \frac{hc}{q \lambda}$ and $\lambda=10^{-7}$m $V = \sqrt[2]{\frac{1}{a^2}} = \sqrt[2]{\frac{1}{10^{-21}}} \cdot 4,1361232.10^{-15} = 12,398eV$
4. For the in-Planck’s length Spin-Energy Gamma-ray, $\gamma$, is the minimum Energy in caves
$E = h f / q = 4,1361232.10^{-15} f = 4,135686.10^{-15} \cdot \frac{1}{\sqrt[2]{V^2}} \leftarrow \text{eV}$ and is in the Smallest acceleration Space-cave $a_\gamma = 1.10^{-15}$ m where issues $f_\gamma = 3,1622776.10^{28}$ H.
5. For the Beyond Planck’s length Spin-Energy is $\rightarrow E = [\Phi \cdot \frac{\sigma}{4\pi r}] \cdot \overline{B} \equiv \frac{[B]^2}{2\pi r^2} \leftarrow$
6. The Resonance-Energy for caves is $E_R = \frac{1}{a^2} \left[ \frac{4\pi}{c^2} + \frac{L^2}{2m} \right] = \frac{\pi}{a^2} \left[ \frac{4\pi}{c^2} + \frac{S^2}{2m} \right]$ and is a Signal
7. From Lorentz-Force $F = \mathbf{q} \cdot \overline{v} \times \overline{B} F = \frac{mv^2}{r}$ equation, and from Cave-Spin $S = r \cdot m \cdot v$, then
Force/cave $\equiv \mathbf{q} \cdot \overline{B} \equiv mv^2 \cdot \overline{B} \frac{S}{r^2}$, Common-Force/cave $\mathbf{q} \cdot \overline{B} C = \frac{cS}{r^2}$, originating E-Caves i.e. Forces $Q_v = 2,9978.10^{6} [5,691952.10^{-34}] = 10,649939.10^{-7} \cdot \left[ \frac{1}{r^2} \right]$ eV ...(Forces)

**The Force** in Charged-Particle , related to their Cave $r (m)$,

<table>
<thead>
<tr>
<th>Particle $r$</th>
<th>Force $Q_v$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1.00 \times 10^{-17}$ m</td>
<td>$10,65 \times 10^{7}$ eV.</td>
</tr>
<tr>
<td>$1.00 \times 10^{-18}$ m</td>
<td>$10,65 \times 10^{8}$ eV.</td>
</tr>
<tr>
<td>$1.00 \times 10^{-19}$ m</td>
<td>$10,65 \times 10^{9}$ eV.</td>
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<tr>
<td>$1.00 \times 10^{-20}$ m</td>
<td>$10,65 \times 10^{10}$ eV.</td>
</tr>
<tr>
<td>$1.00 \times 10^{-21}$ m</td>
<td>$10,65 \times 10^{11}$ eV.</td>
</tr>
<tr>
<td>$1.00 \times 10^{-22}$ m</td>
<td>$10,65 \times 10^{12}$ eV.</td>
</tr>
<tr>
<td>$1.00 \times 10^{-23}$ m</td>
<td>$10,65 \times 10^{13}$ eV.</td>
</tr>
<tr>
<td>$1.00 \times 10^{-24}$ m</td>
<td>$10,65 \times 10^{14}$ eV.</td>
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<tr>
<td>$1.00 \times 10^{-25}$ m</td>
<td>$10,65 \times 10^{15}$ eV.</td>
</tr>
<tr>
<td>$1.00 \times 10^{-26}$ m</td>
<td>$10,65 \times 10^{16}$ eV.</td>
</tr>
<tr>
<td>$1.00 \times 10^{-27}$ m</td>
<td>$10,65 \times 10^{17}$ eV.</td>
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<tr>
<td>$1.00 \times 10^{-28}$ m</td>
<td>$10,65 \times 10^{18}$ eV.</td>
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<td>$1.00 \times 10^{-37}$ m</td>
<td>$10,65 \times 10^{27}$ eV.</td>
</tr>
<tr>
<td>$1.00 \times 10^{-38}$ m</td>
<td>$10,65 \times 10^{28}$ eV.</td>
</tr>
</tbody>
</table>

Particle & Wave Duality Photon , and Cosmic-Particles Origination .
16-Particle $r = 1.10^{-22}$ m → $Q_{-22} = 1.0649939.10^{-6} \cdot \left[ \frac{1}{10^{-22.2}} \right] = 10.65.10^{37}$ eV.

17-Particle $r = 1.10^{-23}$ m → $Q_{-23} = 1.0649939.10^{-6} \cdot \left[ \frac{1}{10^{-23.2}} \right] = 10.65.10^{39}$ eV.

18-Particle $r = 1.10^{-24}$ m → $Q_{-24} = 1.0649939.10^{-6} \cdot \left[ \frac{1}{10^{-24.2}} \right] = 10.65.10^{41}$ eV.

**Voltage** in caves becomes from **Lorentz-force** $F = q \cdot \vec{v} \times \vec{B}$, from the Magnetic field $q \cdot B = mv^2/r$ → $q \cdot B = m \cdot v = m \cdot w$, and Energy equation $E = hf = F / c = q \cdot V$ i.e.

Voltage V in a cave $r$ is → $V = \frac{hf}{q} = \frac{h}{2m \cdot q} \cdot (m \cdot eV)^2 \cdot \frac{2}{m} = \frac{6.62606957.10^{-34}}{2 \pi.1.602.10^{-19} \cdot \sqrt{r}} = 0.6582148.10^{-15}$ * \sqrt{\frac{r}{m}} ←

**The Voltage** in Charged-Particles, and the relation to their **Cave** $r$ (m) is:

1- Energy in $r = 1.10^{-7}$ m → $V_{-7} = 0.6582148.10^{-15} \cdot \frac{2}{\sqrt{[10^{-7}^2]}} = 6.5,18653.10^{-5}$ eV.

2- Energy in $r = 1.10^{-8}$ m → $V_{-8} = 0.6582148.10^{-15} \cdot \frac{2}{\sqrt{[10^{-8}^2]}} = 2.061375.10^{-3}$ eV.

3- Energy in $r = 1.10^{-9}$ m → $V_{-9} = 0.6582148.10^{-15} \cdot \frac{2}{\sqrt{[10^{-9}^2]}} = 6.518653.10^{-2}$ eV.

4- Energy in $r = 1.10^{-10}$ m → $V_{-10} = 0.6582148.10^{-15} \cdot \frac{2}{\sqrt{[10^{-10}^2]}} = 2.061375.10^{0}$ eV.

5- Energy in $r = 1.10^{-11}$ m → $V_{-11} = 0.6582148.10^{-15} \cdot \frac{2}{\sqrt{[10^{-11}^2]}} = 6.518653.10^{2}$ eV.

6- Energy in $r = 1.10^{-12}$ m → $V_{-12} = 0.6582148.10^{-15} \cdot \frac{2}{\sqrt{[10^{-12}^2]}} = 2.061375.10^{3}$ eV.

7- Energy in $r = 1.10^{-13}$ m → $V_{-13} = 0.6582148.10^{-15} \cdot \frac{2}{\sqrt{[10^{-13}^2]}} = 6.518653.10^{4}$ eV.

8- Energy in $r = 1.10^{-14}$ m → $V_{-14} = 0.6582148.10^{-15} \cdot \frac{2}{\sqrt{[10^{-14}^2]}} = 2.061375.10^{6}$ eV.

9- Energy in $r = 1.10^{-15}$ m → $V_{-15} = 0.6582148.10^{-15} \cdot \frac{2}{\sqrt{[10^{-15}^2]}} = 6.518653.10^{7}$ eV.

10- Energy in $r = 1.10^{-16}$ m → $V_{-16} = 0.6582148.10^{-15} \cdot \frac{2}{\sqrt{[10^{-16}^2]}} = 2.061375.10^{9}$ eV.

11- Energy in $r = 1.10^{-17}$ m → $V_{-17} = 0.6582148.10^{-15} \cdot \frac{2}{\sqrt{[10^{-17}^2]}} = 6.518653.10^{10}$ eV.

12- Energy in $r = 1.10^{-18}$ m → $V_{-18} = 0.6582148.10^{-15} \cdot \frac{2}{\sqrt{[10^{-18}^2]}} = 2.061375.10^{12}$ eV.

13- Energy in $r = 1.10^{-19}$ m → $V_{-19} = 0.6582148.10^{-15} \cdot \frac{2}{\sqrt{[10^{-19}^2]}} = 6.518653.10^{13}$ eV.

14- Energy in $r = 1.10^{-20}$ m → $V_{-20} = 0.6582148.10^{-15} \cdot \frac{2}{\sqrt{[10^{-20}^2]}} = 2.061375.10^{15}$ eV.

15- Energy in $r = 1.10^{-21}$ m → $V_{-21} = 0.6582148.10^{-15} \cdot \frac{2}{\sqrt{[10^{-21}^2]}} = 6.518653.10^{16}$ eV.

16- Energy in $r = 1.10^{-22}$ m → $V_{-22} = 0.6582148.10^{-15} \cdot \frac{2}{\sqrt{[10^{-22}^2]}} = 2.061375.10^{18}$ eV.

17- Energy in $r = 1.10^{-23}$ m → $V_{-23} = 0.6582148.10^{-15} \cdot \frac{2}{\sqrt{[10^{-23}^2]}} = 6.518653.10^{19}$ eV.

Particle & Wave Duality Photon, and Cosmic-Particles Origination.
18- Energy in $r = 1.10^{-24}$ m $\rightarrow V_{-24} = 0.6582148.10^{-15}.2 \sqrt{\frac{E}{[1.10^{-24}]^3}} = 2.061375.10^{21}$ eV

19- Energy in $r = 1.10^{-25}$ m $\rightarrow V_{-25} = 0.6582148.10^{-15}.2 \sqrt{\frac{E}{[1.10^{-25}]^3}} = 6.518653.10^{22}$ eV

20- Energy in $r = 1.10^{-26}$ m $\rightarrow V_{-26} = 0.6582148.10^{-15}.2 \sqrt{\frac{E}{[1.10^{-26}]^3}} = 2.061375.10^{24}$ eV

Remarks:

1. Caves $r$, determine the Voltage $V = U$ Potential energy in caves. The Kinetic - Energy is, $K_E = \frac{mv^2}{2} = \frac{mGm}{2.\pi} = \frac{GM}{2.\pi}$, or $K_E = (1/2)(-P_E) = \frac{P_E}{2}$ and $\rightarrow -P_E = U = 2.K_E \leftrightarrow$

The Total-energy is $E = K_E + P_E = K_E - 2.K_E = -K_E$, i.e. The Potential - Energy $P_E$ is Always -Negative and Twice the Kinetic-Energy While The Total - Energy $E$, of any Central-Orbiting-System is Negative.

This Property $U = 2.K_E = h f = h / T$ is very interesting for caves with changeable frequency because the two unknowns $K_E$, $T$, may be measured or be calculated. For Weak Force $Z$ in caves $d=10^{-17}$ m then Period $T = \frac{d}{c} = \frac{10^{-17} m}{[2.998.10^8 m/s]} = 3.3358.10^{-26}$ s, and the produced Energy in $d$, is $E_2 = \frac{h}{T} = \frac{1.055.10^{-34} Js}{[3.3358.10^{-26} s][1.602.10^{-19} J/eV]} = 98.84.10^9$ eV $= 99$ GeV

2. From the equation of Forces $Q_i = \left( \frac{cS}{12} \right) = 10.649939.10^{-7}.\left( \frac{1}{r^2} \right)$ eV is seen that Strong and Weak-Forces Converge at cave 5,546.10^{-16} m, of Voltage $V_{-16} = n.[1/r^2] = 2.06.10^9$ eV. to smaller than, $r < 10^{-15}$ m, caves. The Range of action is analogous to the cave on STPL. In all caves Exist the Fundamental Particles [The Six-Quarks and The Six-Leptons] and their Antiparticles as well as Their combinations of these twelve monads, Plus those of Forces.

3. Kinetic Energy equation of Elementary-Particles is given from $E = q V = mc^2/2$ ...(1)

From $B = r m v = r^2 m \omega = r^2 m (2\pi f) = \pi^2 r^4 f$, then $\rightarrow m = \pi r^2/2 \leftrightarrow$ and (1) becomes

$q = \frac{mc^2}{\pi r^2} = \frac{7.0590672.10^{16}}{\pi} \left( \frac{r^2}{V} \right), V = 0.658.10^{-15}.2 \sqrt{\frac{E}{r^2}}$ and for the three types of Particles, lepton.. $r = 10^{-15}$ m $\rightarrow V_{Leptons-Ecave} = 0.6582148.10^{-15}.2 \sqrt{\frac{E}{[1.10^{-15}]^3}} = 6.5188857.10^7$ eV

$Q_{Leptons-Charge} = 7.0590672.10^{16}.\frac{10^{-30}}{[6.5188857.10^7]} = 1.082864.10^{-21} C$

quark.. $r = 10^{-17}$ m $\rightarrow V_{Quarks-Ecave} = 0.6582148.10^{-15}.2 \sqrt{\frac{E}{[1.10^{-17}]^3}} = 6.5188857.10^{10}$ eV

$Q_{Quarks-Charge} = 7.0590672.10^{16}.\frac{10^{-34}}{[6.5188857.10^{10}]} = 1.082864.10^{-28} C$

neutrino.. $r = 10^{-19}$ m $\rightarrow V_{Neutrinos-Ecave} = 0.6582148.10^{-15}.2 \sqrt{\frac{E}{[1.10^{-19}]^3}} = 6.5188857.10^{13}$ eV

and $Q_{Neutrinos-Charge} = 7.0590672.10^{16}.\frac{10^{-38}}{[2.0814579.10^{13}]} = 1.082864.10^{-35} C$

i.e. Energy in Elementary-Particles is related to cave $r$, and Voltage $V$ of cave.

4. From above is seen the following Diagram of Forces in eV².

Particle & Wave Duality Photon, and Cosmic-Particles Origination.
It is proved in \[90\].

**5. Question?** How Forces as Strength-Voltage \(V\), (eV), Quarks \(q\), as Charges \(2/3\) and \(1/3\).e

Leptons \(l\), as Charges \(-1\).e and Neutrinos \(\nu\), with 0 Charge, in Caves \(D\), \(P\) Linear Effect (Interact) and How these are Connected \(??\).

Answer \(\rightarrow\) Charge \(D = + \overline{D}\), and Charge of Point \(P\) is \(\rightarrow\) Charge \(p = - \overline{P}\). i.e.

- \(D_A\) Content-Charge \(\equiv [D_A M]^2 \equiv |\rightarrow [D_A I]\), \(P_A\) Content-Charge \(\equiv [P_A M]^2 \equiv |\rightarrow [D_A I]\|\), or
- \(u\)-Charge \(\equiv\) Charge \(u = +\overline{D_A I} = +\frac{2}{3}\), \(d\)-Charge \(\equiv\) Charge \(d = -\overline{P_A I} = -\frac{1}{3}\), linear Effect and Clipping.

\[W^+ = [-\rightarrow [D_A I]] > [-\rightarrow P_A I], \quad W^- = [-\rightarrow [D_A I]] < [-\rightarrow P_A I], \quad W^0 = [-\rightarrow [D_A I]] = [-\rightarrow P_A I] \ldots(w)\]

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**Figure –27**: The [STPL] Physical-Mechanism -Cave-axis of \(\rightarrow\) Forces and Energy-Caves \(\leftarrow\)

Particle & Wave Duality Photon , and Cosmic-Particles Origination .
1. The Breakage being alternative at Space-Points $A, B, C \rightarrow \textbf{Attacks}$ to the Charges at Anti-Space-Points $K_A, K_B, K_C$, and forms Leptons $\{ e^-, \mu^+, \tau^+, \nu_e, \nu_\mu, \nu_\tau \}$ and Quarks $\{d, s, b, u, c, t\}$, on STPL Points $P_A, P_B, P_C - D_A, D_B, D_C$ respectively.

2. Because the Breakage $\Rightarrow \Rightarrow$ to Charge thus Anti-Particles are Generated only from the Opposite-motion, opposite direction, in their Conductors. $D, P \rightarrow I \leftarrow P, D$

3. From [91] The Geometry of STPL line allows Six Quantities on the three Loads as The Artificial 3-Phase-Star-Circuit and The Physical 6-Phase-Delta-Circuit for $Q_{\overrightarrow{AKA}}$, and $Q_{\overrightarrow{AEKA}}$, Elementary-Particles are launched at $P_A$ and $D_A$ Points of STPL.

4. BOSONS are formed Axially to Common-circle in Sub-Space $A_E, B_E, C_E$, such for Space, $A, B, C$, as for Anti-Space $K_A, K_B, K_C$, and thus acquire their Spin and, Instead of Charge $\rightarrow$ a Voltage-Force $\equiv$ Motion-in-Magnet $\equiv$ Material-Point from their Conductors, $A_P, A_D, A_A$, as Breakage $\Rightarrow \Rightarrow$ to, $\Rightarrow Zero$-Charge, $\Rightarrow \Rightarrow\Rightarrow$ to $Q_+ = \frac{\text{gS}}{2\pi^2}$ and are Launched with $Q_{\overrightarrow{AKA}}, Q_{\overrightarrow{AEKA}}$ Quantities at $P_A, D_A$ Points of the STPL line with the (w) above Linear-relation.

9g. The Interactions and Decays, of Cosmic Particles : $A \rightarrow [L+Q]$ Interactions in Space, Anti-Space for Leptons-Quarks Origination.

**Figure - 28 :** The Physical-Rotor in [STPL]-Mechanism Produces at Pascal’s and Desargues Points $P_A, P_B, P_C \rightarrow D_A, D_B, D_C$, The Leptons and Quarks : 1A. Breakage $s^2 = \overrightarrow{b}\overrightarrow{a} = \overrightarrow{\text{wx}}\overrightarrow{\text{y}} \equiv \Theta$ being at Point $A \rightarrow \textbf{Attacks}$ Breakage Charge $\rightarrow$, $s^2 = \Theta$ at Point $K_A$ with an Impressed-Force $Q_{\overrightarrow{AKA}} = \frac{Z_{\overrightarrow{AKA}} d}{r} \equiv \overrightarrow{|e|} \times \frac{3}{3}$, with $\overrightarrow{c}$ velocity and forms electron-Lepton $\{ e^- \}$ in Conductor $[\frac{d=AKA}{AKA}] = \frac{3}{3}$, as $\frac{3|e|}{3}$, and being at Point $A_E$ forms down-Quark $\{ d \}$ in Conductor $[\frac{d=AEKA}{AKA}]$, as $\frac{|e|}{3}$, and Both the Work-Energy-Storages $Q_{\overrightarrow{AKA}} \equiv \overrightarrow{|e|} \times \frac{3}{3}, Q_{\overrightarrow{AEKA}} \equiv \frac{|e|}{3}$, are Launched-Off the common-circle at the Pascal Point, $P_A$, of the [STPL] line.

Particle & Wave Duality Photon, and Cosmic-Particles Origination.
2A.. The ⊗ Breakage being at Point A → **Attacks** the ⊆ Charges at Points K_B, K_C ← with the **Impressed-Force** \( Q_{AK_B} = Z_{AK_B} \frac{d}{r} = \frac{1}{3} |\vec{e}| \times \frac{1}{3} \), with \( \vec{c} \) velocity forming the

**electron-neutrino-Lepton** \( \{ e^- \} \) in Conductor \( \left[ \frac{d=AK_B}{AK_A} \right] = \frac{1}{3} \) as \( |\vec{e}| \times \frac{1}{3} \), and \( \frac{d=AK_C}{AK_A} = \frac{2}{3} \)

**up-Quark** \( \{ u \} \) in Conductor \( \left[ \frac{d=AKC}{AK_A} \right] = \frac{2}{3} \) as \( |\vec{e}| \times \frac{2}{3} \), and Both the Work-Energy-Storages

\( Q_{AK_B} = \frac{|\vec{e}|}{3} \equiv \text{Charge } v_e = +D_{A\rightarrow} = \frac{1}{3} \), \( Q_{AK_C} = \frac{2|\vec{e}|}{3} \equiv \text{Charge } u = +\vec{D}_{A\rightarrow} = \frac{2}{3} \), are Launched -Off the common-circle at the Desargues Point , \( D_A \), of the [STPL] line .

as → \( v_e \)- Charge \( \equiv +\vec{D}_{A\rightarrow} = +\frac{1e}{3} \), \( u \)- Charge \( \equiv +\vec{D}_{A\rightarrow} = +\frac{2e}{3} \).

**B→[ - L-Q ] Interactions in Space ,Anti-Space for Anti Leptons -Anti Quarks Origination**

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**Figure - 29 -** : The [STPL] line Machine Produces the Anti-Leptons and Anti-Quarks :  
1A.. Breakage \( s^2 = +\vec{V}^2 = |\vec{W}x\vec{V}| \equiv \bigotimes \text{being at Point A} → \text{**Attacks**} Breakage Charge, \( -s^2 = \odot \) at Point K_A , and forms \( Q_{AK_A} \), \( Q_{AEKA} \) Quantities which are Launched at Points P_A of [STPL] line as → **electron-Lepton** \( \{ e^- \} \) and **down-Quark** \( \{ d \} \) ← Simultaneously [F-13] Breakage \( s^2 \), being at Point K_A , **Attacks** Breakage Charge ( \( -s^2 \) ) at Point A **On-Opposite** Conductors \( \left[ \frac{d=KA}{AK_A} \right] = -\frac{1}{3} \), and at Point A_E \( \left[ \frac{d=KEKA}{AK_A} \right] = -\frac{1}{3} \), forms the Energy-Quantities as \( Q_{KA} = -|\vec{e}| \times \frac{3}{3} \), **Positron-Lepton** \( \{ e^+ \} \), and \( Q_{KEA} = -|\vec{e}| \times \frac{1}{3} \), **Anti-down-Quark** \( \{ \bar{d} \} \). which are Launched-Off the common-circle at the Pascal Point , P_A , of the [STPL] line.

2A.. The ⊗ Breakage being at Point A → **Attacks** the ⊆ Charges at Points K_B, K_C ← and forms \( Q_{AK_B} \), \( Q_{AK_C} \) Quantities which are Launched at Point D_A of the [STPL] line as → **electron-neutrino-Lepton** \( \{ v_e \} \), and **up-Quark** \( \{ u \} \) ← Simultaneously [F-13] ⊗ Breakage \( s^2 \) being at Points K_B, K_C , **Attacks** Breakage Charge ( \( -s^2 \) ) at Point A ,

Particle & Wave Duality Photon, and Cosmic-Particles Origination.
On-Opposite 

Conductors \([d=K_B A] = -\frac{1}{1}\), and \([d=K_C A] = -\frac{2}{3}\), forming the Energy Quantities 

\[ Q_{K_B A} \equiv \ -\frac{1}{1} \cdot Q_{K_C A} \equiv \ -\frac{2}{3} \], the Anti-electron -neutrino-Lepton \([\bar{\nu}_e]\), and the Anti-up-Quark \([\bar{u}]\) which are Launched-Off the common-circle at the Desargues Point \(D_A\), of the [STPL] line.

C→[ F-V ] Interactions in Space Anti-Space , for Forces and Voltage Origination :

![Diagram of the Six-Triple Points-Line](image)

**Figure - 30 -** The [STPL] line Machine Produces the Force carriers as Material-Points :

It is known that a Force \(F\) is , any influence that causes an Object to , undergo a Change in speed , a Change in Direction , or a Change in Shape . In Material-Geometry the \([\oplus]\) Charge Attacks \([\odot]\) Charge , the motion , and are created Interactions between the Charges . All Above actions happen in Sub-Space and 12 Leptons , 12 Quarks , 12 kind of Forces are so launched into the Pascal \(P\) , Desargues \(D\) , Points which occupy a different Energy-Magnitude and Voltage . The Two Positions of these \([\oplus]\) , \([\odot]\) Charges exist in Standing and Travelling Wave , since there are only Two-Positions , possible-nodes , in a Wavelength \(\lambda = 2r\).

As in Duality-Photon \(\rightarrow \{ c \cdot f_n + \bar{c} \cdot f_n \} \leftarrow \equiv \) Stationary- Storage in Standing-Wave + Travelling-Wave \(\rightarrow\) Particle + Wave \(\leftarrow\) therefore Force \(F\) is the Space → Anti-Space influence of the \([\oplus]\) , \([\odot]\) Charges at the Two - Positions of Wavelength \(\lambda = 2r\).

The Two Positions in Wavelength follow all laws of Mechanics and the Cauchy-Stresses.

From Lorentz-Force \(F = q \cdot \vec{v} \times \vec{B} \) is \(= 2\pi\cdot q\cdot v\cdot \frac{f-1}{g}\) equation , and from Nutation-Force \(F = \frac{v_S}{r} \) is found the Common Charge \(q = Q_+ = \frac{\frac{R}{2\pi}}{r}\), which originates Forces as ,

**Forces** \(Q_+ = \frac{8.9876754.5691952.10^{-34}}{2\pi.1.602.10^{-19}} \) = 5, 5457194.10^{-15} \(\frac{1}{r^2}\) eV ...(Forces)

Voltage in caves becomes from Lorentz-force \(\vec{F} = q \cdot \vec{v} \times \vec{B} \) , from the Magnetic field \(q \cdot v \cdot B = mv/r \rightarrow q \cdot B = \) m v \(= m \cdot r \cdot w\) , and Energy equation \(E = h \cdot f = F / c = q \cdot V\) i.e.

Voltage \(V \) in a cave \(r \) is \(\rightarrow V = \frac{h}{e} \cdot \frac{2 \cdot \sqrt{R}}{R} = 6.62606957.10^{-34} \) \(\frac{1.602.10^{-19}}{\sqrt{R}}\) \(= 4.1356686.10^{-15} \cdot \sqrt{R}\) \(\leftarrow\)

All Particles and Forces End in STPL , Pascal’s , \(P_A\) , and Desargues’s Points , \(D_A\) , \(A_K_C\) , Creates the , + Force \(G^+\) = + → \(\odot\), and \(A_K_C = \odot \leftarrow \odot\), Creates the , − Force \(G^-\).

87

Particle & Wave Duality Photon , and Cosmic-Particles Origination .
It was referred that two u-Charge \( \equiv \{ \rightarrow D_A I = + \frac{2}{3} \} \), one d-Charge \( \equiv \{ \leftarrow P_A I = - \frac{1}{3} \} \), are Effecting linearly and Connected by linear-forces, as \( \rightarrow [u-d-u] \rightarrow \) with Resultant-charge \( \sqrt{2} \left[ + \frac{2}{3} \right] \left[ - \frac{1}{3} \right] = + \frac{5}{3} \equiv \) Charge \( C_e \equiv 1,602.10^{-19} \) C in cave \( a = 5,0.10^{-17} \) m, and are,

\[
W^+ = \{ \rightarrow D_A I \} \quad \text{or} \quad W^- = \{ \leftarrow D_A I \} \quad \text{and} \quad W^0 = \{ \rightarrow D_A I \} \quad \text{or} \quad \leftarrow P_A I \} \ldots(w)
\]

It was shown [Page-55] that, Forces between the Opposites Equilibrium-Linearly, as this is for two or three Particles \( \rightarrow [u-e] \rightarrow \) or, \( \sqrt{2} e - \sqrt{2} e = 0 \), \( \leftrightarrow [d-u-d] \rightarrow \) where is the Resultant for the Neutral-cave issues \( q_n = 2. q_a + q_u = - 2 \frac{1}{2} e + \frac{2}{3} e = 0.0 \), and the Stability of forces is axial as in Proton and this because the Dynamic-Strip-Polygon doesn’t close. \( \leftrightarrow \)

Electric-Force is the Dominant where Particles are responding to the Constructive \( \oplus \rightarrow (+) \leftarrow \oplus \) or to Destructive \( \oplus \rightarrow (-) \leftarrow \oplus \) Interference as.

Constructive-Interference \( [\oplus \rightarrow \oplus = \oplus \oplus ] \equiv CI^{+,-+}_{=+1} \equiv W^+ \), \( [\oplus \rightarrow \oplus = \oplus \oplus ] \equiv CI^{-,-0} \equiv W^- \), \( [\oplus \rightarrow \oplus = \oplus \oplus ] \equiv CI^{+,-0} \equiv W^{++} \), \( \ldots \)Types of CI-Forces.

Destructive-Interference \( [\oplus \rightarrow \oplus = 0_+ \equiv D_1^{+,-0} \equiv Z^+ \), \( [\oplus \rightarrow \oplus = 0 \equiv D_1^{+,-0} \equiv Z^0 \), \( [\oplus \rightarrow \oplus = 0 \equiv D_1^{+,-0} \equiv Z^- \), \( \ldots \)Types of DI-Forces.

Because Force can’t exist by itself, there must always be an equal and opposite reaction force acting on the Opposite Position or Direction. Coulomb-Force acting between two Particles is \( F_c = C \frac{q_1 q_2}{r^2} \), while the Voltage is \( V_r = C \frac{q_1 q_2}{r^2} \) of cave, \( r \), and is \( \rightarrow V_r = F_c \cdot r \leftrightarrow \ldots \) (v)

i.e. when Two Particles are in a cave, \( r \), then exists an Interaction between the two Particles.

The \( \oplus \) Charged-Particle produces an Electric-field \( \vec{E} \) which exerts a force \( \vec{F} \) on the other charged Particle creating the Constructive or the Destructive Interference in an Homogenous Harmonic vibration Voltage, as Dynamic Matrix \( [L M+K]X = 0 \) where \( X = C \sqrt{1/w^2 = 1/\lambda} \).

The moving Charged Particle, \( \oplus \) or \( \ominus \), produces a Magnetic-field \( \vec{B} \) which exerts a Force \( \vec{F} \) on other moving charge. The Force \( \vec{F} \) of these charges is always perpendicular to the Direction of their Velocity vector, therefore the Velocity-magnitude does not change, and only the Direction of the Velocity-vector changes. With this way is created the Electromagnetic Wave in cave, \( r \), with Wavelength, \( \lambda = 2r \), on Two or more Possible nodes. This formation is that of the Material-Point, i.e. a Standing-Wave, with the Two \( \pm \) Charges at the two-nodes.
The Permutations-Per-Two for Six Leptons is 15, and the same 15 for the Six Anti-Leptons.

\[
P_l e^6 \rightarrow e^{-\mu^+e^{-\tau^+e^{-\nu_e}}}, e^{-\nu_\mu}, e^{-\nu_\tau}\]

\[
\tau^+v_e, \tau^+v_\mu, \tau^+v_\tau, v_\nu e, v_\nu_\mu, v_\nu_\tau, v_\nu_\tau, v_\nu_\tau = 15\text{-Ple}
\]

The Permutations-Per-Two of the Six Quarks is 15, and the same 15 for the Six Anti-Quarks.

\[
P_{qu}^6 \rightarrow u, s, u, t, u, d, c, s, b, t, d, s, c, s, b - t, d, c, t, b - d, c, d, b, c b = 15\text{-P}
\]

The Permutations-Per-Three, Not the same, of the Six Quarks is 20-P

while with repetition is PR ⁶₃ = [7³+1] / 2 = 172 as below.

\[
P_3 \rightarrow u s t, u s d, u s c, u s b, u t d, u t c, u t b, u d c, u d b, u c b -
\]

\[
s t d, s t c, s t b, s d c, s d b, s c b - t d c, t d b, t c b, d c b = 20\text{-P}
\]

PR ²₆ , P₃ ² , P₆ ² , P₃ qu ² , P₆ qu ² , P₆ , PR ⁶ , and generally Pₙⁿ are the Basic-Permutations of the Primary-Particles, while others are Composite, for Interactions and Decays.

10g... AN NEW INTERACTION - METHOD based on – 2f-3f - P48-56 :

Interaction of Electron e⁻, and Electron-neutrino vₑ, is → e⁻ vₑ≡ [-1-0+W⁻] ≡ Σ [vₑe⁻]

From Summation E-neutrino [vₑ=0] in Cave PA .attacks > > Electron [e⁻=1] in Cave PA.

Of STPL as (v), creating the Constructive-Interference [ ⊢ ≡ ⊢ W⁻].

The Process from measurements, 1... DATA.

Electron-mass mₑ = 9.11.10⁻³¹ Kg, Charge qₑ = 1.602.10⁻¹⁹ C, Diameter a = 5.0.10⁻¹⁷ m

E-neutrino mₑvₑ = 3.922.10⁻³⁶ Kg, Charge qₑvₑ = 1.602.10⁻¹⁹ C, Diameter a = 5.0.10⁻¹⁸ m

From mₑ = 5.011.10⁶ eV/c² = (17,826614.10⁻³⁷), 0.511. 10⁶ Kg = 9,1094.10⁻³¹ Kg

mₑvₑ = 22.10⁻⁷ MeV/c² = 22.10⁻⁷.10⁶ eV/c² = 2,2eV=2,2(17,8266.10⁻³⁷) = 3,922.10⁻³⁶ Kg

2... THE SYSTEM.

The two Particles are two Waves { yₓ = cos(kx-wt , y₂ = cos(kx-wt+δ) } where , δ , is the Phase difference , k is the wave number , x is the wave Position and , t is the time which Interact as One Parallel-Harmonic-Resistors-Connection as → [vₑe⁻]

The System Total-Harmonic-mass ≡ Mₜ is → \( \frac{1}{1 + \frac{1}{m_e} + \frac{1}{m_ν}} = \frac{1}{1032} + \frac{3.1032}{0.0003922} \)

= \( \frac{0.003572}{0.0003919} \) and , \( Mₜ = 0.0003919.10⁻³² Kg = 3,919.10⁻³⁶ Kg \).

The System Total-Harmonic-Charge ≡ Qₜ ≡ qₑ + qₑvₑ = - 1,6022.10⁻¹⁹ + 0

and the Resonance-Charge is \( Qₜ = -1.6022.10⁻¹⁹ C \)

Frequency Unit-Cave is the Stationary-System becoming from Kepler second Planetary-law equation , \( 4 π² m f²_o = k \), and constant law of Areas 1 = k . f²_o a³. Their common k , is the Constant-Energy = k \( = 4 π² \) m \( f²_p = \frac{1}{4 π² m a³} \) or , \( f⁴ = \frac{1}{4 π² m a³} \) and \( f_p = \sqrt{\frac{1}{4 π² m a³}} \), so the frequency becoming from this equal Resonance-Energy is the one Mass frequency and is

Particle & Wave Duality Photon , and Cosmic-Particles Origination.
The Magnetic-fields laws for Charges and Periods are, \( T = \frac{2\pi m_T}{q\mu B} \), \( \overline{B}_e = \frac{2\pi m_T}{q\mu} = \frac{|2\pi m_T|}{Q_T} \) for \( T \).

From Energy-Relation \( W = 2E = B w = j.w^2 \), or \( 2E = 2\pi f B \) then Total-Spin*Frequency

\( \overline{B}_f = \frac{E}{g} \), and \( E = S.g.f = 5.69152.10^{-34} \text{ (Kg/m/s).g.} \{ 2, 6815643.10^{21} \text{ H/1/6022.10^{-19}} \}

9.3433859.10^{-6} \text{ eV} = 9.3433859 \text{ MeV}, i.e. the Energy produced from total-System-Spin.

From Planck’s length \( a = \sqrt{\frac{k}{f^2}} \) then \( k = a^3.f^2 \), and since Energy \( E = k \) then Cave \( a = \overline{E} = 3 \sqrt{\frac{E}{f^2}} \)

or \( a = \frac{3}{f^2} \) is figured

The Weak Force \( W^- \) in System is Coulomb’s Force \( \rightarrow [e^- \nu_e] \equiv [-1-0+W^-] \) which may be calculated from the Time needed, for Harmonic-mass to vibrate in cave \( r \), from Energy equation \( r = \frac{m\nu}{q.B} = \frac{3}[9.191.10^{-36} \text{ Kgl.2.997810^{-8}}]{1.6022.10^{-19}} = 17,792361.10^{-15} \text{ m} \), and for Weak Force

\( W^- \) in cave \( d = 10^{-15} \text{ m} \) then Period \( T = \frac{c}{d} = \frac{17,792361.10^{-15} m}{2.99810^{8} m/s} = 5.9351394.10^{-23} \text{ s} \), and

The produced Energy in \( d \), is \( \rightarrow E_W \rightarrow = \frac{1}{T} \) \( = \frac{1,055.10^{-34} \text{ Js}}{2[5.9351394.10^{-23} s][1.602.10^{-19}] / \text{eV}] \) \( = 5.5472.10^6 \text{ eV} = 5.55 \text{ MeV} \), and because from Coulomb-Force \( F_C = m\nu = \frac{CQ}{r} \) and \( V_C = \frac{CQ}{r} \)

then issues \( \rightarrow \) Weak-Force \( W = [E_W] \rightarrow \rightarrow \frac{CQ}{r} \) \( = \frac{5.5472.10^6}{17.792361.10^{-15}} = 3.1177424.10^{20} \text{ eV} \), so the Weak-Force is \( W^- = \frac{h/T}{2r} = \frac{h\nu}{2d} \equiv \frac{h\nu}{2d} \equiv \frac{h\nu}{2d} eV \) \( \rightarrow \rightarrow \) (w-f)

The above Interaction-System is figured as follows,

\( [e^- \nu_e] \equiv [-1-0+W^-=-1]+(W^-) \equiv \Sigma \frac{[ve \rightarrow e^-]}{P_{A}=P_{A}} \rightarrow \right}
For Combinations $\rightarrow [v_e \nu_e] \equiv [-0+0+Z^0] \equiv (0 | Z^0) \equiv [v_\mu \nu_\mu] \equiv [v_\tau \nu_\tau]$

For Quarks $\rightarrow$ Quarks, Combinations issues ,

For 2-Combinations $\rightarrow [u d] \equiv [\frac{2}{3} \frac{1}{3} + Z^0] \equiv [u s] \equiv [u b] \rightarrow K^0 \equiv [s \bar{d}] \equiv (0 | Z^0)$

For 2-Combinations $\rightarrow [u c] \equiv [\frac{2}{3} \frac{2}{3} + W^+] \equiv \left( + \frac{1}{3} \right) W^+ \equiv [u t] \equiv [c t]$

For 2-Combinations $\rightarrow [u \bar{u}] \equiv [\frac{2}{3} \frac{2}{3} + Z^0] \equiv (0 | Z^0) \equiv [\bar{c} \bar{c}] \equiv [t \bar{t}] \equiv [d \bar{d}] \equiv [s \bar{s}] \equiv [b \bar{b}]$

For 2-Combinations $\rightarrow [u \bar{d}] \equiv \left( \frac{2}{3} \frac{1}{3} + W^+ \right) \equiv \left( \frac{1}{3} \right) W^+ \equiv [c \bar{s}] \equiv [t \bar{b}]$

For 2-Combinations $\rightarrow [d \bar{d}] \equiv \left( \frac{1}{3} \frac{1}{3} + Z^0 \right) \equiv (0 | Z^0) \equiv [s \bar{s}] \equiv [b \bar{b}] \rightarrow [e^- e^+]$

The Combinations $[d \bar{u}] \equiv [\frac{1}{3} W^+] \equiv (-1| W^-) \equiv [c \bar{d}] \equiv [\bar{t} \bar{s}] \equiv [e^- \nu_e] \equiv [\mu^+ \nu_\mu] \equiv [\tau^+ \nu_\tau]$

Are Common for all Particles Leptons, Anti-leptons and Quarks, Anti-Quarks.

Since $[\mu^+ \nu_\mu] \equiv \pi^+ \equiv (-1 | W^-)$ then $\pi^- = \pi^- = [\mu^- \bar{\nu}_\mu] \equiv (+1 | W^+) \equiv (+1 | Z^0)$ and $\pi^0 = [\mu^+ \nu_\mu] + [\mu^- \bar{\nu}_\mu] = [\mu^+ \nu_\mu] + [\mu^- \bar{\nu}_\mu] = \equiv (0 | Z^0) \equiv (0 | Z^0) \equiv 2Z^0 = 2\gamma$

For 3-Combinations $\rightarrow [u d c] \equiv [\frac{2}{3} \frac{1}{3} + W^+] \equiv \left( \frac{3}{3} \right) W^+ \equiv [c s t] \equiv [t b u] \equiv [t b c]$

For 3-Combinations $\rightarrow [u u d] \equiv [\frac{2}{3} \frac{2}{3} + W^+] \equiv \left( \frac{1}{3} \right) W^+ \equiv [c s c] \equiv [t t b] \equiv [u c s]$

For 3-Combinations $\rightarrow [d d u] \equiv [\frac{1}{3} \frac{1}{3} + W^-] \equiv (0 | W^- Z^0) \equiv [s c c] \equiv [b t b] \equiv [d s c] \equiv [s b t]$

EXAMPLE :

PROTON is $\rightarrow [u u d] \equiv [\frac{2}{3} \frac{1}{3} + W^+] \equiv \left( \frac{3}{3} \right) W^+ \equiv \text{Two u-Quarks and one d-Quark}.$

Interaction of Up-Quark u , and Up-Quark u , is $\rightarrow [u u] \equiv [\frac{2}{3} \frac{2}{3} + W^+] \equiv [\Sigma]_{DA>DA}$ and the Summation of Up-Quarks [u+u] of Cave DA, Attacks $>>$ Down-Quark [d=1/3] in Cave PA

Of STPL as (v) , creating the Destructive-Interference $[\Theta \rightarrow \Theta = +] \equiv DI + \equiv Z^0$

Since, u u, Summation occupies Constructive-Interference, W^+, therefore is Stable.

The Process from measurements ,
1. DATA .

Up-Quark mass $m_u = 8.91.10^{-30}$ Kg , Charge $q_u = \left[ \frac{1}{3} \right].1.602.10^{-19}$ C , Diameter $a = 5.0.10^{-17}$ m , The Down-Quark $m_d = 10.7.10^{-30}$ Kg , Charge $q_d = \left[ \frac{1}{3} \right].1.602.10^{-19}$ C , mean-Diameter $a = 5.0.10^{-18}$ m

From $m_u = 5.0.10^6$ eV/c^2 = (17,826614. 10^{-37}).5.10^6 Kg = 8.931307.10^{-30}$ Kg

$m_d = 6.0.10^6$ eV/c^2 = (17,826614. 10^{-37}).6.10^6 Kg = 10.695968.10^{-30}$ Kg

2. THE SYSTEM .

The three Particles are three Waves $\{ y_1 = \cos(kx - wt) , y_2 = \cos(kx - wt) , y_3 = \cos(kx - wt + \delta) \}$ where , $\delta$ is the Phase difference , k is the wave number , x is the wave Position and , t is the time which Interact as One-Harmonic-mass-Resistor-System as $\rightarrow [y_1 + y_2 \rightarrow y_3]$

The System Total-Harmonic-Mass $\equiv M_T \rightarrow \frac{1}{M_T} = \frac{1}{m_u} + \frac{1}{m_d} = \frac{2.10^3}{8.9133} + \frac{10^3}{10.696} = \frac{2.10^3}{8.9133} + \frac{10^3}{10.696} = \frac{2.10^3}{8.9133} + \frac{10^3}{10.696} = \frac{2.10^3}{8.9133} + \frac{10^3}{10.696} = \frac{2.10^3}{8.9133} + \frac{10^3}{10.696} = \frac{2.10^3}{8.9133} + \frac{10^3}{10.696}$

and , $M_T = 3 , 1458799.10^{-30}$ Kg . ....(1)

The System Total-Harmonic-Charge $\equiv Q_T \equiv 2q_u + q_d = 2,(2/3),e - (1/3)e = + \frac{3}{3} c = + 1.6022.10^{-19}$ C , and the System-Resonance-Charge $Q_T = + 1.6022.10^{-19}$ C . ....(2)

Particle & Wave Duality Photon , and Cosmic-Particles Origination .
Frequency Unit-Cave is the Stationary-System becoming from Kepler second Planetary-law equation \(4 \pi^2 \frac{m}{a^3} \frac{f^2}{a} = k\), and constant law of Areas \(l = k \cdot \frac{f^2}{a} \cdot a^3\). Their common \(k\), is the Constant-Energy \(\rightarrow k = 4 \pi^2 \frac{m}{a^3} \frac{f^2}{a} = \frac{1}{f^2} \cdot \frac{p}{\pi^2} \cdot a^3\) or, \(f^4 = \frac{1}{4\pi^2 \cdot m \cdot a^3}\), and \(f = \sqrt{\frac{1}{4\pi^2 \cdot m \cdot a^3}}\), so the frequency becoming from this equal Resonance-Energy is the one Mass frequency and is \(f_{2u-d} = \sqrt{\frac{1}{4\pi^2 \cdot m \cdot a^3}} = \sqrt{\frac{1}{4\pi^2 \cdot 3.1458799 \cdot 10^{-30} \cdot (5.19 \cdot 10^{-3})^3}} = \frac{4}{805.18982.10^{80}} = 5, 3269.10^{20} H\)

The System’s Energy is \(E_{2u-d} = h \cdot f_{2u-d} = 6, 62606957.10^{-34} . 5, 3269.10^{20} = 35,29641.10^{-14}\) Joules / 1,6022.10^{-19} \(C = 22,009965.10^{-6} \text{ eV} = 2, 2029965 \text{ MeV} ... (3)\)

The Magnetic-fields laws for Charges and Periods are, \(T = \frac{2\pi \cdot m \cdot T \cdot q \cdot B}{q \cdot B} \), \(\overline{B} = \frac{2\pi \cdot m \cdot T}{q \cdot T} \cdot f\)

so \(\overline{B} = \frac{2\pi \cdot m \cdot T}{q \cdot T} \cdot f\) or \(\alpha = \frac{3}{f^2} \cdot k\), and since Energy \(E = k\) then Cave \(a = \sqrt{\frac{1}{f^2}}\)

or \(\alpha = \sqrt{\frac{1}{f^2}} \cdot \sqrt{\frac{[22029965.10^{-5}]}{(5,3269.10^{20})^2}} = \sqrt{\frac{7,763628.10^{-36}}{1,9801050.10^{-12}} m}\)

The Weak Forces, \(W^+Z^+\), in System is the Coulomb’s Force \([u-u] > [d] \equiv [\frac{4}{3} \cdot I_3 \cdot W + Z^+]\) which may be calculated from the Time needed, for Harmonic-mass to vibrate in case \(r\), from Energy equation \(r = \frac{m \cdot v}{q \cdot B} = \frac{3.1458799 \cdot 10^{-30} \cdot 9.29778 \cdot 10^8}{1,6022.10^{-19} \cdot [65,7 \cdot 10^{-9}]} = 8, 959064.10^{-14} m \ldots (5)\)

and for Weak Forces, \(W^+Z^+\), in cave \(d = 10^{-14} m\) then Period \(T = \frac{d}{c} = \frac{8,959064.10^{-14} m}{(2,998 \cdot 10^7 m/s)} = 2,9833468.10^{-22} s\), and The produced Energy in \(d\), is \(\rightarrow E_{W^+Z^+} = \text{h} / T = 1, 055.10^{-34} J/s = 1, 055.10^{-34} \text{ J/s} \) from Coulomb Force \(F_C = \frac{C \cdot Q}{r^2}\) and Voltage \(V_C = \frac{C \cdot Q}{r}\), then \(\text{Force} [F_C] \times \text{Cave} [r] = \text{Voltage} [V_C] \rightarrow \text{so\ Weak-Forces} \ W^+Z^+ = \frac{[E_{W^+Z^+}]}{r} = \frac{1,055.10^{-34} \text{ J} \cdot [2,998 \cdot 10^7 m/s]}{8,959064.10^{-14} = 1,229736.10^{19} \text{ eV/} ... (7)\) from Weak-Forces \(W^+Z^+ = \frac{[\text{h} / T / 2 \pi]}{r} = \frac{h \cdot c \cdot d}{2 \pi \cdot r} = \frac{h \cdot c}{2 \pi \cdot r} \cdot c \text{ eV} = \frac{1,055.10^{-34} \cdot [2,998 \cdot 10^7 m/s]}{8,959064.10^{-14} = 1,2297.10^{10} \text{ eV}}\)

Remarks:
\(a.\) The Mass and Charge of Primary-Particles is measured in eV and is changed to Kg.
\(b.\) The Harmonic-Resistor-Connection Mass \(M_T\) follows the Ohm’s Inverse-Resistance law.
\(c.\) The System of Masses and Charges is transformed to an-Resultant-mass Oscillating System.
\(d.\) The System’s-Frequency follows Kepler-Planetary-laws and Planck’s Energy. Coulomb laws are for measuring the Magnetic fields, circular Orbits and Forces.

Particle & Wave Duality Photon, and Cosmic-Particles Origination.
The Magnetic Lorentz System's Energy, and the frequency, so

\[ \text{Energy} \rightarrow k = \frac{1}{10} \sqrt{\omega} \]

is \( \equiv 0 \) \( |W^0| \) is Two d-Quarks and One u-Quark. Interaction of Down-Quark \( d \), and Down-Quark \( d \), is \( \rightarrow d \ d \equiv [\frac{1}{3} \ + \ W^0] \equiv \Sigma [d + d] \) and the Summation of Down-Quarks \([d + d]\) of Cave \( \mathcal{P}_A \). Is attacked \( \ll \) by the, Up-Quark \([u = \frac{2}{3}] \) in Cave \( D_A \). OF STPL as relation (v), creating the Destructive-Interference as

\[ \oplus \rightarrow \ominus = 0 \] \( \equiv [\frac{2}{3} + W^0] \) or, \( \mathcal{C} \equiv [W^0] + Dl^{0 +} \equiv Z^0 \) and \([d \ d \ u] \equiv 0 \) \( |W^0| \) The Process from measurements, 1... DATA . The Down-Quark-mass \( m_d = 10,7.10^{-30} \) Kg , Charge \( q_d = [\frac{1}{3}]1,602.10^{-19} \) C, mean-Diameter \( a = 5,0.10^{-18} \) m. Up-Quark mass \( m_u = 8,91.10^{-30} \) Kg , Charge \( q_u = [\frac{2}{3}]1,602.10^{-19} \) C , Diameter \( a = 5,0.10^{-17} \) m. From \( m_d = 6,0.10^6 \) eV/c² \( \rightarrow \) (17,826614. 10^{-37}).6.10^6 Kg = 10,695968.10^{-30} Kg

\( m_u = 5,0.10^6 \) eV/c² \( \rightarrow \) (17,826614. 10^{-37}).5.10^6 Kg = 8,913307.10^{-30} Kg 2... THE SYSTEM . The three Particles are three Waves \( [y_1 = \cos(kx-wt), y_2 = \cos(kx-wt), y_3 = \cos(kx-wt+\delta)] \) where, \( \delta \) is the Phase difference, \( k \) is the wave number, \( x \) is the wave Position and, \( t \) is the time which Interact as One-Harmonic-mass-Resistor-System as \( \rightarrow [y_1+y_2 \rightarrow y_3] \)

The System Total-Harmonic-Mass \( \equiv M_T \) \( \rightarrow \frac{1}{M_T} = \frac{2}{m_d} + \frac{1}{m_u} = \frac{2,10^{30}}{10,696} + \frac{10^{30}}{8,9133} = \frac{28,522108.10^{30}}{95,336656} = \frac{10^{30}}{3,3425529} \) and, \( M_T = 3,3425529 \cdot 10^{-30} \) Kg. ……(1)

The System Total-Harmonic-Charge \( \equiv Q_T \equiv 2q_d + q_u = 2(-1/3).e + (2/3) e = 0 e \), and the System-Resonance-Charge \( Q_T = 0 \) C ……(2)

Frequency Unit-Cave is the Stationary-System becoming from Kepler second Planetary-law equation, \( 4 \pi^2 \) m \( f^2 \) \( q = k \), and constant law of Areas \( l = k \cdot f^2 \cdot a^3 \). Their common \( k \), is the Constant-Energy \( \rightarrow k = 4 \pi^2 \) m \( f^2 \) \( p = \frac{1}{f^2} \cdot a^3 \) or, \( f^4_p = \frac{1}{4 \pi^2 m a^3} \) and \( f_p = \frac{1}{\sqrt{4 \pi^2 m a^3}} \), so the frequency becoming from this equal Resonance-Energy is the one Mass frequency and is

\( f_{2u-d} = 4 \sqrt{\frac{1}{4 \pi^2 m a^3}} = 4 \sqrt{\frac{1}{4 \pi^2 3,3425529 \cdot 10^{-30}(5.10^{-19})^3}} = \sqrt{606,25053.10^{80}} = 4,962072.10^{20} \) H

The System's Energy is \( E_{2d-u} = h f_{2d-u} = 6,62606957.10^{-34} \). \( 4,962072.10^{20} = 32,879031.10^{-14} \) Joules / \( 1,6022.10^{-19} \) C = 20,521177.105 eV = 2 , 0521177 MeV ……(3) Lorentz Force \( F = q (\vec{\nu} \times \vec{B}) \) shows that + q charges turn Right while –q charges turn Left .

The Magnetic-fields laws for Charges and Periods are, \( T = \frac{2 \pi m r}{q B_T} \), \( B_T = \frac{2 \pi m r}{q T} = \frac{2 \pi m r}{Q_T} \)

so \( B_T = \frac{[2\pi m r]}{Q_T} f_{2d-u} = \frac{2 \pi m r}{Q_T} \cdot \frac{3,3425529 \cdot 10^{-30}}{1,6022.10^{-19}} \) (Kg/Cs) = 409 .10^9 Tesla. ……(4)

From Energy-Relation \( W = 2E = B w = J.w^2 \), or \( 2E = 2 \pi f B \) then Total-Spin*Frequency \( \vec{B} \) \( f = \frac{E}{g} \), and \( E = S.g.f = 5,691952.10^{-34} \) [Kg/m/s].g.[1, 4,962072.10^{20} H]/1,6022.10^{-19} = 17,289721.10^6 eV = 17 , 289 MeV , i.e. the Energy produced from total System-Spin .

From Planck's length \( a = \frac{\sqrt{E/f^2}}{2} \) then \( k = a^3.f^2 \), and since Energy \( E = k \) then Cave \( a = \sqrt{E/f^2} \)

Particle & Wave Duality Photon , and Cosmic-Particles Origination .
or \[ a = \frac{3E}{F^2} = \frac{3[(17.289721.10^5)}{(4.962072.10^{20})^2} = \frac{3\sqrt{7.0290166.10^{-36}}}{1,91493462.10^{-12}} \text{ m} \]

The Weak Forces, \( W^-Z^0 \), in System is the Coulomb’s Force \( [d+d] \equiv [\frac{2}{3}+\frac{1}{3}]W^-Z^0 \) which may be calculated from the Time needed, for Harmonic-mass to vibrate in cave \( r \), from Energy equation \[ r = \frac{m\nu}{q\nu} = \frac{[3.342529.10^{-30} K g][2.997810.8]}{1,602.10^{-19}[409.10^9]} = 1,52911.10^{-14} \text{ m} \ldots(5) \]

and for Weak Forces, \( W^-Z^0 \), in cave \( d = 10^{-14} \text{ m} \) then Period \( T = \frac{d}{c} = \frac{1,52911.10^{-14}}{2,998.10^{8} m/s} = 5,100773.10^{-23} \text{ s} \), and The produced Energy in \( d \), is \( E_{W^-Z^0} = \frac{h}{T} = \)

\[ \frac{1.055.10^{-34}}{2[5,100773.10^{-23}][1,602.10^{-19}]/eV} = 6,455411.10^{6} \text{ eV} \equiv 6,455 \text{ MeV} \ldots(6) \]

and from Coulomb Force \( F_C = \frac{CQ}{r^2} \) and Voltage \( V_C = \frac{CQ}{r} \), then \( \text{Force } [F_C] \times \text{Cave } [r] = \text{Voltage } [V_C] \rightarrow \text{so} \)

Weak-Forces \( W^-Z^0 = \frac{E_{W^-Z^0}}{1,52911.10^{-14}} = 4,22141.10^{-20} \text{ eV} \ldots(7) \) or from Weak-Forces

\[ W^-Z^0 \equiv \frac{h/T}{2r} = \frac{h/c/d}{2r} = \frac{h/c}{2er} \text{ eV} = \frac{1.055.10^{-34}}{2[1,602.10^{-19}]/eV[1,52911.10^{-14}]} = 4,22141.10^{-20} \text{ eV} \]

Since \([d u u] \) Summation occupy the Zero-Constructive-Interference therefore is Stable and Forces \( W^-, Z^0 \) are equal and opposite as \( [ W^- + Z^0 = 0 ] \equiv [ \Theta \leftarrow \Theta \rightarrow \Theta ] \)

Reams \( \pi^+ \equiv (\pi^-) \), \( \pi^- \equiv (\pi^+) \), \( \pi^0 \equiv 2Z^0 \equiv 2\gamma \), and \( p \equiv (+1|W^+Z^+) \)

For 3-Combinations \( [u u u] \equiv \left[ \frac{2}{3}+\frac{2}{3}+W^+ \right] = \left[ \frac{4}{3}+W^+ \right] \equiv (2|W^+) \equiv \Delta^+ \) and \( \{\pi^-\} + \{p\} \equiv (+1|W^+)+(+1|W^+Z^+) \equiv (+2|W^+Z^+) \equiv (2|W^+Z^+) \equiv (\Delta^+|Z^+) \)

i.e. \( \Delta^+ \) Particle Decays to \( \{\pi^- + p\} \) through The-Destructive-Interference-Force \( \rightarrow Z^+ \).

For 3-Combinations \( [d d d] \equiv \left[ \frac{1}{3}+\frac{1}{3}+Z^+ \right] \equiv (-1|W^-Z^0) \equiv (0|W^-Z^0) = \Delta^- \)

For 3-Combinations \( \equiv [e^-e^-e^-] \equiv [-1-1-1+Z^0] \equiv (-2|W^- - 1) \equiv (-3|W^- W^-) \)

For 3-Combinations \( [v_N v_N v_e] \equiv [0-0-0+Z^0] \equiv (0|Z^0 - 0) \equiv (0|Z^0 Z^0) \)

For 3-Combinations \( [s s s] \equiv \left[ \frac{1}{3}+\frac{1}{3}+Z^- \right] \equiv (-1|W^--Z^0) \equiv (-1|W^-) \equiv (0|W^-Z^-) = \Omega^- \)

For 3-Combinations \( [d s s] \equiv \left[ \frac{1}{3}+\frac{1}{3}+W^- \right] \equiv (-1|W^- - Z^0) \equiv (-1|W^-Z^-) \equiv \Xi \equiv \Omega^- \)

Using above Reams, then All Elementary and Composite Particles are defined .

Charged-Pions \( \pi^+ \equiv (-1|W^-) \equiv (+1|Z^-) \), \( \pi^- \equiv (+1|W^+) \equiv (1|Z^0) \), \( \pi^0 \equiv 2Z^0 \equiv 2\gamma \),

Proton \( \rightarrow p \equiv (+1|W^+Z^+) \), Stability is \( \Theta \rightarrow \Theta \leftarrow \Theta \)

Neutron \( \rightarrow n \equiv (0|W^-Z^0) \), Stability is \( \Theta \leftarrow \Theta \rightarrow \Theta \)

Delta \( \rightarrow \Delta^+ \equiv (+2|W^+Z^+) \equiv (+1|W^+) \equiv (+1|W^+Z^+) \equiv \pi^- + p \)

Delta \( \rightarrow \Delta^+ \equiv [u u d] \), \( \Delta^0 \equiv [u d d] \),

Delta \( \rightarrow \Delta^- \equiv (-1|W^-Z^0) \equiv (-1|W^-) \equiv (0|W^-Z^0) \equiv \pi^- + n \)

Omega \( \rightarrow \Omega^- \equiv (-1|W^-Z^0) \), \( \Xi \equiv (-1|W^-) \equiv (0|W^-Z^-) \)

Particle & Wave Duality Photon, and Cosmic-Particles Origionation .
Figure - 31 - : The [STPL] line Voltage-Machine Producing the Forces as Material-Points

1. The Constructive and Destructive Interference between Wave-Particles-System Regulates the Voltage, the free energy motion ≡ binding Energy, in Nucleus or other Caves.
2. When the Binding Energy of any Two Particles ≡ The-motion of ⊕ to ⊖ is as ,

Particle & Wave Duality Photon, and Cosmic-Particles Origination.
Example 1:

Equating Coulomb equation $E = q$ From Mechanics

In any system $G ≡ \text{Force}$

The Stability of System $\frac{2}{1}H \equiv p + n = - p + n - p + (0 [W^{-Z^0}])$ if $|W^Z + Z^0| = - p + (-1 |Z^+ Z^0|) = - p + (-1 |Z^+ | + \tau + 0[Z^0]) = - p + [e^- |V_e | + e^+ ] = - p + 2e^- + V_e [e^+ ] ……(D)

Initial $D = \frac{2}{1}H \equiv p + n = (1 |W^Z + Z^0|) + (0 |W^{-Z^0}|) = (1 |Z^+ Z^0|) + (0 |Z^0|) = [e^- |V_e |] + [e^- e^- + [e^+ |V_e |] = 2e^- + [e^- |V_e |] = 2e^- + (1 |Z^0|)$ ……(D)

From relation $\frac{2}{1}H \equiv (1 |Z^+ Z^0|) >> 0$ is seen that Deuterium is an Stable-System although its bound is Weak. The Relation $p \equiv (1 |W^Z + Z^0|)$ shows that W-Boson is the only force which Particles can transform. In Hydrogen cave, Voltage $= \frac{k e^2}{r}$ and for Deuterium $V_p + n = \frac{\hbar q^2}{4\pi \epsilon_0 r^2} = 9,10^9 [0,6022 \times 10^{-19}]^2 = 14,42 \times 10^5$ eV = 1,442 MeV which is Resonance Voltage.

i.e, in order to shift the Nucleons of a Deuterium into a Proton Spin-pair would require an extra input of 1,442 MeV, so Proton paired with a Neutron is Stable.

The Proton’s Charge distribution is all Positive as $p \equiv [u u d] \equiv (+1 |W^Z + Z^0|)$, while the Neutron’s $n \equiv [d d u] \equiv (0 |W^{-Z^0}|)$

The Stability of the Compound Particles:

From Coulomb-Energy equations issues, Force $[F_c] \times \text{Cave} [r] = \text{Voltage} [V_C]$ because Force $F_c = \frac{C Q}{r^2}$, Voltage $V_C = \frac{C Q}{r}$, meaning that Voltage, Potential Energy, in a cave defines the Strength of the Force involved, since Gravitational constant, the Newton’s-Force,

$G \equiv \Phi^n \cdot \{ [\sigma \Phi] \equiv 2 \pi P_r r = \frac{2B}{\pi^2} \equiv w r \equiv \frac{\pi}{\epsilon_0} \equiv m a \equiv m g \equiv c \}$ can be expressed in all Spectrum.

Voltage $V_c = \int \frac{\hbar q^2}{4\pi \epsilon_0 r^2} = \frac{\hbar q^2}{4\pi \epsilon_0 r}$ while Force $F = \frac{\hbar q^2}{4\pi \epsilon_0 r^2}$ and $V_c \equiv r F_c$ ...(q) i.e.

In any cave, $r \equiv$, exists a Voltage $V_C$, and in which a Force $F_C$.

From Mechanics Energy $E = \frac{mv^2}{2}$ is dependent on mass and velocity-squared, and equal to Coulomb equation $E = q V_C$ dependent on Charge, $q$, and Voltage of Area or Volume.

Equating Energy then $E = \frac{mv^2}{2} = q V_C = h f = \frac{h}{T} = \frac{h}{2\lambda/v} = \frac{h}{2\lambda} = \frac{h}{4\lambda v}$ and also $m v = \frac{h}{2r}$.

$v = \frac{h}{2m r} = \frac{h}{m \lambda} \ldots (1)$ and Voltage $V_C = \frac{mv^2}{2q} \ldots (2)$. Placing (1) to (2) then becomes, $V_C = \frac{mv^2}{2q} = \frac{m h^2}{2 q m^2 \lambda^2} = \frac{m h^2}{2 q m^2 \lambda^2}$, or Voltage $V_C = \frac{h^2}{2 q m^2 \lambda^2}$, related to inverse squared cave $\lambda = 2r$, the Charge and mass.

Example 1: For $q = e = (1,602.10^{-19})$, $m_p = 3,3425529 \cdot 10^{-30}$ Kg, and wavelength $\lambda = 2r = 6.10^{-12} m$, then Velocity of Proton $v_p = \frac{h}{m \lambda} = \frac{6.626.10^{-34}}{3,3425529.10^{-30}[6.10^{-12}]} = 0,3303861.10^8 = 3,303861.10^7 m/s$, a velocity near light velocity.

Voltage of Cave is equal to the Kinetic Energy of Proton, $V_p = \frac{3,3425529.10^{-30}[3,964634.10^{-7}]^2}{2[1.6022.10^{-9}]} = 1,1386102 Volts$, or from $V_p = \frac{h^2}{2 q m \lambda^2} = \frac{[6.626.10^{-34}]^2}{2[1.6022.10^{-9}]3,3425529.10^{-30}[6.10^{-12}]} = 1,1386 Volts$.

Particle & Wave Duality Photon, and Cosmic-Particles Origination.
Example 2:

Because the Wavelength of Particles in caves changes inversely to the velocity, so occupies Lower values when reaching light velocity, therefore its Energy increases and becomes greater than that of Voltage, it is an Unstable-cave, in Cave and when it is equal becomes, an Radioactive cave. If This Potential of caves is measured with light-velocity \( c \), as equation

\[
\frac{h}{m} = \frac{c}{\lambda}, \quad \text{and} \quad m = \frac{h}{c^3}, \quad \text{so} \quad E = \frac{mc^2}{2} = qV_C = \frac{h}{c\lambda^2}, \quad \text{or} \quad V_C = \frac{h}{2q\lambda^2} = \frac{h.c}{2q\lambda}, \quad \text{then Voltage is}
\]

\[
V_C = \frac{6.626.10^{-34}.[2.998.10^9]}{2[1.6022.10^{-19}]} = 1,0332016.10^5 \text{ Volts}, \text{ i.e. increases } 10^5 \text{ times}.
\]

With this way starting energy \( qV_C \) is converted to the final form \( h \), and is an Stable-System of an accelerated single elementary charge like that of electron or composite Proton, through a Potential given in Volts then their energy in eV have the same numerical value. Thus 50-kV Potential generates 50 k-electrons which in turn can produce Photons with a maximum energy of 50keV. This accelerating-Potential happens because of the Voltage increasing.

Equating the Lorentz and Nutrition-Force in a Cave = Magnetic-field, then becomes

\[
\rightarrow \text{Charge} \quad \bar{q} = \frac{q.S}{2\pi r^2} \quad \text{which originates the [ \oplus ] Forces as},
\]

a) Lorentz-Force \( \rightarrow F_L = \bar{q} \cdot \bar{V} \cdot \bar{B} = 2\pi \cdot q \cdot \bar{V} \cdot \bar{B} \) where Magnetic-Field \( \bar{B} = \frac{2\pi m}{Q}\).

b) Nutrition-Force \( \rightarrow F_N = \frac{2\pi m}{Q} \). where Spin \( S \), is in \( r \) cave. Equating \( \bar{F}_L = \bar{q} \cdot \bar{V} \cdot \bar{B} \), from where \( \rightarrow \text{Charge} \bar{q} = \frac{q.S}{2\pi r^2} \).

3. It was shown [82] that Monads = Quaternions consist of the Real and Imaginary-Part as

\[
z^{1/w} = [s + \bar{V} \cdot \bar{i}]^{1/w} = [z_0]^{-w} \cdot e^{-i(\varphi + 2k\pi)w} = [z_0]^{-w} \cdot \cos(\varphi + 2k\pi) + i \cdot [z_0]^{-w} \cdot \sin(\varphi + 2k\pi) \quad \text{for} \quad \varphi = \pi/2
\]

where \( z^{-w} = \text{The Space}, \quad \text{and} \quad z^{1/w} = z^{-w} \text{ The Anti-space of Monad = Quaternion } \bar{AB} \).

Above equations define the Wave-nature of monads in all Levels or Sub-levels.

From above monads \( (s + \bar{V} \cdot \bar{i})^{1/w} = [z_0]^{-w} \cdot e^{-i(\varphi + 2k\pi)w} \), where \( \cos \varphi = s / |z_0| \) and for the Rotated Energy case, where \( s = 0 \) and \( \cos \varphi = 0 \), exists for angle \( \varphi = \pi/2 \) quaternion \( (s + \bar{V} \cdot \bar{i})^{1/w} \) as dimension power \( \rightarrow w = b \) and for \( k = 1 \) becomes,

\[
e^{-i(\pi/2 + 2k\pi)w} = e^{-i(\pi/2 + 2k\pi)w} = e^{-i(\pi/2)w} = e^{-i(5\pi/2)w} \quad \text{for} \quad \varphi = \pi/2
\]

Equation (b) fits, as minimum, in the Planck length and is \( L_p = e^{-i(5\pi/2)w} \) .......(c).

Equation (c) is the smallest Energy-Unit of Space and this because of \( s = 0 \) and \( k = 1 \). It was shown [31] that Space and Energy is quantized and measured on the two Constant and Natural numbers, \( e, \pi, \), where for base the natural logarithm, \( e, \) and exponent the decagonal base, \( b = 10 \).

From \( \rightarrow z^{1/w} = (s + \bar{V} \cdot \bar{i})^{1/w} = |z_0|^{-w} \cdot \cos(\varphi + 2k\pi /w + i \cdot \sin(\varphi + 2k\pi /w) =}

\]

\[
|z_0|^{-w} \cdot e^{-i(\varphi + 2k\pi)w}, \quad \text{where} \quad \cos(\varphi + 2k\pi /w = 0
\]

exists only the Imaginary-Part of monad, \( (\varphi \cdot \bar{i}) \neq 0 \), where \( \varphi = \pi/2 \) and then,

\[
z^{1/w} = |z_0|^{-w} \cdot e^{i(\varphi + 2k\pi)w} = e^{-i(\pi/2 + 2k\pi)w} \quad \text{and it is the Diffraction Energy mechanism}
\]

while for minimum-Space \( r = e^{-i(\pi/2)b} = 0 \), 207879576.b = 1,507019.10^{-7} \ m

for all Space Levels of quantization which are, The Energy Particles only i.e.

The Energy particles in Stationary caves as \( z^{1/w} = |z_0|^{-w} \cdot L \cdot v = \text{Energy Monads} \).

97

Particle & Wave Duality Photon, and Cosmic-Particles Origination.
Extending Quantization of Energy according to exponential formula, \( L_V = e^{-i(\varpi/2)T} \).

On the decimal base \( b = 10 \), then for \( k = \pm 1 \rightarrow \pm \infty \), are found the Energy caves as

For base \( e = 2.71828 \) and base \( b = 10 \) then \( e^k - (15,707963) = 1, 507 \cdot 10^{-7} \) m

which is the Space-Part as \( L_S = e^{i(-\pi)k}b = e^{-1(-31,41593)} = 2, 27110104 \cdot 10^{-14} \) m

For base \( e = 2.71828 \) and base \( b = 10 \) then \( e^k - (47,123889) = 3, 42259 \cdot 10^{-21} \) m

For base \( e = 2.71828 \) and base \( b = 10 \) then \( e^k - (62,831853) = 5, 15790 \cdot 10^{-28} \) m

For base \( e = 2.71828 \) and base \( b = 10 \) then \( e^k - (78,5398) = 7, 7730546 \cdot 10^{-35} \) m

or \( e^{-(78,5398)} = 8, 906.10^{-35} \) m = \( \{ \sqrt{3} \pi, 1,61619.9 \cdot 10^{-35} \} \) \( \equiv L_P \) = Planck`s Length

For base \( e = 2.71828 \) and base \( b = 10 \) then \( e^k - (109,95574) = 1, 76534 \cdot 10^{-48} \) m

For base \( e = 2.71828 \) and base \( b = 10 \) then \( e^k - (141,37166) = 4, 00929 \cdot 10^{-62} \) m

i.e. The **minimum Energy-cave** for the **Primary-Particles** is that of \( 10^{-21} \) m while

The **maximum Energy-cave** for the **Primary-Particles** is that of \( 10^{-11} \) m, and

The **minimum-1D-Space-cave** for the **Primary-Particles** is that of \( 1,507 \cdot 10^{-7} \) m

The **minimum-2D-Space-cave** for the **Primary-Particles** is that of \( 2,271 \cdot 10^{-14} \) m

The **minimum-3D-Space-cave** for the **Primary-Particles** is that of \( 3,423 \cdot 10^{-21} \) m

or the 3D-cave \( \rightarrow 0,3423 \cdot 10^{-20} \) m, in where The Strong and Weak Forces converge to one value \( \rightarrow 12,4.10^{25} \) eV \( \equiv 12,4.10^{16} \) MeV, meaning that Forces are Quantized in their Energy-Caves which are Energy-monads, where

Weak - force is as \( Q_{1r} = \left[ \frac{G S}{2\pi r^2} \right] \leq 1.10^{17} \) GeV for amplitude \( r \rightarrow 10^{-16} \) \( \leq r \leq 10^{-11} \) m

Strong - force is as \( Q_{4r} = \left[ \frac{G S}{2\pi r^2} \right] > 1.10^{17} \) GeV for amplitude \( r \rightarrow 10^{-21} \) \( < r \leq 10^{-16} \) m

Strongest-force is \( Q_{6r} = \left[ \frac{G S}{2\pi r^2} \right] = 1.10^{22} \) GeV for amplitude \( r \rightarrow 10^{-21} \leq r \leq 10^{-27} \) m

3... **Hydrogen-CAVE → 1-Proton** \( [\oplus], 1-Electron \) \( [\ominus] \), 1-Neutron \( \oplus \ominus \ominus \ominus \) – \( [\oplus \rightarrow \ominus] \)

Hydrogen is \( \rightarrow [p \, n \, e] \equiv \left[ \frac{3}{3} + 0 \frac{2}{3} + W^+ \right] \equiv \left[ 0 \left| W^+ Z^0 \right. \right] \) = One Proton and One Electron .

Interaction of Proton and Electron is \( \rightarrow p \, e \equiv \left[ \frac{3}{3} + \frac{3}{3} + W^+ Z^0 \right] \equiv \sum [Np^+Ne] \) and the Summation of Nucleus-Charges \( [p + n] \) of Cave \( Np^+N_e \), **attacks** \( \rightarrow \) the Electron \( \left[ e = -1 \right] \) of Cave \( H_{Ne} \)

creating Destructive-Interference \( \left[ \oplus \ominus = 0 \right] \equiv \left[ +1-1+Z^0 \right] \) or, \( Cl^+ \equiv [1|W^+]+DI_{++} \equiv Z^0 \)

and \( [p \, n \, e] \equiv \left[ 0 \left| W^+ Z^0 \right. \right] = -8,72.10^{-20} \)

J = -5.45.10^{-1} eV = -5, 545 eV

The Process from measurements , 1... DATA .

From \( m_p = \) Resonance \( M_{TP} = 3,1458799.10^{-30} \) Kg ,

\( m_e = 0,511 \) eV = 0,511, \( 1.7826614.10^{-36} \) = 9,109399.10^{-35} Kg

\( m_n = \) Resonance \( M_{TN} = 3,3425529.10^{-30} \) Kg

The **Atoms** Total-Harmonic mass \( \equiv M_A \) is \( \rightarrow \frac{1}{M_A} = \frac{1}{m_p} + \frac{1}{m_n} + \frac{1}{m_e} = \frac{10^{30}}{3,146} + \frac{10^{30}}{3,343} + \frac{10^{35}}{9,109} = \frac{31^{31}}{34,43} + \frac{31^{31}}{9109} \)

and the **Total-mass** \( M_{N-E} = 9,10899.10^{-35} \) Kg \( ...(1) \)

The **Total-Harmonic-Nucleus-Charge** \( \equiv Q_T = q_p = 1,6022.10^{-19} = 1,6022 \cdot 10^{-19} \) C

and the **System-Resonance-Charge** \( Q_N = 1,6022.10^{-19} \) C \( .......(2) \)

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The frequency of the Closed-Nucleus-Orbit-System becomes from Kepler second Planetary law equation, \(4 \pi^2 \text{ m} f^2_o = k\), and constant law of Areas \(1 = k \cdot f^2_o \cdot a^3\). Their common \(k\), is Constant-Energy \(\rightarrow k = 4 \pi^2 \text{ m} f^2_o = \frac{1}{f^2_o} a^3\) or, \(f^4 = \frac{1}{4 \pi^2 m a^3}\) and \(f = \sqrt[4]{\frac{1}{4 \pi^2 m a^3}} \) \ldots(f)

With this way, Impedance \(\equiv\) Resistor and \(w_0 = 1\), the Resistor in the System is unaffected by the frequencies of Inductive and Capacitive Reactance and the Total-Resistance becomes as above \(m = M_T = 9.10899.10^{-35}\) Kg. The Resonance-Cave-frequency is as \(\ldots(f)\),

\[
f = \left(\frac{1}{\sqrt{\pi}2.991347.10^{64}}\right)^{1/4} = \frac{1}{1.304936.10^{16}} H.\ldots(3)
\]

Coulomb-law issues between Nucleus and orbit diameter Charges \(d = 10^{-10}\) m, while Newton’s-law issues for all masses between Nucleus and Nucleus-Orbit \(d = 10^{-14}\) m.

The System \(M_{N-E} = \) masses, \(Q_{N} = \) Nucleus-Charges creates the constant Magnetic-field

\[
\vec{B}_F = \left[\frac{2 \pi M_T}{Q_T}\right] f = \frac{2 \pi 9.10899.10^{-35} - [1.309932.10^{15}]}{[1.6022.10^{-19}]} (\text{Kg}/\text{C.s}) = 46,793163 \text{ Tesla} \ldots(4) \text{ i.e.}
\]

\[
\vec{B}_F = 46,793163 \text{ Tesla} \rightarrow \text{the Strength in an High-Magnetic-Laboratory}
\]

since \(1\text{Tesla} = [\text{N.s}/\text{C. m}] = [\text{N/Ampere . m}] = [\text{Kg}/\text{C.s}] = 10^{4} \text{ Gauss} = 10^{-9} \text{ Mega-Tesla.}

Resonance-Cave \(a = 3 \sqrt{T^2/g} = 3 \sqrt{1/g} f^2 = 3 \sqrt{1/g} [1,309936.10^{16}]^2 = \sqrt{0.594136.10^{-33}} = 8,401675854.10^{-12}\) m, and the Resonance - Energy \(E = \frac{1}{a^3} \left[\frac{4 \pi^2}{c^2} + \frac{L^2}{2m}\right]\), where

\(L\) = the Spin \(S = 5.691952.10^{-34}\) [Kg/m/s], System-mass \(M_{N-E} = 9.10899.10^{-35}\) Kg, \(c = 2,998.10^8\) m/s, and \(E = \left[4,1466682.10^{22}\right] \times \left[4,3923448.10^{-16} + 1,7783703.10^{-33}\right] =

6,2224952.10^6 J + 2,5193606.10^{-11} J \rightarrow 3,8837193.10^{25} \text{ eV} + 1,5724382.10^{-30} J \ldots \ldots(E)

The Strong Forces, \(W^+Z^0\), in System is the Hydrogen \([p n e] \equiv \left[\frac{3}{3} + \frac{3}{3} + W^+ Z^0 \right] \equiv (0 \{W^+ Z^0\})\) which may be calculated from the Time needed, for Harmonic-mass to vibrate in cave \(r\),

From Energy equation \(r = \frac{m v}{q_B} \equiv \frac{[9,10899.10^{-35} \text{Kg}][2,9978.10^8]}{1.6022.10^{-19}[46,793163]} = 3,642283.10^{-9}\) m \ldots(5)

and for Weak Forces, \(W^+Z^0\), in cave \(d =10^{-9}\) m then Period \(T = \frac{d}{c} = \frac{3,642283.10^{-9}m}{[2,998.10^8m/s]} =

= 1,2149042.10^{-17}s\) \ldots, and The produced Energy in Hydrogen cave \(d\), is \(\rightarrow E_{W^+Z^0} = h / T =

= \frac{1,055.10^{-34}s}{2[1,2149.10^{-23}] [1,6022.10^{-19}] / \text{eV}} = 0,2709965. 10^2 \equiv 27, 10 \text{ eV} \ldots \ldots(6)\) and from Coulomb

Force \(F_C = \frac{c Q}{r^2}\) and Voltage \(V_C = \frac{c Q}{r}\), then Force \([F_C] \times \text{Cave} \[r] = \text{Voltage} \[V_C] \rightarrow \) so

Nucleus-Forces \(W^+Z^0 = \frac{E_{W^+Z^0}}{r} = \frac{27,09965}{3,642283.10^{-9}} = 7,4402922.10^{-9}\) eV \ldots(7) or Strong-Forces

\(W^+Z^0 = \frac{[E_{W^+Z^0}]}{r} = \frac{1,055.10^{-34}}{2[1,6022.10^{-19}] \{3,642283.10^{-9}\}^2} = 7,4429.10^{-9}\) eV

Neutron \(n \equiv (0 \{W^+Z^0\})\) with Zero Charge, \(w\) is in a voltage \(V = F_C \cdot r\) and then is executed on it the Weak Forces \((0 \{W^+Z^0\}) = -7,4429.10^{-9}\) eV \ldots

4..The Gravitational constant \(G \equiv F^2, \left\{\left(\sigma \Phi\right)\equiv 2 \pi f_r \equiv \frac{2B}{mt} \equiv w r \equiv V \equiv m a \equiv m g \equiv c \right\}

11g... The Periodic motion in all Displacements :

Particle & Wave Duality Photon, and Cosmic-Particles Origination.
Angular Momentum continuous changeable Spin, in $\mathbf{r}$ the Laplace as which has an Electric, in $\mathbf{f}$ for the motion of electrons $\mathbf{w}$ in $\mathbf{S} = \mathbf{AM}$ ≡ $\mathbf{AM}_z \mathbf{e}$, denotes the $\mathbf{f}$ field in $\mathbf{c}$ cave a = $2,1127839.10^{-11} \times 10^{-11} \text{ m}$. From Linear-Periodic-motion $\omega = \frac{u}{2\pi} \sqrt{\frac{k}{m}}$, or $4 \pi^2 f \varepsilon_m = k = \pi g$, then for Electron $m_e = \frac{e}{4 \pi f^2 \varepsilon_e}$ so,

$$m_e = \frac{g}{4 \pi f^2 \varepsilon_e} = \frac{9,808,238}{4 \pi \left[3,28399.10^{15}\right]^2} = -7 \times 2373149.10^{-32} \text{ kg, } f_\varepsilon = 3, 28398.10^{15} / \text{s,}$$

The Spin-Cave is equal to The Moment of couple from two $\uparrow \leftrightarrow \downarrow$ Angular-momentum Vectors as $\mathbf{B} = \mathbf{a} \mathbf{m} \mathbf{v} = 2,1127839.10^{-11} \times 7.2373149.10^{-32} \text{ kg} \times 2,99798.10^{8} = 4,5841758.10^{-34} / \pi$, and Spin $\rightarrow S/2 = 1,4591885.10^{34}$ which is the Electron-Spin. The $k = \pi g$, denotes the $\Theta$ Space $\equiv$ Electric-field in-where exist the Electric-lines the tracks for the motion of electrons $\Theta$ Anti-space. The Right angular momentum vector AM $\equiv \uparrow$ is the Produced Work and stored in Magnetic-field as motion while left-vector AM $\equiv \downarrow$ is the Produced Work and stored in the Opposite Magnetic field as motion and both consist the Dipole-vector $[\Theta \cup \Theta \cup \Theta]$, directed to $[\Theta \rightarrow \Theta]$, as it is Tack-Geometry.

For Quantum-Energy equal to $g$ then $k = g$, and $a = \frac{1}{k f^2} \frac{1}{k^2} \frac{1}{h^2}$, or $a_\mathbf{m} = \frac{3}{4 \pi f^2 \varepsilon_\mathbf{e}}$

the corresponding cave $a$ is for Energy-mondas,

In (2). Is formatted the Energy-Space of M-P vibration of opposites which creates a wave which has an Electric, E, and an Magnetic component, H, perpendicular each other and is as $[E^2 + H^2] = 2(2r)\varepsilon \sin 2\varphi$ on where does Not-exists the Skin-effect and this because of the Laplace $\nabla^2 f = 0$ equation issuing in Tack-Geometry. The Property of Periodic-motion in M-P conserves The Inner-Magnetic-Wave, into the Centre of mass Charges with an changeable Spin, S, between $-S$, to $+S$, resulting to a Stationary-State. i.e. it is an continuous $-S + S = 0$, Torsional and Point-equilibrium, where Charge is equal to the Angular Momentum-vector per Unit-Plane or $\rightarrow S = \mathbf{AM} / \pi = \mathbf{r} \mathbf{m} \mathbf{v} = [\mathbf{a m c}] / \pi$

Spin $S = \left[ \frac{3 a m c}{\pi} = \mathbf{B} = \frac{2L}{2\pi^2} = \frac{2L}{2\pi} = \frac{\pi^2 r^4 f}{2} \right] = $ The Spin of Particle-cave.

Particle & Wave Duality Photon, and Cosmic-Particles Origination.
Above **Double-Orbital-Periodic motion** [⊕<→⊕] in a Material-Point is the eternal-Plane-Curve-motion of the ⊕ constituent to the ⊗ constituent in the two x, z, axis of motion. Considering the distance of motion be , the diameter of the cave, l = 2r, then velocities as angular velocity \( \omega \), and velocity \( v \), under the condition y(2r,0) = 0, then leads to Energy-equation \( \sin \frac{2rw}{v} = 0 \), or \( w_n \frac{2r}{v} = n \frac{4\pi r}{\lambda} = \frac{4\pi rf}{v} \), where \( n = 1, 0, \lambda = \frac{c}{f} \) and is the wavelength and \( f \), is the frequency of oscillation, *i.e.* The \( n = 1 \) defines a **Normal mode vibration** with natural frequency \( f_n = \frac{v}{2\pi r} = \frac{\alpha}{4\pi r} [1+ \sqrt{5}] \) ...(n)

Above **Double-Orbital-motion** is in a Uniform-Energy-Point-Space as this is for Spin \( S = \vec{S} \) and then Issues \( \vec{B} = \vec{r} \) \( m \vec{v} = \sqrt{\vec{r}^2 + m^2\vec{v}^2} \), because the vector \( \vec{r} \equiv Space \), is Perpendicular to \( m \vec{v} \equiv The \ Energy \). Laplace Energy-equation for **Incompressible Space** \( \vec{r} \), is \( \nabla^2 \vec{E} = -\nabla \vec{E} = - \vec{v} \vec{r} = - \vec{v} \sqrt{\vec{r}^2 + m^2\vec{v}^2} \) and squaring \( \vec{v}^2 + [2\pi mf] = 0 \) issues \( \vec{r} = - 2\pi mf \vec{a} \) ... (1)  
The condition for **Irrotational Energy** is \( \nabla \times \vec{B} = \vec{v} \vec{S} = 0 \), or \( \nabla \times \vec{B} = \vec{v} + 2\pi mf \vec{a} = 0 \), and vector \( \vec{r} = 2\pi mf \vec{a} \) ....(2) 

**Relations** (1), (2), + \( \vec{a} \) and - \( \vec{a} \), denote the **Alternative-Positions of Magnetic Field** in the **Two-transverse-Positions** as in Fig 20-(2).

For Photons which force is \( F_{\text{photon}} = \frac{[\vec{e} \equiv \vec{E} \rightarrow \vec{E}]}{r} = \frac{[\sigma \sigma]}{r^2} = \frac{\sigma f}{r} = \frac{[2\pi f]}{\Phi} = \frac{[2\vec{B}]}{\Phi \vec{r}^2} \), issue above .

Since for Electron \( 4\pi f^2 e \cdot m_e = k = \pi \vec{g} \), then for Gravity issues , \( -\nabla E = - \vec{g} \) \( f = 4\pi \cdot m_e f^2 e \).

**All above Physical Structures Vibrate**, **In-Sectors** with minimum Energy, and form the \( \rightarrow \) **Electron-charge** \( \rightarrow \) **In Surfaces** with minimum Energy, and **thus forming the Orbits**.

The Orbit relation \( r^3 f_p = \text{Constant} \), as multiplication of Space-cave \( r \) and frequency \( f \), is Energy . The **Unit-Work done** \( \equiv \text{motion} \), and conserved in orbit \( r \) as the \( n \) frequencies \( f_n \), and after filling the **minimum cave** Burst Into another cave connected to \( G = \Phi[2\pi rf_{p} = \frac{2B}{\pi r}] \)

**Remarks on EPR Argument** :

The Point like Particles of Quantum Mechanics in Vacuum, are the three Elements, [66-68]  
[ \( s^2 = \nu \equiv \emptyset \) , \( 2s^2 = 2\nu \equiv \emptyset \) , \( -s^2 = -\nu \equiv \emptyset \) ], which are the content, **Primary material**, of the Cosmic Particles [91]. The extension for a Deeper existence of the Particles is defined in Coulomb-Energy equation where Force \( F_C = \frac{CQ}{r^2} \) and Voltage \( V_C = \frac{CQ}{r} \), and so \( V_C = r \cdot F_C \) or **Force** \( [F_C] \times \text{Cave} \} \equiv \text{Voltage} \} [V_C] \) , *i.e.* Voltage of caves defines Forces in caves.

The Presented NEW Interaction Method , [ 10g.] is Based on the Common-Knowledge of the **Constructive and Destructive Interference of Waves**, Since Particles are Waves . For l-rays

- **EG** \( \equiv \) Light ray \( \rightarrow \) Straight line \( \equiv \) The Euclidean-Geometry  
- **HG** \( \equiv \) Light ray \( \rightarrow \) A Circle \( \equiv \) The Hyperbolic-Geometry  
- **RG** \( \equiv \) Light ray \( \rightarrow \) A Line-Sector, \( \equiv \) The Riemann-Geometry  
- **MG** \( \equiv \) Light ray \( \rightarrow \) A Line-Sector in Caves , and Straight line to Infinite .

[ \( \emptyset \leftarrow \emptyset \leftarrow \emptyset \rightarrow \emptyset \) ] \( \equiv \text{Material-Geometry} \) [9]. The answer is left to the Reader .

Markos Georgallides 25/9/2020
A CRITIC ON THE - FUNDAMENTAL - FORCES

1. Gravitational-Force:

It was shown[81] that The Primary-Material-Point is composed of Infinite-Material-Points in the TwoAperon, + ∞ , - ∞, which consist a Huge Magnet with Infinite Parallel-lines where the ⊗ constituent Attacks, moves to, the case of Newton-Gravitational-constant G-force, Periodically to ⊗ constituent [82-86]. G Newtonian Constant of Gravitation is related to g, as

\[ G = \frac{G}{r^2} \] and Voltage \( V = \frac{C}{r} \), and so \( V = r \cdot F_C \), or

**Force** \([F_C] \times \text{Cave} [r] = \text{Voltage} [V_C] \), i.e. Voltage of caves defines Forces in caves.

The Stress \( \sigma \), occupies Minimum and Maximum because is related to frequency and velocity as \( f = \frac{\sigma}{2\pi} + \frac{\sigma \phi}{2\pi} \) \( \equiv \frac{\sigma + \sigma \phi}{2\pi} \) \( \equiv \frac{\sigma + \sigma \phi}{2\pi} \), or

\[ \sigma = \frac{f \phi}{\pi^2} \equiv \frac{w \sigma}{r^2} \equiv \frac{v}{\phi} \equiv \frac{c - 1}{\phi^2} \]

and it is The-Stress-Way of Photon-Storages \( f_n \equiv \frac{\sigma}{2\pi} \), and Photon-Information \( f_n \equiv \frac{\sigma \phi}{2\pi} \)

so, Photon is directly related from \( G \) as \( G = F = \sigma A = (2\pi f) \frac{A}{\Phi} \)

This Stationary-Energy-Storage follows the Coulomb Electrical-Force where the Electrical Force is added, while for Photon, an Moving-Energy-Storage exist Gravitational-Forces as,

\[ F_{\text{electron}} = k_c \frac{Q_1 Q_2}{d^2} \]

\[ F_{\text{photon}} = \frac{\sigma}{r^2} \]

Angular-momentum \( \equiv \text{Spin} \equiv \frac{\sigma^2}{r^2} \)

It is shown that Force, \( G \), occupies Mass, \( m \), from velocity, and Charge, \( q \), from Stress, therefore \( G \) is an Gravitational-Force as \( F_{\text{ele}} \), and an Electromagnetic-Force as \( F_{\text{pho}} \).

\[ G = E = h \cdot f_n = \frac{c^3}{\phi^2} \cdot [g_L \cdot k_L] = g \cdot k \cdot E = g \cdot [g_L \cdot k_L] \]

Since for the First Chemical-Neutral-material-cave \( r \), constants, \( g_L, k_L \) are equal to unity i.e., \( g_L = k_L = 1 \), then above Energy of \( E = 13.6 \text{ eV} \) in Hydrogen-Plane-orbit corresponds to the minimum-energy-cave → The Phys-Quantized-Energy-Structure. Since \( G \) Pushes →
on the Earth-Unit-coefficient, k_E, and because is the **Starting, for first time begins**, of this **Mechanism** then from \( G = g [g_L k_L \equiv g ]^2 \) \[ \equiv \rightarrow g \], or \( G = g \), meaning that in Earth System of gravity, the Newton’s Gravitational constant, \( G \), and Gravity \( g \) are equal, while in all other relative Systems are equal to the proportionality of their Local-constant \( k \).

Now is proved that, \( \textbf{Constant, } G \), \textit{is the mechanism, the mould} for the \textbf{First-kick-Start}, upon this Unit-Granular-Energy-Stress-Layer, \( g \), to formulate in that orbit, \( a \), into Planck’s cave the lightest and the less-energy mass Particle of this universe, which is the Hydrogen with the minimum **Quantized-energy** of, \( 13.6 \text{ eV} \), following the **Material -Geometry** Light-Ray \( [\Theta \rightarrow \lambda \rightarrow \Theta] \rightarrow \lambda \rightarrow [\Theta \rightarrow \lambda \rightarrow \Theta] \).

2. **Gravity-Force**: 

The **Gravity-System**, is an Infinite of ± Equilibrium-Rotating vectors \( \vec{r} \), where for the Stability \( \uparrow \vec{r} \downarrow \vec{r} = 0 \), and which **Gravity-System** interacts with **Hydrogen – Cave- Systems**.

The condition for **Irrotational Energy** is \( \nabla \times \vec{B} = 0 \), or \( \nabla \times \vec{B} = \nabla \times \vec{F} + 2 \pi \text{ mF} \vec{a} = 0 \), and \( \vec{r} = \pm 2 \pi \text{ mF} \vec{a} \). Vector \( \vec{r} \), occupies Both directions for Rotational-equilibrium, i.e. The vector \( \vec{r} = \pm \vec{B} \equiv \vec{B} = 2 \pi \text{ mF} \), and \( f_n = \frac{B}{2 \pi m_e} = \frac{E}{h} \) is the **Stationary-Filling-Ocean** of the Spinning-Gravity-Material Points, in the called Empty-Space, with frequency that of Material-Point \( f_n = n f_1 = \frac{E}{h} = \frac{n \nu}{2 \pi} = \frac{n \nu}{4 \pi r} \left( 1 + \sqrt{\frac{E}{\nu}} \right) = \frac{\sigma \Phi}{2 \pi r n} \), and from \( \nu = w = r = 2 \pi f r \) then, \( f_n = v/2 \pi r = \left( \frac{1 + \sqrt{\frac{E}{\nu}}}{4 \pi r} \right) \), and \( \vec{v} = \vec{\sigma} \cdot \Phi \cdot (a) \), and ± Spin \( S_G = \vec{B} = J w = \pi^2 \cdot r^4 \cdot f_n = g \).

i.e. **Gravitational-Constant Force** \( G \), is Spread-over a **minimum - Surface**, the **Layer or Conductor or**, a-Surface, or **The-Permissible-Path**, in-where exists Reaction as mass

From the Energy-force \( F_g \) in any cave, \( r = L_p \) of Planck’s scale of any reaction to any change of motion and which is mass, the \( m_g = J . w^2 \), and in Electricity is Impedance, where angular-velocity \( w = \frac{c}{r} \) and in the 3-Dimensional Space of the Two Elements \( [2^3 = (\Theta \leftrightarrow \Theta) \leftrightarrow \] ), The Impedance, \( g_L \), of the 3D-Space is \( \rightarrow \ln(3) \leftrightarrow \) and of Anti-Space is \( \pi \sqrt{2} \leftrightarrow \) and this because consist the moulds of Growth [45]. From above, → **The Light velocity vector** \( \vec{v} = \vec{c} \) is **Acting on cave**, \( r = L_p \), and finding Impedance, \( m_g \), becomes the **Centrifugal-Force** \( F_g \) of Cave and becomes the **Gravity g** ← as, \( F_g = m_g \left( \frac{c^2}{r} \right) = J . w^2 \cdot c^2 \) and \( g_L = \left( \frac{\nu^4}{2} \right) \cdot \left( \frac{c}{r} \right)^2 \cdot \left( \frac{c^2}{r^2} \right) \cdot \left( \frac{\nu^2}{4 \pi r} \right) \cdot \left( 2^3 \cdot \ln(3) \cdot \pi \sqrt{2} \right) = 4 \sqrt{3} \ln(3) \cdot \pi r^2 \cdot c^4 \), or Gravity → \( g = 4 \sqrt{3} \cdot \ln(3) \cdot \pi \sqrt{2} \cdot L_p \cdot c^4 \) ← i.e. → For the **In-Planck’s-length**

It is the **Centripetal-Force**, \( F_g = \vec{g} \), of The **Pointy-Spinning** Material-Points \( S_{pg} = \vec{B} = 4 \sqrt{3} \cdot 1.098612288668 \cdot \pi^2 \cdot 1.616199.10^{-35} \cdot [2.99819938]^4 = 9 \cdot 8076754 \).

For the **Out-Planck’s-length** Photon-velocity equation \( \vec{v}_m = n \cdot \vec{c} \cdot \left\{ \frac{\vec{F}_n}{f_n} + f_n \right\} \) and from \( \vec{v}_m = w = n \cdot \pi \cdot c \cdot f = \frac{n \cdot c}{2 r} \), then → \( \vec{v}_m = n \cdot \vec{c} \cdot \left\{ \frac{\vec{F}_n}{f_n} + f_n \right\} \) ← which is velocity-Out \( L_p \).

**Photon was proved to be a Material-Point** in cave, \( r \), where its **Inner Storage is the Stationary-Standing-wave** the Electromagnetic-Wave \( [E^2 + H^2] = 2(2 r) . c . \sin 2 \varphi \) with \( n \) Lobs representing the **Normal mode vibration** with frequencies \( f_n = n . f_1 = \frac{E}{h} = \frac{n \cdot \nu}{4 r} = \frac{n \sigma}{2 \pi r} \left[ 1 + \sqrt{\frac{E}{\nu}} \right] \), on Two or more Possible nodes the, \( \Theta \lambda / 2 \Theta \). Space \( \Theta \) and Anti-Space \( \Theta \)
Exist on the Two opposite-nodes of the Standing wave-wavelength $\lambda$ and **Outward Storage is the Propagating Electromagnetic- Wave.** $\rightarrow \{E = 2.\lambda.e.\sin.2\varphi\}$ $\leftrightarrow$ **where Particle $2r = n \lambda = n.\vec{c}. \{\frac{E}{h}\}** Cave $r$, is the **Electromagnetic-Energy-Storage**, and $= n.\vec{c}. \{\frac{E}{h}\}$

Electromagnetic-Radiation $E,B$, is the **Wave Conveyer of Cave** $r$, with frequency $f = E / \text{Planck-constant} h$, or $f = E / h$. From relation Stress $\sigma = \frac{c}{\Phi} = \frac{2\pi r}{\Phi} = \frac{2\pi r}{\Phi}$

$$\sigma \equiv \frac{c}{\Phi} = \frac{2\pi r}{\Phi} = \frac{2\pi r}{\Phi} = \frac{2\pi r}{\Phi}$$

**Stress $\sigma_{PL} = n.1,8445635.10^{11}$ Kg/m²**, and is for the **Outside-Planck’s-Length-caves.**

Remarks :

a. The Stresses become from a Force and a Surface as equation $\sigma = \frac{F}{A}$, and in the case of Gravitational constant $G$ and a cave, $r$, then $\sigma = \frac{G}{\pi r^2} = \frac{G}{\pi^2 r^2}$, or vector $s$. Above relation means that Force $G$ needs a Vector-surface $\pi.s^2$ to be spread as Stress $\sigma$, which is the case of Constant-light-velocity, $c$, as the **first Surface**.

b. The case of a vector, $s$, is the **Linear-Stress** while of an Plane is the **Surface-Stress** and consequently for a Volume is a **Space - Stress**, as this was referred before for $G$ Force, i.e. $G = \sigma.\Phi^3 = \Phi^3.\{\sigma.\Phi\} = \frac{28}{\pi^2 r^2} = 2\pi r \Rightarrow w = a = m \Rightarrow g = \frac{2B}{\pi r^2}$

c. Since Stresses follow equation $\sigma = \frac{F}{A} = \frac{2\pi r}{\Phi}$, conclusively **Forces and Areas** are everywhere and are related to any-cave $r$, through $f$, which is the mean of **every-Information**.

d. Since the Nutation-Frequency $f_N = \frac{r_e Q_e}{2 \pi J_{3w}} = 2.8398447.10^{10}$ s$^{-1}$, then $f_N = \frac{r_e Q_e}{2 \pi J_{3w} G}$ i.e. the effect of gravity is in caves and is related to $G$ as Nutation force.

The Golden-ratio-frequency $f_p = \frac{\sigma r}{\pi B} = \frac{\sigma r}{\pi B}$, exists in nature from the micro to the macro scale and is a **Pressure**, $\sigma$, everywhere in all the Energy structures.

e. Light velocity vector $\vec{v} = \vec{c}$ Acting on an-cave, $r \neq L_p$, faces-to the Impedance $Z_c$, from Velocity $\vec{c}$, and Becomes the minimum-Energy-cave in $L_p$, and Equal to $E \equiv r \cdot Z_c \cdot \vec{c}$

$$r_H = \frac{h}{cz_c} = \frac{[6.62606975.10^{-34}]}{2.99798.10^8 \cdot 1.0460975.10^{-31}} = 2.1127839.10^{-11} \text{ m},$$

which is the Hydrogen cave.

f. Atoms Bonding happens on, **Slit-Vectors** [ **Bracket-Orbit-Hook** ] which occupy the **Unit-Energy-Space frequency** in order that the Electron-Hook $\bigodot$, to Joint with the Bracket-Proton $\bigodot$. For this to happen is needed a common equation for the different

[ **Bracket-Orbit-Hook $\equiv 2r$** ] as $\rightarrow \vec{v} + w^2 r = 0$ where $w = 2\pi f_1$ as above frequency, $2r = \Delta$ is the amplitude of vibration, and then $T = 2\pi^2 \sqrt{\frac{m}{k}}$, Natural $f_1 = T^{-1} = \frac{1}{2\pi} \sqrt{\frac{k}{m}}$

$$= \frac{1}{2\pi} \sqrt{\frac{k}{m}} \text{ in cave } 2r = \Delta = \frac{g}{k} \text{, i.e. an Energy loop.}$$

g. From Gravity-Force $DE \equiv [\vec{c} \cdot \vec{v}] \equiv \vec{c} [\vec{v}] \equiv$ The Travelling-Energy-cave, $\vec{c}$, with the velocity-vector, $\vec{c}$, Gravity $g$, does dominate over the other forces and thus has a long range. The Strong and Weak nuclear forces are very short ranged in the nuclei of atoms. Electron-Nutation occurs because Gravity acts on the electron mass and thus Energy is created and overflows as Photons. For Planets issues the Volume-Spherical effect $3/4\pi$, Particles & Wave Duality Photon, and Cosmic-Particles Origination.
because of the mass dominating, while Atom-Range-action follows that of Electric-Dipole h. For a circular motion in \textit{Neutrino-caves, dominates}, velocity is proportional to the inverse square of radius \( r \), and \textit{Newton-Force acceleration} the fifth, where \( C = \frac{na_b}{T^2} \Rightarrow \frac{na}{T} \left( \frac{1}{r^2} \right) = \frac{na}{T^2} \)

From relation \( r = 2a \cos \phi \), \cos \phi = \frac{r}{2a} \Rightarrow \frac{1}{r} = \frac{1}{2a \cos \phi} \) and \( \frac{d1}{dr} = \frac{1}{r} \) tan \( \phi \) and from

Central-motion \( \rightarrow v^2 = 4C^2 \left[ \frac{\sin^2 \phi}{p} + \frac{1}{r^2} \right] \) is \( v^2 = 4C^2 \left[ \tan^2 \phi + 1 \right] = \frac{4C^2}{\cos^2 \phi} = \frac{16C^2a^2}{r^4} \)

and \textit{velocity} \( v = \frac{4Ca}{r^2} \). The Centripetal-acceleration \( a_p = \frac{v^2}{r} = \frac{16C^2a^2}{r^4} \cdot \frac{1}{a} = -\frac{16C^2a^2}{r^4} \)

and equal to \( \frac{a_p}{\cos \phi} \), therefore, \textit{Centripetal-acceleration} \( a_p = -\frac{32C^2a^2}{r^5} \Rightarrow -\frac{32na^4}{T^5} \) \( m \) m exhibits \textbf{five attractions} of different Strengths. These attractions are from the Strong forces \( \{ \Theta \leftrightarrow \Theta \} \) which differ in color, \textit{Quantum Chromodynamics}, as is the change of Phase \( \phi = 180^\circ \) in Photoelasticity. Gravitational-Force, for multiple close-together masses, follows the Electric, \textit{Parallel Connections Resistors} inverse law and not the additive. \[83-89\].

The old perception for Negative-mass was a transient description of General-Relativity which tells that gravity is not a real force but is a warping of Spacetime. The answer is that there is NOT Negative-Mass \textbf{NOT} Spacetime, \textbf{But} Reaction to velocity-change and Space-Energy. Concerning Gravity-Force \( DE = [\mathbf{c} \ [V_{i}]] \) is a Travelling-Energy-cave, \( c \), with vector, \( \mathbf{c} \), and goes away on the scales larger than Galaxy-Groups until that of generation predicted by Force as Voltage equation \( V_C = r \cdot F_C \) and, \( \text{Spin} S = \left[ \frac{amc}{\pi} \right] \Rightarrow \mathbf{B} = \frac{2L}{w} = \frac{2L}{2\pi f} = \frac{2\pi r + 4f}{2} \).

On \textit{Scales Smaller} than Planck’s Scale, \textit{Space-Energy} as above acts dominantly like the Newtonian gravity, while for \textit{Scales Larger than Galaxy-Groups}, acts dominantly like The travelling Gravity-Force \( DE = [\mathbf{c} \ [V_{i}]] \). \[72\]

3. \textit{Electromagnetic-Forces}:

Electricity is the motion of the Material-Points, and their relation. The \textbf{Three Elements} \( \equiv \) Digits of Material-Geometry are \( \rightarrow \{ \Theta, \ [\Theta \leftrightarrow \Theta] \}, \Theta \} \equiv \{ +, 0, - \} \leftarrow \)

The \textbf{Permutation}, \textbf{arrangement}, of the Two-Elements \( P_1^2 = 2 \), i.e. are \( \rightarrow \{ \Theta, \Theta \} \rightarrow \{ \Theta, \Theta \} \rightarrow \)

The Three-Elements in Space need \( P_3^1 = 3 \cdot (3-1) \cdot (3-2) = 6 \) Positions and the same for the Three-Elements in Anti-Space need \( P_3^3 = 3 \cdot (3-1) \cdot (3-2) = 6 \) Positions, and Total Places \( P_1^3 \cdot P_3^3 = 6 \times 6 = 36 \) Positions for Spaces and Anti-Spaces as Impedance, and as before for \( \log_{10} x \) and Base \( x = 10 \) then \( \log_{10} 10 = 10^{10} \) and for the two elements \( \{ \Theta, \Theta \} \) the Growth is \( 10^{(10)^2} = 10^{20} \) Positions \( \equiv \) Distances \( \equiv \) \( r \), and since issues \( 10^{-\delta} = \frac{1}{10^{\delta}} \) then \( b = 36.10^{-20} \), and \( \Rightarrow \mathbf{v} = \frac{F}{A} = \left[ \frac{G \Phi}{A} \right] = \left[ \frac{6.673692 \cdot 10^{-11} \cdot 1.6180339887}{36.10^{-20}} \right] = 2.9995163 \cdot 10^8 \) m/s i.e. \textbf{Ubiquity of Material-Geometry in Electromagnetism} is \( \mathbf{v} \), Instantly-Everywhere. For Charges issues \textit{Coulomb law} of Forces between Charges as \( \rightarrow \mathbf{F}_C = C \frac{q_1 q_2}{r^2} \), and the United Newton-Coulomb \textit{Electro-Mechanical Equation}, \( q \mathbf{B}_L = 2\pi f m \), for masses as the
Resonance frequency \( f_R \equiv \sqrt{\frac{1}{4\pi \varepsilon_0 \mu_0 a^3}} \) between Charges and masses . The System \( M_T \) = masses.

\[ Q_T = \text{Charges creates a constant Magnetic-field with Magnetic-field-Strength} \quad B_T = \frac{2\pi M_T f}{Q_T} \]

Energy in cave is

\[ E_K = \frac{k}{r} + \frac{L^2}{2mr^2} = \frac{k}{r} + \frac{L^2}{2r^2\left(\frac{\pi}{2}\right)} \]

\[ \frac{n}{r} + \left(\frac{\pi}{2}\right) + \frac{\pi}{2} = \frac{\pi}{2} + \frac{\pi}{2} = \frac{\pi}{2} + \frac{\pi}{2}, \]

related to Spin ,cave.

Dual-Photon \( \tilde{\nu} = \tilde{c} \cdot \left( \tilde{f}_n + f_n \right) \), is Particle + Wave \( \equiv \) Energy moving with light-velocity and its Duality exists in frequency . The Material-Points travel with velocities \( n, \tilde{c} \), and are

\[ \tilde{v}_m = n.\tilde{c} \cdot \left( \tilde{f}_n + f_n \right) = \tilde{G}_{\tilde{c} + L_P} \left( \tilde{f}_n + f_n \right), \]

where \( \tilde{f}_n \) is the Stationary Storage and \( \{ f_n \} \) Travels as an Propagating Electromagnetic-Radiation where motion \( = \) Energy \( \equiv \) Wave as Electric-Force and is altered to the , Space \( \equiv \) Magnetic force as \( \tilde{E} = \tilde{B} \cdot c \).

The Propagating-Photon follows the Dual-Property \( \tilde{v} = \lambda \cdot f_n = \tilde{c} \cdot \left( \frac{\sigma}{2\pi} + \frac{\sigma\Phi}{2\pi} \right) \).

i.e. Ubiquity of Material-Geometry in Electromagnetism is Everywhere .

Remarks : On the Duality-Photon \( \{ \tilde{c} \cdot \tilde{f}_n + \tilde{c} \cdot f_n \} \equiv \rightarrow \) Particle + Wave \( \leftarrow \)

a. From equations \( f = \frac{\sigma_1 \Phi}{2\pi} \) and \( \sigma_1 \cdot [\pm (\sqrt{5})] / 2 = \sigma_2,\) then Frequency \( f_p \) of Photon is Independent of the Amplitude \( [\varepsilon E^2 + \mu B^2] \) of the Vibration , it is Not-Damped and Not-Driven , and so can be related to Any-Force that can produce Energy as Wave and thus can be Quantized to a Monad .

b. Photon striking an Object of Microcosm or Macrocosm then becomes , a Source that Gives Energy as Energy-Storage , and Information as the Propagating - Energy .

c. Photon in the Microcosm of Hydrogen - Cave can-\textit{Give} such Potential-Energy as Resonance-Energy-Frequency \( f_R \), as that Energy in \( \left( \text{Bracket} \rightarrow \text{Orbit} \rightarrow \text{Hook} \right) \) which Joints the Atoms to produce the Molecules .

d. Electric-Force is the Dominant where Particles are responding to the Constructive \( [\Theta \rightarrow (+) \leftrightarrow \Theta] \) or [\( \Theta \rightarrow (+) \rightarrow \Theta \)], and to Destructive \( [\Theta \rightarrow (-) \rightarrow \Theta] \) Interference as ,

\[ \text{Constructive} \quad [\Theta \rightarrow \Theta = \Theta + \Theta] \equiv \text{Cl}^{\Theta + +} \equiv \text{W}^+, \quad [\Theta \rightarrow \Theta = \Theta \Theta] \equiv \text{Cl}^{\Theta - \Theta} = \text{W}^- \]

Interference \( \rightarrow [\Theta \rightarrow \Theta = \Theta] \equiv \text{Cl}^{\Theta + n} \equiv \text{W}^{++} \), ...

3-Types of Cl-Forces .

\[ \text{Destructive} \quad [\Theta \rightarrow \Theta = 0_+] \equiv \text{DI}^{\Theta + +}_{\Theta 0} = \text{Z}^+, \quad [\Theta \rightarrow \Theta = 0] \equiv \text{DI}^{\Theta + +}_{00} = \text{Z}^0, \]

Interference \( \rightarrow [\Theta \rightarrow \Theta = 0_-] \equiv \text{DI}^{\Theta + +}_{\Theta 0} = \text{Z}^- \), ...

3-Types of DI-Forces .

With the above Mould are Originated all Types of Forces Strong and Weak. From equality \( G \equiv \sigma_2 \Phi^3 \), is seen the Quantum-Chromodynamics and Quantum-Electrodynamics Origin. Because Force \textit{can’t exist by itself} , there must always be an equal and opposite reaction force acting on the Opposite Position or Direction .Coulomb-Force acting between two Particles is \( F_c = C \frac{q_1 q_2}{r^2} \), while the Voltage is \( V_r = C \frac{q_1 q_2}{r} \) of cave , \( r \), and is \( \rightarrow V_r = F_c \cdot r \leftarrow \ldots (v) \)

i.e. when Two Particles are in a cave \( r \), where \(-\infty < r < 0 \) then exists an Interaction between the Two Particles .

4. Strong-Forces :

a). Strong forces are created on , Markos-STPL , in Pascal’s and Desargues’s Six-Points.

BOSONS are formed Axially to Common-circle in Sub-Space \( A_E \ , B_E \ , C_E \) , such for Space , A , B , C , as for Anti-Space \( K_A \ , K_B \ , K_C \), and thus acquire their Spin and ,

Particle & Wave Duality Photon , and Cosmic-Particles Origination .
Instead of a Charge, an Voltage-Force ≡ Motion-in-Magnet ≡ Material-Point from their Conductors, APₐ, ADₐ, when the Θ Breakage Attacks =⇒ to, ⊙ Zero-Charge, as

Θ =⇒ ⊙ =⇒ Q⁺ = \frac{gS}{2\pi r²} and are Launched with \( \frac{Q}{A⁡Kₐ} \), \( \frac{Q}{A⁡Eₐ} \) Quantities at \( Pₐ, Dₐ \)

Points of the STPL line with the Linear-relation \( \vec{B}_F = \frac{vS}{q r²} \) as below.

From \( \vec{B}_F = \frac{m 2\pi q}{q} f = \left[ \frac{2\pi m}{q} \right] f \), so, \( F = \vec{q} \vec{v} \times \frac{2\pi m}{q} f = \frac{m}{q} \vec{q} \vec{v} \left[ \frac{m}{q} \right] f = \frac{vS}{r²} \) or \( \frac{2\pi q}{g} f = \frac{vS}{r²} \)

and M-Force \( \vec{B} = \frac{vS}{q r²} \) or \( \vec{B} = \frac{3.10^8 5.691952.10^{-34}}{1.602.10^{-19}(10^{-19})^2} = 1.065127.10^{32} T \), half Plank-M-Field

Nutation-Force \( F_N = q c B = 1.062.10^{-19}[2.9978.10^8].1.065.10^{32} = 5.1146.10^{21} N \).

Above relates the Inside existing force \( F \), which becomes from Charge \( Q⁺ \) only, from Spin \( S \), and of from \( r \), cave, and in STPL Mechanism creates the Six-Forces of Nature, i.e.

In the same cave, \( r \), Charge \( \vec{Q}⁺ \), creates the Magnetic field \( \vec{B}_F \), following Coulomb law and in where the Gravity, \( g \), acts on Charge mass \( m⁺ \) and creates the Navigation-frequency \( f_N \), and the Inertial-Force \( F \). This Useful-Property allows MRI-Photos from the Surface of caves.

The Hydrogen cave \( L_H = r = \frac{h}{c Z_e} = 2.1127839.10^{-11} m \) is the min-cave in Planck’s-cave with max-Energy \( h \). The cave with [Anti-Space + Space-Positions] is 0.707106781.10⁻²⁰ m and is the Border-line between the, Weak and Strong Forces, because in cave exist the maximum Space-Positions. Placing the above \( r \), Nucleus-Cave in charge \( Q⁺ \) then.

\( \vec{q}_{w-s} = \frac{gS}{2\pi r²} = \frac{2πr²}{9,807654.5,691952.10^{-34}} = 8.8850567.10¹ J/1.062.10^{-19} eV = 5,546.10^{25} eV \)

or it is the E-Border-line between the S-W Forces → \( \vec{q}_{\text{Weak-Strong}} = 5,546.10^{16} \) GeV ←

All Particles and Forces End in STPL, Pascal’s, \( Pₐ \), and Desargues’s Points, \( Dₐ \).

AKₐ, Creating the, + Force \( G⁺ = \Theta =⇒ \varnothing \), and \( AKₐ = \Theta =⇒ \varnothing \), Creating the, − Force \( G⁻ \).

It was shown that Newton-Force in a Neutrino-cave 10⁻¹⁸ m exhibits five attractions of different Strengths. These attractions are from the Strong forces as \( \{ \Theta =⇒ \Theta \}, \{ \Theta =⇒ \varnothing \}. \)

For 3-Combinations → \( \{ s s \} = \left[ \frac{1}{3} \right] \frac{1}{3} + \frac{1}{3} + W⁺ \} \equiv \left( -\frac{2}{3} \right) \left[ W⁻^{-1/3} \right] W⁻ \equiv (-1) \left[ W⁻ \right] \)

and because of the 3-Negative (-) elements exists Strong -Repulsion, But Final-Interaction becomes as Attraction, and this because of the NEW Equilibrium on the vertices of the Equilateral formation, the New-Positions, of the Space and Anti-Space, forming the Strong forces \( \{ \Theta =⇒ \Theta =⇒ \varnothing \} \) which differ in color, Quantum Chromodynamics, [91].

For 3-Combinations → \( \{ s s \} = \left[ \frac{1}{3} \right] \frac{1}{3} + \frac{1}{3} + W⁺ \} \equiv \left( -\frac{2}{3} \right) \left[ W⁺^{+1/3} \right] W⁺ \equiv (+1) \left[ W⁺⁺ \right] \)

and because of the 3-Positive (+) elements exists Strong -Repulsion, But Final-Interaction becomes as Attraction, and this because of the NEW Equilibrium on the vertices of the Equilateral-formation, the New-Positions, of the Space and Anti-Space, forming the Strong forces \( \{ \Theta =⇒ \varnothing =⇒ \Theta \} \) which differ in color, Quantum Chromodynamics, [91].

i.e., as Photoelasticity describes the changes in Stresses and Strain in a material, so QCD Determines the Stresses and Strain { Energy - Space }, in Cosmic-Caves Subjected to Coulomb -Forces. This Light-Wave is seen as Screen of, Fringe-Pattern, Tension-lines.

Particle & Wave Duality Photon, and Cosmic-Particles Origination.
5. **Weak-Forces**:  
1. Weak-Forces are created on **Markos-STPL**, in Pascal’s and Desargues’s Six-Points.  
2. The ⊕ Breakage being alternative at Space-Points A, B, C → **Attacks** to the ⊗ **Charges** at Anti-Space-Points \( K_A, K_B, K_C \), and forms **Leptons** \{ e\(^-\), \(\mu^+\), \(\tau^+\), \(v_e\), \(v_\mu\), \(v_\tau\) \} and **Quarks** \{ d, s, b, u, c, t \}, on STPL Points \( P_A, P_B, P_C \rightarrow D_A, D_B, D_C \) respectively.  
3. Because the ⊕ Breakage **Attacks** \(\Rightarrow\) to ⊗ **Charge** thus Anti-Particles are Generated only from the Opposite-motion, opposite direction, in their Conductors. \(D,P \rightarrow I \leftarrow P,D\)  
4. From [91] The Geometry of STPL line allows Six Quantities on the three Loads as The **Artificial 3-Phase-Star-Circuit** and The **Physical 6-Phase-Delta-Circuit** for \( Q_{AKA}^{-} \), and \( Q_{AEBKA}^{-} \), Elementary -Particles are all-launched at \( P_A \) and \( D_A \) Points of STPL.  
5. Primary Particles occupying mass \( m \), exert Gravitational attraction on each other.

For the **Repulsion-Strong-Forces** \( [\oplus \rightarrow = \ominus] \equiv CI^{+\rightarrow -} \equiv W^{++} \), and because in each Phase \( \phi = 180^\circ \) the Energy increases, is presented \(<\text{color}>\) as in Photoelasticity and thus exert **Attraction** via the Strong – Nuclear-force which is the **Stress** \( \rightarrow \sigma \equiv G / \Phi^3 \).

For the case of Two Protons in Hydrogen cave, these become bound, forming the Helium Nucleus and because the Dynamic-Strip-Polygon doesn’t close, a neutron is also needed to keep the Helium Nucleus Stable. A wide analysis in [91-92]

**ACKNOWLEDGE**

Because of Covid-19, was impossible for me to communicate with Professors or Electrical Engineers Specialists in Electromagnetism ubiquity. As is seen Frequencies or Energy and Electromagnetism is everywhere in nature from microcosm to macrocosm. The Relation of frequencies and Stresses become from the Eternal-motion of the Opposites which are the only elements of this cosmos, which Drive us to the Energy - Space Constructions of everything existing in Objective - Reality. It was done an effort to frame the all document in Classical Mechanics so that the Reader can understand the Deep-meaning of equations, because that we call **Nature follows The - Material - Geometry and its Rules**.

Articles [89] - [90-91] were intended for, Future Technology Journals, but because Nobody knows when Covid-19 is to be eliminated so I decided to detach Parts and include in present believing that Present Revised [89R], will Share this Knowledge of Electromagnetism in M-Geometry to all Readers, becoming from the One - Force of Energy-Space-Univers and which is that of Newton’s Gravitational-Constant G only. Markos Georgallides 1/3/2020.

The Revised Article [89] is a completion of Prior and an Effort of an Simplified approach to Elementary-Particles-origination. I believe Scientists will find the way from the existing Chaos to clarify what is Objective-Reality. Markos Georgallides 1/3/2020.

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110

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