

PHOTON-PARTICLE , PHOTON-WAVE OR DUALITY - PHOTON ?

Markos Georgallides

¹Larnaca – Cyprus

(Expelled from Famagusta town occupied by the Barbaric Turks Aug-1974) ,
Cyprus , Civil-Structural Engineer (NATUA) , Athens

Email address : georgallides.marcos@cytanet.com.cy

Abstract

Distance is the Quantum of E-Geometry, while **Material-point** is the Quantum in **Physics** and **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 \pm axes pass from zero , The Rolling of Positive \oplus , constituent on the Negative \ominus , constituent , creates the Neutral Material point which Equilibrium . **Spin \bar{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* .

Space is Quantized as Energy-Caves under the effect of Gravitational-force G , and **Energy is Quantized as Frequency** in **Energy-Caves** following Kepler`s First-law of equal areas in equal intervals . **Quaternion** $[(+)\cup\cup(-)]$ is a **Quantum-Mould** for Space $[(+)(-)]$ and Energy \equiv motion \equiv Force x Displacement as $[\cup\cup$ or $\uparrow\leftrightarrow\downarrow]$ \equiv Box **B_Q** \equiv An Material Point which carries the Principal Stress σ between A(+), B(-) , and σ is **Centripetal-acceleration** of minimum Energy becoming from the in-storage AB acceleration and which is **equal to the Gravity g** .

From Quaternion Quantum-Mould $[r + \bar{v} \nabla i]^{1/w} = e^{-i.(\pi/2+2k\pi).w}$ is created the **min-cave** $r = 1,07.10^{-7}$ m and the **min-energy** $\bar{v} = w r = 2\pi r f$, The frequency $f_m = 2,839844. 10^{10}$ H . Gravitational-force G effecting on light velocity \bar{c} creates Electron-charge \bar{q} and Electron \bar{e} , while acting on Planck`s-cave the Gravity $g \equiv \pm \sigma$, as $G = g k = k_E g = k_L \sigma = g.g_L k_L$, and g effecting on the min-Planck-cave L_p formulates Hydrogen-cave **H** with its electron H_e .

Constant G is effecting on **Gravity g** and in turn g , effects on Electron \bar{e} of **Hydrogen-cave**, **Originates Nutation-motion** in Precession as Resonance-frequency $f_N \equiv f_R \equiv$ **Work \equiv Energy**, and is stored in the [Nucleus-Electron] **Orbit** , as the w_L Larmor – frequency. Moreover

A...The **Link** between G and all above is the Photon [**Particle-Wave**] which as Particle is an Confined f_N ,in a Stationary-Wave-Storage , and as Wave an Propagating Electromagnetic-Wave.

B... The **United Coulomb-Newton-Law** of **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 .

C... **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 of Space** , which are the **Natural-frequency of Atom f_1** , and the **Storage Magnetic-field \bar{B}_L** .

Keywords : The Duality Photon , The Constancy of light-velocity , Atoms-Nutation-motion .

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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 [48] .

3...The Solution of all the Unsolved-Ancient-Greek-Problems [50] opened the way to **Material-Geometry** [54] which Incorporates the Motion In-Space ($\oplus \leftrightarrow \ominus$) , [61] .

The Space exists in Energy-Caves as **Energy-Quantum-Quantities** [39] while Motion or **Energy exist** inCaves as an **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 \rightarrow Zero-Point (0) \equiv [+ = -] or (+A)+(-A) = 0 in E-Geometry and \rightarrow [0] = [$\oplus \leftrightarrow \ominus$] \equiv ds , [$\oplus \leftarrow ds \rightarrow \ominus$] in Material- Geometry , to the aperon , $\pm \infty$, where , **in The Space \equiv ds** , the **motion exist as Vibration** [52] .

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

5... Gravitational-Force G , Acting in the **Beyond-Planck** - Cave , and on the light Velocity **Vector \bar{c}** , creates Electron-Charge $\bar{q}_{\text{Electron}} = \frac{G}{c\sqrt{2}}$ and the Material-Points $\bar{q}_{\text{Photon}} = \frac{G}{\sqrt{2}.f}$ while by effecting on the **Whole-Planck-Cave** $\mathbf{L}_p \equiv \mathbf{e}^{i.(-5\pi/2).10}$, creates the Pointy-Gravity Force as this is the **Ocean of Spins \bar{g}** ,and which Oriented-Spins , **Originate** the Gravity **g** and **Electron \bar{e}** [72] .

6...The Rotation of the Two Elements , [$\oplus \cup \cup \ominus$] , Up or Down in the Material-Point-circles

Originates the Spins , $\pm \frac{1}{2}$, ± 1 , $\pm \frac{1}{2}$, for All-Particles **Fermions or Bosons** which become

from above Three-States of motions , just by Adding the Spins [36] . Linear Motion [$\oplus \leftrightarrow \ominus$]

of Breakage [$\pm \bar{c}. s^2_m$] in cave { M-Point = d s_m = $e^{i.(\frac{N\pi}{2})b=10^{-N} = \pm \infty}$ m} as $\rightarrow v = w r = 2\pi r. f =$

$\sigma \Phi$, in the Great and Small circles of Glue-Bond rotation creates the **Three-States** of

frequencies $f_{\pm 1/2} = \frac{(1+\sqrt{5}) \sigma}{8\pi r}$, $f_{\pm 1} = \frac{(1+\sqrt{5}) \sigma}{4\pi r}$, $f_{\pm 1/2} = \frac{(1+\sqrt{5}) \sigma}{8\pi r}$, and energy $E = h f_m$.

Because **Angular-Momentum \bar{B}** = $\frac{2L}{w} = \frac{2L}{2\pi f} = [\frac{2L}{2\pi}].[\frac{1}{f}] = \frac{\text{Constant}}{2\pi} [\frac{1}{f_m}] = \text{SPIN}$ [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 $g . a^3 . f_p^2 = 1$ and $E = h f_p$.

8...When the Unit-Quantum-Energy k in Planck-length is equal to the Stress of Gravity g and **frequency f_e** becomes from Hydrogen Least-Unit-Energy = πg , then Reaction = mass

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is that of the **Electron Cave**, \mathbf{e} . as $4\pi^2 f_e^2 \cdot m_e = \mathbf{k} = \pi \mathbf{g}$ and $\mathbf{m}_e = \mathbf{g} / [4\pi f_e^2]$, [82]

9...The Rotation around the \oplus constituent, of the Confined-Electron \ominus constituent in the Potential-Energy of Hydrogen-cave, which consists a configuration of masses \mathbf{m}_p and of Charges \mathbf{q}_e , **Originates**, the **Uniform-Magnetic-field $\bar{\mathbf{B}}_L$ 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 \mathbf{f}_N , so Produces an **oscillating magnetic-field $\bar{\mathbf{B}}_N$** , which in turn is the source of an oscillating Electric-field $\bar{\mathbf{E}}_N$, which implies the Regeneration each other and which is a Propagating Electromagnetic - Wave where $\bar{\mathbf{E}}_N = \bar{\mathbf{B}}_N \mathbf{c}$. [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, a Heap 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 \mathbf{G} is effecting on Gravity \mathbf{g} , and in turn \mathbf{g} is acting on Electron $\bar{\mathbf{e}}$ in the Hydrogen-cave, Originates the Nutation-motion in Precession as **Cyclotron-Resonance - frequency $f_R = \sqrt[4]{\frac{1}{4\pi^2 m_e r^3}}$** of cave, r , and the produced-Energy \equiv motion is stored in the

Orbit as a New **Uniform-Magnetic-field $\bar{\mathbf{B}}_F = \left| \frac{2\pi M_T}{Q_T} \right| f_R$** 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 the 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 \mathbf{G} , and light velocity $\bar{\mathbf{c}}$, with Derivatives the Photon-Charge $\bar{\mathbf{q}}_{\text{photon}}$ in Material Point cave \mathbf{r} , Gravity Constant \mathbf{g} , and Planck constant \mathbf{L}_p , with a Rigorous Geometrical and Mechanical logic.

It was shown [33-39] that from \langle *The Balancing of Space, Anti-Space in a Rotating Sub-Space Common circle* \rangle Un-clashed Fragments through center, \mathbf{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 $[\nabla \mathbf{i}]$, while the clashed with the constant velocity, $\bar{\mathbf{c}}$, consist the Dark matter $[\pm \bar{\mathbf{c}} \cdot s^2]$ and the Dark energy $[\bar{\mathbf{c}} \cdot \nabla \mathbf{i}]$, **Declaring that** \rightarrow Antimatter-Galaxies and Antimatter-Asteroids can exist only as Dark-matter or and Dark-Energy and **NOT** as Antimatter light, $(-\mathbf{c})$, alone, or from \rightarrow velocity - Breakages, $[\pm s^2 = \pm (wr)^2]$ and $[\nabla \mathbf{i} = 2(wr)^2]$, where then become the **Waves** { *On distance $ds = |AA_E|$ 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 $\mathbf{S} \equiv [\oplus \leftarrow \mathbf{r} \rightarrow \ominus]$ + Motion $\mathbf{M} \equiv [\bar{\mathbf{v}} - \mathbf{Vector}]$ as [87].

From vibration in Material-Points become ,

- A → Particles , with Inherent Vibration occupying distance $r = ds = |AA_E|$,
- B → Gravity-Field-Energy without Vibration , the only Stationary-Rotating Photon-Spinning-Material-points .
- C → Dark-matter-Energy constituents as below ,
- A.. $[\pm\bar{v}.s^2]$ → Fermions , *Quarks and Leptons* , and $[\pm\bar{v}.\nabla i]$ → Bosons ,
- B.. $[\pm s^2]$ → [MFMF] *Neutral Field* \equiv **The Equilibrium Energy - Chaos** , with the *Negative-Energy* binder Field $[\nabla i]$ → The Gravity force G_f
- C.. $[\pm\bar{c}.s^2]$ → Dark-matter , and the binder Gravity-force $[\nabla i]$, $[\bar{c}.\nabla i]$ → 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 → Energy as velocity , \bar{v} , and , \bar{c} , exists in the

Quantized , *Discrete monads* , $\pm\bar{v}.s^2$ and $\pm\bar{c}.s^2$.

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

Dark Energy DE $\equiv [\bar{c}.\nabla i]$ (©) → Acting , *is Positive-Energy* , on the Five Constituents →

{ [$(\nabla i),(+s^2),(-s^2),(+cs^2),(-cs^2)$] } Produces

$[\pm s^2]$ → MFMF Field $[\pm\bar{c}.s^2]$ → DM-DE Field of , Dark matter and Anti-matter

$[\pm\bar{v}.s^2]$ → Fermions $[\nabla i]$ → $G_f \equiv$ Gravity-Force in DM-DE Stationary Field .

$[\bar{v}.\nabla i]$ → Bosons , $[\bar{c}.\nabla i] \equiv$ DE → Dark Energy $c \times$ (©) $[\nabla i]$

→ Gravity Force DE $\equiv [\bar{c}.\nabla i] = \bar{c} [\nabla i] =$ The Travelling-Energy-cave , c ,
with the velocity-vector. , \bar{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 , \bar{v} , and since Energy is vectors then

$$k = \bar{v}x\bar{v} . \bar{r} = v^2.r . \bar{n} = v^2 . r = (wr)^2.r = \left[\frac{2\pi r}{T}\right]^2.r = \frac{4\pi^2 r^2}{T^2} . r = \frac{4\pi^2 r^3}{T^2} = 4\pi^2 \frac{r^3}{T^2} = 4\pi^2.r^3.f_p^2 \text{ i.e.}$$

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

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-Linear motion as an Propagating Electromagnetic-Wave , which carries the Energy-conveyer,

i.e. The stored energy in the loop is → $W_1 = v^2 \left[\frac{h}{2\pi} \right] = 4\pi^2.r^3.f_p^2 = k$, where as **Wave** is

Frequency $[f_1 = (E^2 + H^2) = n \frac{(1+\sqrt{5})\sigma}{4\pi r} = \frac{2n\bar{B}}{\pi^2 r^4}]$ and **Particle** as velocity $[\bar{v} = \bar{c} = \lambda \frac{f}{\phi}]$

and dependent on velocity , v , 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 → $\{ \bar{c} . \boxed{f_n} + \bar{c} . f_n \} \leftarrow$ is proved that ,

1.. Energy-Storage $S \equiv [\oplus \leftarrow r \rightarrow \ominus] \equiv$ Particle $[\bar{v} . \boxed{f_n}] \rightarrow [\bar{v} = \bar{c} = \lambda \frac{f}{\phi}] \rightarrow$

And is an Stationary Standing - Wave → $\{ S \equiv EM-R \equiv [f_{1=N} , f_2 , f_3 , f_D ,, f_n = w^2] \}$.

2.. Energy-Motion $M \equiv [\bar{v} - \text{Vector}] \equiv$ Wave $[\bar{v} . f_n] \equiv [f_1 = (E^2+H^2) = n \frac{(1+\sqrt{5})\sigma}{4\pi r} \rightarrow$
 $= \frac{\bar{B}}{\pi^2 r^4}]$ **and it is a Propagating Wave** $\{ W \equiv EM-R \equiv [\epsilon E^2 + \mu B^2] = 2.\lambda c . \sin.2\phi \}$.

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 , \bar{c} , \bar{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 $r = |(\bar{c}.T)| = \sqrt{v^2 + c^2}$ and by using Geometry-Space Vector $\bar{r} = |(\bar{c}.T)| = \sqrt{v^2 + c^2}$ then The total Rotating energy $\bar{\Lambda}$ is $\rightarrow \pm \bar{\Lambda} = \bar{p}.r = (M.c).r = (M.c). \sqrt{v^2 + c^2}$ and squaring both sites $[\pm \bar{\Lambda}]^2 = p^2.r^2 = M^2.c^2.(v^2+c^2) = (M^2.v^2).c^2 + M^2.c^4 = (p^2.c^2) + M^2.c^4 = [pc]^2 + [m_0.c^2]^2$ or is $E_T = E_R + E_K$ i.e.

The Total - Energy of Elementary-particle \equiv 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 $ds = |AB|/n$

$$[A] \quad ds = (AB/n = \infty) = 0 \quad [B] \quad [A] \quad ds = \rightarrow = AB / n = 1 [B]$$

..... $\rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow$

Continuous as Points (.) *Discrete as monads ($r \equiv ds = 1 \rightarrow n$)*

Work done (W) by Impulse (P) on a Virtual displacement ($ds > 0$) is zero , or $W = \int A-B = [P.ds] = 0 \rightarrow [ds . (P_A + P_B) = 0] \rightarrow P_A \equiv$ Points in Space [S] and $P_B \equiv$ Anti-Space [AS] or $[ds . (P_A + P_B) = 0]$, 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 = 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 $AB = ds = Constant = v . 0 = \infty . 0$. 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 $W = Force \times D = Displacement \equiv Momentum [mv] \times Distance [r] \equiv mv . r$ or $W \equiv mv . r$, exists Work where $1... \rightarrow r$ Becomes from Material-Geometry where the Quantization of Space for the Rotated Energy case ($s = 0$ and $\cos \varphi = 0$) , In-Primary-Quaternion $[s + \bar{v} \nabla i]^{1/w} = e^{-i.(\pi/2 + 2k\pi). w}$ { 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 $e^\wedge - (16,1181) = 1 . 10^{-7}$ or $r = 1,07.10^{-7}$ m $r_{min} = 1,07.10^{-7}$ m \rightarrow i.e. $r_{min} \equiv$ The minimum Energy-Space-Cave \equiv Space-Quantum .

Placing the $\rightarrow r_{min}$ in the Dynamic-Space-Energy relation , $g . r^3 . f_p^2 = 1$, when $g=1$, then , $f_p^2 = \frac{1}{r^3} = 8,0647139.10^{20}$ m , or $f_{min} = 2,839844.10^{10}$ H , is the minimum Energy in Cave , $2... \rightarrow f = f_{min} = 2,839844.10^{10}$ H \equiv The minimum Energy in Cave \equiv The-Energy-Quantum

From wavelength-relation $n \lambda = 2r = n v/f$, exists $v = \lambda f$ or $\rightarrow \bar{v} = \bar{c} = \lambda f$. and since $v = w r = [2\pi/T].r = 2\pi.f_1 . r$, wavelength $\lambda = c T = c /f_1$, 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. \rightarrow The Quantum of velocity is constant c.

From Constant-Energy Orbit-relation $\mathbf{k} = [\bar{v} \times \bar{v}] \cdot \bar{r} = v^2 r = (w r)^2 \cdot r = \left[\frac{2\pi}{T} r\right]^2 \cdot r = \frac{4\pi^2 r^2}{T^2} r = \frac{4\pi^2 r^3}{T^2} = 4\pi^2 r^3 f_{\min}^2 = [2\pi f \cdot r]^2 \cdot r = [\mathbf{n} \cdot \pi \cdot \mathbf{c}]^2 \cdot r \equiv \text{Kepler Universal Laws for macrocosm and microcosm} .$

Frequency $\rightarrow \mathbf{f}_{\min}$, becomes from velocity relation $v = w r = 2\pi f \cdot r$, as $\mathbf{f}_{\min} = \frac{v}{2\pi r_{\min}}$ or

$$\mathbf{f}_{\min} = \frac{v}{2\pi r_{\min}} = \frac{\mathbf{n} \cdot \pi \cdot \mathbf{c}}{2\pi r_{\min}} = \frac{\mathbf{n} \cdot \mathbf{c}}{2 \cdot r_{\min}} = \frac{2,99810^8}{21,07 \cdot 10^{-7}} = 1,4009345 \cdot 10^{14} \text{ H}$$

From momentum relation $\mathbf{B} = m r v = m r^2 w = m r^2 (2\pi f) = \frac{J \cdot w}{2} = \left[\frac{\pi r^4}{4}\right] \cdot [2\pi f]$, then the Mass of the elementary particles is $\mathbf{m} = \frac{\pi \cdot r^2}{4} = \frac{\pi \cdot (1,07 \cdot 10^{-7})^2}{4} = 8,992023 \cdot 10^{-15} \text{ Kg}$ or ,

3... $\rightarrow \mathbf{m} = \mathbf{m}_{\min} = 8,992023 \cdot 10^{-15} \text{ Kg}$. while from relation $\mathbf{B} = r m v = \frac{\pi^2 r^4}{2} f$, then

$$\text{Planck mass } \mathbf{m} = \frac{\pi^2 r^4 f}{2 r v} = \frac{\pi^2 r^3 f}{2 c} = \frac{\pi^2 (1,07 \cdot 10^{-7})^3 \cdot 1,4009345 \cdot 10^{14}}{2 \cdot 2,99810^8} = 2,8248572 \cdot 10^{-15} \text{ Kg} = \mathbf{m}_{\min} / \pi$$

Quantization , **for $\mathbf{k} = 1$** , is the Planck-minimum-Energy-Scale Decimal-Cave $\mathbf{L}_{\min} = \mathbf{L}_p$

$$\mathbf{L}_p = e^{i \cdot \left(\frac{\pi}{2} + 2k\pi\right) \cdot b} = e^{i \cdot \left(-\frac{5\pi}{2}\right) \cdot 10} = e^{-i \cdot (78,5398)} = \mathbf{8,906} \cdot 10^{-35} \text{ m} = \{ \sqrt{3} \cdot \pi \cdot \mathbf{1,616199} \cdot 10^{-35} \text{ m} \}$$

From [70] the velocity of Elementary particles is the light velocity-vector . $\bar{c} = \bar{v} = 2\pi \cdot f_e$ and the frequency $f_e = \frac{\bar{c}}{2\pi \cdot r}$ (1) . The Balancing of , Space and Anti-Space in a Rotating

Sub-Space Common circle happens from the $[\pm]$ equilibrium- Rotational-Energy as relation $\bar{B} \bar{w} = L = \frac{1}{2} J_1 w_1^2 + \frac{1}{2} J_2 w_2^2 + \frac{1}{2} J_3 w_3^2$, or A-momentum $\bar{B} = \frac{J \cdot w}{2} = \frac{\pi r^4}{4} [2\pi f] = \frac{\pi^2 r^4}{2} [f] \dots(2)$

Frequency $\mathbf{f} = 2\mathbf{B} \frac{1}{\pi^2 \cdot r^4} = \frac{2\mathbf{B}}{\pi^2 \cdot r^4} = \frac{[1+\sqrt{5}] \cdot \sigma}{4\pi r} = \frac{\bar{c}}{2\pi \cdot r} = \frac{\Phi \cdot \sigma}{2\pi r}$, or $2\bar{c} = [1 + \sqrt{5}] \sigma \dots(3)$.A-momentum

$\bar{B} = \frac{[1+\sqrt{5}] \cdot \sigma \cdot \pi \cdot r^3}{4} = \frac{\pi r^3 \Phi \cdot \sigma}{2} \dots(4)$, where **Unit-energy-constant** is $\frac{T^2}{a^3} = k = \left[\frac{4\pi^2}{G \cdot m}\right]$, or $ka^3 f^2 = 1$

The Rotational energy is $\rightarrow E_R = \bar{B} \cdot \bar{w} = 2L = J \cdot w^2 = J \frac{c^2}{r^2} = \left[\frac{\pi r^4}{2}\right] \frac{c^2}{r^2} = \frac{\pi c^2}{2} r^2 \dots\dots\dots(5)$

Mass is the Reaction to any motion or change and is measured by the cave-moment of Inertia **J**. Energy and frequency of Elementary particles can be found from cave **r** only since , **c** , is

constant .**Total-Energy** $\rightarrow \mathbf{E}_T = E_R + E_K = \frac{\pi c^2}{2} r^2 + \frac{1}{2} m \cdot v^2 = \mathbf{1,4118323} \cdot \mathbf{10}^{16} \cdot \mathbf{r}^2 + \frac{1}{2} \mathbf{m} \cdot \mathbf{v}^2 \dots\dots(5a)$

Since Total-Energy $L = B w = \frac{J \cdot w}{2} w = \frac{J \cdot w^2}{2}$ then $2L = J \cdot w^2$, and $\bar{B} = r \cdot m \cdot v = r \frac{\pi \cdot r^2}{2} 2\pi f \cdot r = \frac{\pi^2 r^4}{1} f$

From momentum relation $\bar{B} = m r v = m r^2 w = m r^2 (2\pi f) = \frac{J \cdot w}{2} = \left[\frac{\pi r^4}{4}\right] \cdot [2\pi f]$, then the Mass of the elementary particles is $\mathbf{m} = \frac{\pi \cdot r^2}{2}$, i.e. is dependent on the radius of cave ,and for Gravity

cave $r = 10^{-62} \text{ m}$, then **Material-Points mass** $\rightarrow \mathbf{m} = \frac{\pi \cdot 10^{-124}}{2} = 1,570796 \cdot 10^{-124} \text{ kg}$.

However from $J_1 w_1^2 + J_2 w_2^2 + J_3 w_3^2 = 2L$ then , $w_1^2 + w_2^2 + w_3^2 = \frac{2L}{J} = \frac{4L}{\pi r^4} = B w = 2\pi f \cdot B$

Angular-velocity-momentum-Ellipsoid $L = \frac{B_1^2}{2J_1} + \frac{B_2^2}{2J_2} + \frac{B_3^2}{2J_3}$, 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 $B^2 = 2LJ = 2L \frac{\pi r^4}{2} = \pi L \cdot r^4$ and $\pi L = B^2 \cdot r^4$.

2b.. In Planck`s Scale , length $r = L_p = 1,616199 \cdot 10^{-35} \text{ m}$ velocity $v = c$:

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

From velocity relation $c = w r = 2\pi r f$, frequency $f = \frac{c}{2\pi r} = \frac{2,998 \cdot 10^8}{2\pi \cdot 1,616199 \cdot 10^{-35}} = 2,95236210^{42} \text{H}$
 and Period $T = \frac{2\pi r}{c} = 3,3871185 \cdot 10^{-43} \text{ s}$. **From Angular momentum** $\vec{B} = r m v = \frac{\pi^2 r^4}{1} f$
 then mass $m = \frac{\pi^2 r^4 f}{r v} = \frac{\pi^2 r^4 f}{2\pi r^2 f} = \frac{\pi r^2}{2} = \frac{\pi \cdot (1,616199 \cdot 10^{-35})^2}{2} = 4,1030756 \cdot 10^{-70} \text{ Kg}$,
 Stress σ from above equation $f_p = \frac{n\sigma \cdot \Phi}{2\pi r}$ is $\sigma = \frac{2\pi r f}{(n)\Phi} = \frac{2\pi r f}{1 \cdot \Phi} = \frac{2\pi \cdot 1,616199 \cdot 10^{-35} \cdot 2,95236210^{42}}{1,6180339} =$
 $= 1,846462 \cdot 10^8 \text{ t/m}^2 = 1,846462 \cdot 10^{11} \text{ Kg/m}^2$, and Angular velocity $|w| = \frac{\sigma}{2r} [1 + \sqrt{5}] =$
 $(\frac{1,846462 \cdot 10^{11}}{2 \cdot 1,616199 \cdot 10^{-35}}) \cdot 1,6180339 = 1.5007013 \cdot 10^{46}$, or $|w| = 1,5 \cdot 10^{46} \text{ rad/sec}$, and the constant
 figure of Energy is that of Stress $\sigma = 1,846462 \cdot 10^{11} \text{ Kg/m}^2 = 1,846462 \cdot 10^{11} \text{ Joule}$.

Velocities in caves become from equation $v^2 = \frac{2}{m} [E - \{ \frac{k}{r} + \frac{L^2}{2m r^2} \}] = [4\pi^2 \cdot k] \cdot [\frac{1+e}{r}]$ where
 constant, $k = a^3 f_p^2$, **Is the Energy** executed by the radius, $r = \text{Focus-Planet}$, 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 is $E = \frac{mv^2}{2} + \{ \frac{k}{r} + \frac{L^2}{2m r^2} \}$ where $L = S = \text{the Spin of Particles}$.

From **Mechanics** In the One degree of freedom Vibration of a mass, m , and Stiffness, k , in a
 distance, a , is for, $w^2 = [k/m]$ from equation, $m \ddot{x} + w^2 x = 0$, with solution \rightarrow the Period
 $T = 2\pi \cdot \sqrt{\frac{m}{k}}$, frequency $f_H = \frac{1}{2\pi} \sqrt{\frac{k}{m}}$, and Energy $E = h f_H$, where, $h = \text{Planck's constant}$, and

from Orbit-equation $\vec{v} = \sqrt{\frac{2}{m} [E - \{ \frac{k}{r} + \frac{S^2}{2m r^2} \}]}$ and for $v = c$ then, $E = \frac{mc^2}{2} + \frac{k}{r} + \frac{L^2}{2m r^2} = h f_R$

From Hydrogen Orbit-motion, $r = \sqrt[3]{\frac{1}{k \cdot f^2}}$, or $k \cdot f^2 \cdot r^3 = 1$ and Constant-Unit-Energy $k = \frac{1}{f^2 \cdot r^3}$
 which **Energy** k , is the, **Quantum of Energy**, in the first Planck-length-cave.

For **Black-Holes**, the Total-Energy $L = \vec{B} \vec{w} = \frac{J \cdot w}{2}$ $w = \frac{\pi r^4}{2} [2\pi f]^2 = 2\pi^3 r^4 f^2 = r m v = r m \cdot w r$
 and mass $m = \frac{2\pi^3 r^4 f^2}{r^2 2\pi f} = \frac{\pi^2 r^2}{1} f = [\frac{\pi r \cdot v}{2}] v$, while **Angular-Momentum** $B = r \cdot m v = r [\frac{\pi r v}{2}] v = \frac{\pi r^2}{2} v^2$
 $= \frac{\pi r^2}{2} v^2 = \frac{\pi r^3}{2} [n \cdot \pi \cdot c]^2 = \frac{\pi^3 r^3}{2} c^2$, or **Black-Hole-Energy** $\rightarrow B_E = 2 \cdot \pi^5 \cdot r^3 \cdot f^2 = (\pi r)^3 \cdot w^2 \leftarrow$
 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 :

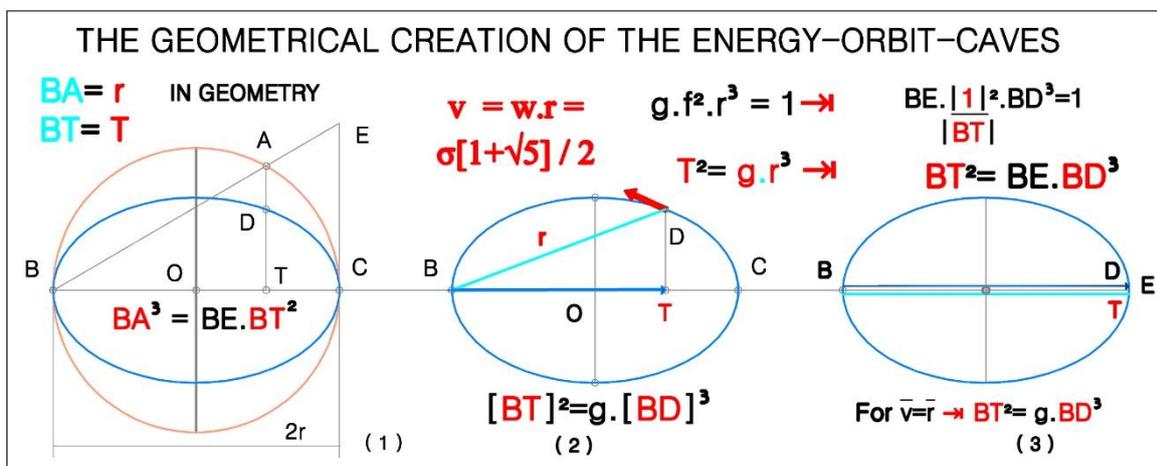


Figure – 1 - : The Periodic motion in Caves follows Material-Geometry rules .

In (1). Is shown the Geometrical Expose of , Dynamic-Space-Energy relation $g \cdot r^3 \cdot f_p^2 = 1$

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

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

To Proof :

The Right-angled-Triangle ABC at $A = 90^\circ$, lies on $[O, OC=OA]$ circle and CE is the tangent at C . Since angle $BAC = 90^\circ$ of triangle CAE , then angle $\angle CAE = 90^\circ$.

Since $BA \perp AC$ and $AT \perp BC$ then , the **Power of Point B on ACT triangle** is $BA^2 = BT \cdot BC$

Since $BC \perp EC$ then , the **Power of Point B on ACE triangle** is $BC^2 = BA \cdot BE$ (2)

Squaring the first relation and substituting (2) then $[BA^2]^2 = BT^2 \cdot (BC^2 = BA \cdot BE)$ and

$$BA^4 = BT^2 \cdot BA \cdot BE , \text{ or } \rightarrow \mathbf{BA^3 = BT^2 \cdot BE} \text{ or } \rightarrow \left| \frac{1}{BE} \cdot BA^3 \cdot \frac{1}{BT} \right|^2 = \mathbf{1} \text{ o.e.}\delta \text{(3)}$$

Remarks :

- 1.. Physics follow the Geometry-Rules in all levels , either in microcosm or in macrocosm.
- 2.. Constants in Physics , 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 $[\ddot{x} + w^2 x = 0]$ 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** $[\ddot{x} + w^2 x = 0]$ of **Three-masses , Occur on Two-Line-Vectors Perpendicular each other** , vibrating on Straight-line , $\ddot{y} + w^2 y = 0$, of $x \perp y$ Plane and follow the Lissajous Shapes , [83] , where for ,

a.. Difference of Phase $d_\phi = 90^\circ$ emission is \rightarrow The Eight-Shapes ∞ .

b.. Difference of Phase $d_\phi = 0^\circ$ emission is \rightarrow The Ellipse-Shapes \propto .

c.. Difference of Phase $d_\phi = 45^\circ$ emission is \rightarrow The Double-Saddle-Shapes . \wp, \wp .

- 6.. For Planck length [73] P-49, was shown that **the Rotated Energy case** , when $s = 0$ and $\cos \phi = 0$, exists for angle $\phi = \pi/2$ and Quaternion $(s + \bar{v} \nabla i)^{1/w} = e^{-i \cdot (\pi/2 + 2k\pi) \cdot w} \dots(1)$ the dimension power $\rightarrow w = b \leftarrow$ **and for $k = 1$** then (1) becomes , [84]-P.74

$$e^{-i \cdot (\pi/2 + 2k\pi) \cdot w} = e^{-i \cdot (\pi/2 + 2k\pi) \cdot b} = e^{-i \cdot (5\pi/2) \cdot b} = e^{-i \cdot (5\pi/2) \cdot 10} \dots\dots\dots(2)$$

Equation (2) fits , *as minimum cave* , in the Planck length and is $L_p = e^{-i \cdot (5\pi/2) \cdot 10} \dots(3)$

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, π , where for base the natural logarithm , e , and exponent the decimal

base , $b = 10$. From $\rightarrow z^{1/w} = (s + \bar{v} \nabla i)^{1/w} = |z0|^{-w} \cdot [\cos \cdot (\phi + k\pi)/w + i \cdot \sin \cdot (\phi + k\pi)/w]$

$= |z0|^{-w} \cdot e^{-i \cdot (\phi + k\pi) \cdot w}$ for $\cos \cdot (\phi + k\pi)/w = 0$ then exists only the **Imaginary part** of monad

$(\bar{v} \nabla i) \neq 0$, where $\phi = \pi/2$ and then , $z^{1/w} = |z0|^{-w} \cdot e^{i \cdot (\phi + k\pi)/w} = e^{-i \cdot (\frac{\pi}{2} + k\pi) \cdot 10}$ 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 $z^{1/w} = |z0|^{-w} \cdot L_v = E\text{-Monad}$.

Extending quantization of Energy according to exponential formula $\rightarrow L_v = e^{-i \cdot (5\pi/2) \cdot 10}$ 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 $e^\wedge - (13,8155) = \mathbf{1 \cdot 10^{-6} m}$

For base $e = \mathbf{2,71828}$ and $k = 0$ $L_v = e^\wedge i \cdot (\pm \pi/2) b$ then $e^\wedge (-\mathbf{15,7079}) = \mathbf{1,78118 \cdot 10^{-7} m}$

For base $e = 2,71828$ and base $b = 10$ then $e^\wedge - (16,1181) = \mathbf{1 \cdot 10^{-7}}$ or $\mathbf{r = 1,07 \cdot 10^{-7} m}$.

Placing r , in the Dynamic-Space-Energy relation when $g = 1$ then $r^3 \cdot f_p^2 = 1$ and $f_p^2 = \frac{1}{r^3}$
 $= 8,0647139 \cdot 10^{20} \text{ m}$ and occurs the, **minimum frequency** $f_m = 2,839844 \cdot 10^{10} \text{ H} \dots(4)$

For Electron radius $r_e = 5,82 \cdot 10^{-16} \text{ m}$, Weight of Electron $Q = m_e g = 9,11 \cdot 10^{-31} \cdot 9,808$
 $= 8,93 \cdot 10^{-30} \text{ Kg}$, the Moment of Inertia-Disk $J_e = J_3 = [\pi a^4/2] = \pi/2 [5,8 \cdot 10^{-16}]^4 =$
 $1,777591 \cdot 10^{-61} \text{ m}^4$, Angular velocity $w_e = \frac{v}{r_N} = \frac{c}{1836} = \frac{3 \cdot 10^8}{1836} = 1,633 \cdot 10^5 \text{ m/s}$ because of
 masses analogy and **Electron-Nutation-frequency** $f_N = \frac{s Q}{2\pi \cdot J_3 w} = \frac{5,82 \cdot 10^{-16} \cdot 8,93 \cdot 10^{-30}}{2\pi \cdot 1,777591 \cdot 10^{-61} \cdot 1,633 \cdot 10^5} =$
 $f_N = f_R = 2,8398447 \cdot 10^{10} \text{ s}^{-1} \dots\dots(23)$

The Quantum-Energy $E = h f_N = 6,62606957 \cdot 10^{-34} \cdot 2,839844 \cdot 10^{10} \text{ H} / 1,6022 \cdot 10^{-19} \text{ eV} =$
 $= 1,17444789844 \cdot 10^{-4} \text{ eV}$, is a small Quantity of Quantum-Energy.

Since this minimum frequency $f_N = f_R = 2,8398447 \cdot 10^{10} \text{ s}^{-1}$ exists in all Atoms, *due to the Hydrogen first cave*, is the **Resonance-frequency** between **Atoms and Molecules** in Cosmos.

i.e. THE SPACE $\{ r_{\min} = 1,07 \cdot 10^{-7} \text{ m} \}$ - **ENERGY** $\{ f_m = 2,839844 \cdot 10^{10} \text{ H} \}$ IN
QUANTIZED-CAVE $\{ g \cdot r^3 \cdot f_R^2 = 1 \}$ OF SPACES $\{ [s + \bar{v} \nabla_i]^{1/w} = e^{-i(\frac{\pi}{2} + 2k\pi) \cdot w} =$
 $= e^{-i(\frac{5\pi}{2}) \cdot 10} \}$, CONSISTS The min. **QUANTUM-ENERGY** $\rightarrow E = 1,1745 \text{ eV}$.

7... For Energy-Cave equation $\rightarrow e^{-i(5\pi/2) \cdot 10}$ **Formatters min-cave** $\rightarrow r = 1,07 \cdot 10^{-7} \text{ m}$
 which in turn by the **Unit-Energy** Orbit-Surface-U-Planck-relation, $g = 1 \approx g$, and from,

8... Unit-Energy-Mould $g \cdot r^3 \cdot f_R^2 = 1$ or $f_R^2 = \frac{1}{r^3}$ creates the minimum frequencies, **Energy**,
 $f_R = 2,8398447 \cdot 10^{10} \text{ H}$, between $1,330265 \cdot 10^{10} \text{ H}$ and $4,1701097 \cdot 10^{10} \text{ H}$, in caves and
 the in Electron-Cave which is **The Nutation-Unit-Frequency** and becomes the minimum
Quantum-Frequency again, in above r , cave and which is following,

a... Frequency $f_N = f_R = g [\frac{s \cdot m_e}{2\pi \cdot J_3 w}]$ which passes through atoms structure and as **Energy-Spring**
in Magnetic-field, Strengthen 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 $\rightarrow \langle r_{\min} | \cup \cup | f_m \rangle \leftrightarrow [f_N] \leftarrow$
 It is proved in [86] that this Energy-Spring of Electron-Nutation creates the Energy -
 Bonds in Atoms so that these bond to Originate-Molecules.

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

1. The **Unit-Quantization** of Planet-Focus line r , sweeping $r \cdot mv = k = \text{Constant-Area}$
2. The **Unit-Cave-Energy Quantization** as Work is $\rightarrow W = 4\pi^2 \cdot r^3 \cdot f_p^2 = 1$

3. The **Resonance** Unit-Cave-Frequency $f = \sqrt[4]{\frac{1}{4\pi^2 m \cdot r^3}}$ 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 $\bar{B}_F = \frac{2\pi \cdot M_T}{Q_T} |f$

5. The Resonance Energy $E = \frac{1}{a^3} [\frac{4\pi^2}{c^2} + \frac{S^2}{2m}]$ or $E = \frac{\pi}{g r^2} [g^2 r + 2 \cdot S^2 \cdot f^2]$ in cave $a = \sqrt[3]{1/g f^2}$

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

d... For Hydrogen-Circular-radius $a = \sqrt[3]{\frac{1}{g \cdot f^2}} = 2,1145016 \cdot 10^{-11} \text{ m}$, issues $E = hf_1 = 13,6 \text{ eV/h}$

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

Electron-Nutation is measured as $\rightarrow k = \frac{2,1145016 \cdot 10^{-11} (2,998 \cdot 10^8)^2}{4\pi^2} = 4,81406 \cdot 10^4 \text{ m}^3/\text{s}^2$

c.. For any Material-Point occupying only **Spin** $\equiv \mathbf{L}$, then $\frac{k}{r} [1+2\pi^2mk(1+e)] = 0$ or $1+2\pi^2mk(1+e) = 0$ and for **Electron** $k = -\frac{1}{2\pi^2 \cdot m(1+e)} = -\frac{1}{(1+e)} [6,9999 \cdot 10^{29}] \text{ N}$ and

Rotating-Energy due to **Electron-Spin** is $E = \frac{S^2}{2m r^3} = \frac{(5,691952 \cdot 10^{-34})^2 \text{ Kg.s/m}}{2 \cdot 7,2373149 \cdot 10^{-32} (2,3762992 \cdot 10^{-16})^3} = 16,68059 \text{ J}$ which is a small amount of energy .

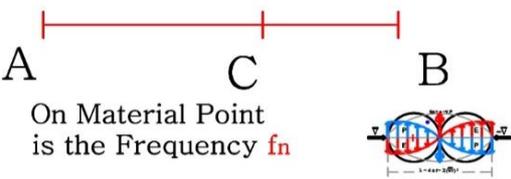
Rotating-Energy due to a **Black Hole-Spin** is $E = \frac{S^2}{2m r^3} = \frac{(1,152 \cdot 10^{66})^2}{2 \cdot 1,6 \cdot 10^{42} (2,4 \cdot 10^{15})^2} = 2,604 \cdot 10^{43} \text{ J}$ equal to the **Energy of an Electromagnetic gamma-ray-burst** \rightarrow i.e. energy-constant **k** , is

the Regulator of Energy as equation , $\mathbf{k} = \frac{r \cdot v^2}{4\pi^2} = \frac{(2,4 \cdot 10^{15}) \cdot 9 \cdot 10^{16}}{4 \cdot \pi^2} = 5,47 \cdot 10^{30} \text{ N}$.

1c... The Golden Ratio Pattern Φ .

THE GOLDEN RATIO ON SEGMENTS & MATERIAL-POINT

On Segments AB ,Point C is such that $AB \times CB = AC^2$ $\frac{AB}{AC} = \frac{AC}{CB} = \Phi = \frac{1+\sqrt{5}}{2}$



A C B

On Material Point is the Frequency f_n

The **Photon** Golden - Ratio - Frequency

$f_n = [1+\sqrt{5}] \sigma / 4\pi r = \Phi \cdot [\sigma / 2\pi r]$

Figure – 2 - : The Physical explanation of **The Golden-Ratio Φ** in Universe :

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

Proof :

According to the definition of Mean ratio exists $AB / AC = AC / CB$, or $AC^2 = AB \cdot CB = AB \cdot [AB-AC] = AC^2 = - AC \cdot (AB) + AB^2 \rightarrow AC^2 + AC (AB) - AB^2 = 0$ (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^3 , then Principal stresses σ_1, σ_2 , and Shear stresses τ_{12} are as equation $\sigma = \sqrt{(\sigma_1 - \sigma_2)^2 + 4 \tau_{12}^2}$, and

$$\sigma_{1,2} = (\sigma_1 + \sigma_2) / 2 \pm (\frac{1}{2}) \sqrt{(\sigma_1 - \sigma_2)^2 + 4 \tau_{yz}^2}$$
 , where $\rightarrow \tan\theta = 2 \cdot \tau_{12} / (\sigma_1 - \sigma_2)$.. (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 τ_{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-handled coordinate system , where exists $\sigma_2 = 0$ and $\tau_{12} = \sigma_1$, then equation (3) becomes ,

$$\rightarrow \sigma_{1,2} = \sigma_1 / 2 \pm (\frac{1}{2}) \cdot \sqrt{\sigma_1^2 + 4 \cdot \sigma_1^2} = \frac{\sigma_1}{2} \cdot [1 \pm (\sqrt{5})] = \frac{\sigma}{2} \cdot [1 \pm (\sqrt{5})]$$
 (4)

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

Since also **Stress** σ eternally exists in Material point and *is of the Golden-ratio-pattern* Φ , therefore microcosm and sequence all macrocosm follows, **the Stress σ , Property Vector**, of the \rightarrow Growing-Golden-ratio-pattern Φ 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 Φ , give the analogous strength to enter caves, and incidentally in satiation Systems to follow the **Split-Property as this happened to Organic - Chemistry**.

The Φ Properties :

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

It is holding $\rightarrow 1 + \frac{1}{\Phi} = 1 + \frac{1}{\frac{1+\sqrt{5}}{2}} = 1 + \frac{2}{1+\sqrt{5}} = \frac{2[\sqrt{5}-1]}{[\sqrt{5}+1].[\sqrt{5}-1]}$ or,

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

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 Φ which defines **the Space**, and of $\frac{1}{\Phi}$ defining the Opposite which is **the Anti-Space**,

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

Because number Φ , multiplied with its Reciprocal number $\frac{1}{\Phi}$, is process of Addition,

and equal to unit 1, so \rightarrow **Space * Anti-Space \equiv Monad** \leftarrow or $\Phi * \frac{1}{\Phi} \equiv 1$ because,

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

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

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

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 \rightarrow **The Two-Opposite-Rotational-Energies** $[\pm]$ \leftarrow as relation $\bar{B} \bar{w} = L = \frac{1}{2} J_1 w_1^2 + \frac{1}{2} J_2 w_2^2 + \frac{1}{2} J_3 w_3^2$, or Angular-momentum $B \equiv \pm$ Spin S as,

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

$$\bar{B} = \frac{4r.L}{(1+\sqrt{5})\sigma} = \frac{2r.[L=hf]}{(1+\sqrt{5})\sigma} = \frac{hf}{2\pi f} = \left[\frac{h}{2\pi} \right] \equiv \text{SPIN}, \text{ where } L = hf = \text{Constant}$$

and Frequency related to Φ is $\rightarrow f_n = \left[\frac{2}{\pi^2 r^4} \right] \cdot \bar{B} \equiv \left[\frac{1+\sqrt{5}}{2} \right] \frac{\sigma}{2\pi r} \equiv \left[\frac{\Phi \sigma}{2\pi r} \right] \dots(7a) \rightarrow$

Occupies the Property of the Golden-Ratio-Pattern Φ , and equation (7-7a) defines that Material Point of frequency f_n , when collide with another Material Point, or with

another Particle or particles then Produces another monad as $\rightarrow \mathbf{1} \equiv \text{New Quaternion}$ and the first continuous to be of the same Identity, **frequency** f_n , as before and from Euler's, rigid body dynamics work $W = 2L = \vec{B} \cdot \vec{\omega} = J \cdot \omega^2 \equiv h \cdot f_n \leftarrow$ i.e.

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

2c... The Forces, Stresses and Spin Orientation :

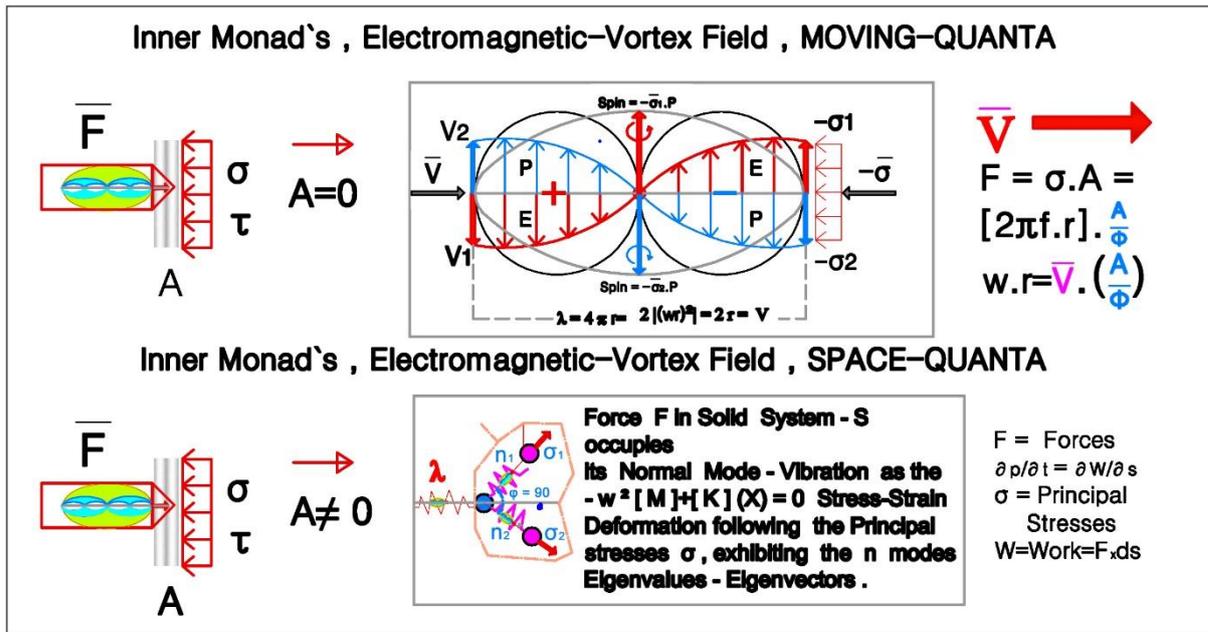


Figure -3- : The Energy-Space, **Stress-Strain** in wavelength $\lambda = 2\pi r$, of a moving Photon :

- 1.. For area $A = 0$, the acting Force F which is an Energy-Space-cave, is manifested into the Transverse-Principal stresses, σ , τ , and then as **an Moving-Storage** (1)-(2) is transported as Velocity-Vector \vec{v} . The force $F = \sigma \cdot A \rightarrow \vec{p}$ vector = $M \cdot \vec{v} = (m \lambda) \cdot \vec{v} = [m \cdot c \cdot T] \cdot \vec{v} = [m \cdot c / f] \cdot \vec{v} = [m / f] \cdot c \cdot \vec{v}$, i.e. **Force** $F \rightarrow$ becomes a **Velocity-Vector** \vec{v} or, a **Force as Stress** σ , enters in Space Φ as $[\sigma \Phi]$ and becomes frequency $\bar{f} = \frac{\sigma \cdot \Phi \cdot r}{2\pi \cdot r_n}$ and exists Force $F = \sigma \cdot A = \left[\frac{2\pi r f}{\Phi}\right] \cdot A = w \cdot r \cdot \left[\frac{A}{\Phi}\right] = \vec{v} \cdot \left[\frac{A}{\Phi}\right]$, which Force F becomes a moving Storage.
- 2.. For area $A > 0$, Force 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 $\mu \cdot \nabla^2 u + (\lambda + \mu) \cdot \nabla \cdot [\nabla \cdot u] = 0$
- 3.. For area $A < 0$, because Force F is an Energy-Space-cave which at first passes from the Zero area $A = 0$ and becomes velocity-vector \vec{v} , this velocity-vector \vec{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, ds, in Calculus**, where stresses $\sigma_2 = 0$ and τ_{12} are very small, it is the equation of stresses $\sigma_{1,2}$, and from Cauchy $\sigma_1 / 2 = \pm (\frac{1}{2}) \cdot \sqrt{\sigma_1^2 + 4 \cdot \sigma_{12}^2} = \sigma_1 \cdot [1 \pm (\sqrt{5})] / 2$, 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 σ , was proved that is going out the Material point as
acceleration and creates Stationary-gravity \mathbf{g} as f_n , acting on Spin as $\mathbf{S}_{PA} \cdot r^4$.

The Proof \rightarrow

Centripetal Force $F_c = mv^2/r = 1 \cdot (wr)^2/r = w^2 \cdot r = \pm \sigma = (2\pi \cdot f_1)^2 \cdot r = \sigma_1 \cdot [1 \pm (\sqrt{5})] / 2$ and
 $w^1 = f_n = \frac{[(1+\sqrt{5})\sigma]}{4\pi r}$. From Kinetic energy = $E = \frac{mv^2}{2} = \frac{1 \cdot w^2 \cdot r^2}{2} = hf$, then $w^2 = \frac{2E}{r^2}$ and
 $E = \frac{[(1+\sqrt{5})\sigma r]^2}{2}$, $f_n = \frac{[(1+\sqrt{5})\sigma]}{4\pi r}$ and $2 \cdot \bar{B} = \pi r^3 \Phi \sigma$, then **force** f_n orients **Spin** \bar{S} to \bar{B} as ,
 $\rightarrow \bar{g} = f_n \times \bar{B} = |f_n| \times |\bar{B}| \cdot \sin \theta = \frac{[(1+\sqrt{5})\sigma]}{4\pi r} \cdot \pi r^3 \Phi \sigma \cdot 1 = \frac{[\sigma^2 r^2 (1+\sqrt{5}) \Phi]}{8} = \left[\frac{\sigma \cdot r \cdot \Phi}{2} \right]^2 \dots (g)$

Equation (g) which is Gravity constant \mathbf{g} , is the permeable Path for inner stress σ , 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 $G = k_E g = g \cdot [k_R g_R]$ 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 $\sigma = \frac{F}{A} = \frac{2\pi r f}{\Phi} = \frac{w r}{\Phi} = \frac{v}{\Phi}$, velocity vector in a Unit-Space Φ .

It was shown that the first Path is Gravity \mathbf{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 , \bar{B} , is equal to spin \mathbf{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 as to , π , number as velocity { $v = n \cdot \pi \cdot c$ } which is the minimum Number relating Lines and Surfaces .

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

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

Equation (π) shows that velocities in lobes are , $n \cdot \pi$ times that of light ,following , π , number in circle , i.e. *in Material-points* exist *velocities multi-times that of light* and the minimum *Surface-constant, Unit π* ,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 π .

From velocity , $v = n \cdot \pi \cdot c$, is seen that *light-velocity is the Quantum of Unit-velocity in Planck`s length* .The Why velocity c and π , is such in [42-51-63] and now later.

Kepler`s Laws \rightarrow Explain How the Planets move around the Sun But NOT the WHY.

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

Markos-Spaces \rightarrow 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 Photons** , 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, **Photons** ,which through the **Golden-Ratio-frequency-Growth** effect and conserve the Whole of the Natural-World from microcosm to macrocosm .

D.. THE PHOTONS :

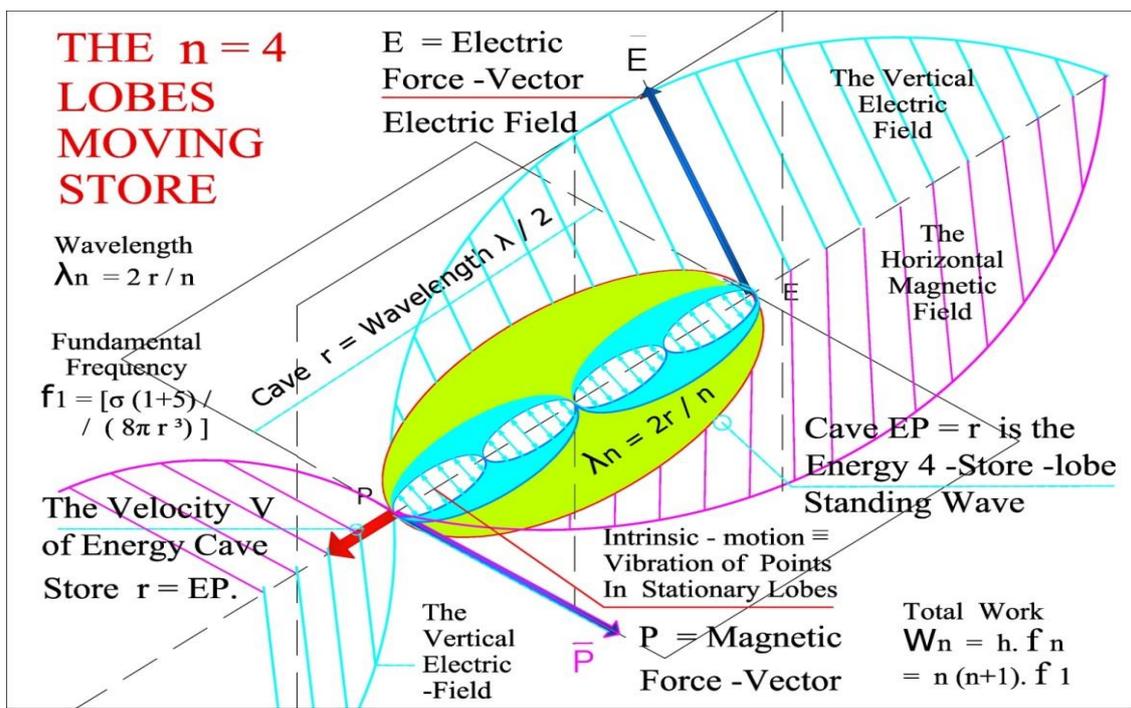


Figure - 4 - : The Propagation of Photon-Electromagnetic-Field-Storage EP :

In figure $r = \lambda/2 = EP$ is the **Energy-Storage-monad** [$S \equiv EM-R \equiv f_{1=N}, f_2, f_3, f_D, f_n = w^2$] Propagating with $\bar{v} = \lambda_n \cdot f_n = \bar{c} \cdot [\frac{\sigma}{2\pi r} + \frac{\sigma\Phi}{2\pi r}] = \frac{\bar{c} \cdot \sigma}{2\pi r} + \frac{\bar{c} \cdot \sigma\Phi}{2\pi r} = \{ \bar{c} \cdot \boxed{\bar{f}_n} + \bar{c} \cdot \mathbf{f}_n \}$, where for frequency $f_p = \frac{\bar{c} \cdot \sigma}{2\pi r} = \frac{\sigma^2\Phi}{2\pi r} = f \cdot \Phi = \frac{2n \cdot \bar{B}}{\pi^2 r^4} = \frac{\sigma\Phi^2}{2\pi r}$, as **Particle**, where velocity $\bar{v} = w \cdot r$, follows the **Breakage-Principle** which is Quaternion $\bar{z} = [s + \bar{v} \nabla i \text{ or } \rightarrow s^2 - |\bar{s}|^2 + 2|\bar{s}|^2 \cdot \nabla i \leftarrow \equiv [\epsilon E^2 + \mu B^2] \equiv \text{The Energy-monad, EP, and as a Wave as, } f_p = \frac{\bar{c} \cdot \sigma\Phi}{2\pi r} = \frac{\sigma\Phi^3}{2\pi r}$

Matter (+) ≡ Magnetic-field $\rightarrow [\mu B^2] \equiv \text{The Storage-Basket}$
Antimatter (-) ≡ Electric-field $\rightarrow [\epsilon E^2] \equiv \text{The Moving-Basket}$

Energy (+ ↔ -) ≡ Motion in n lobes \rightarrow as $[\partial E / \partial t, \partial H / \partial t]$ i.e.

The Stationary-Cave-lobes, consist the **Particle-Photon** as the Inside **motion, in the cave** $r = n [\lambda/2]$ **Energy-Storage**, and $[E^2 + H^2] = 2 \cdot (2r) \cdot c \cdot \sin 2[\varphi \equiv \frac{\bar{B}}{\Phi}]$, the **Wave-Photon**. **Energy-Storage-monads** are consisted of the above **Three-constituents** all-together,

Or each-one of them. The Work ratio is $\rightarrow W_n / W_1 = f_n / f_1 = n(n+1) \cdot [v_n / v_1] =$

$$n(n+1) \frac{\lambda_n f_n}{\lambda_1 f_1} = n(n+1) \frac{n \lambda_n f_1}{2r f_1} = n^2(n+1) \frac{\lambda_n}{2r} = n(n+1) \quad \text{and}$$

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 λ_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 $\rightarrow \{ \bar{c} \cdot \boxed{\bar{f}_n} + \bar{c} \cdot \mathbf{f}_n \}$

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 $2\lambda = r = h/p \equiv [f_1, f_2, f_n = w^2 \equiv n \text{ lobes}]$ 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 Store 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 $\lambda_n = \frac{2r}{n}$, Fundamental-frequency $f_1 = [\frac{\sigma(1+\sqrt{5})}{4\pi r}]$, and Work = h.f₁

The Energy-Storage length E-P = $\lambda/2$, is composed of 4 Lobes with wavelength $\lambda_4 = \frac{2r}{4}$,

$f_4 = \frac{4v}{2r} = 4f_0$, and $W_4 = \frac{h}{2r} v_4$, and for → Loop-Total-Work , $W = [\frac{4\pi r^2 f_1}{3}] . n . (n+1)$

or $W = \frac{80 . \pi r^2 f_1}{3}$, and from Photon → { $\bar{c} . \boxed{\bar{f}_n} + \bar{c} . \mathbf{f}_n$ } ← $v_4 = \lambda_4 . f_4 = 4 . \lambda_4 . f_0$, therefore for ,

$n = 1 \rightarrow f_1 = 1 . [\frac{\sigma(1+\sqrt{5})}{4\pi r}]$, Wavelength $\lambda_1 = \frac{2r}{1}$, Energy $W_1 = [\frac{4\pi r^2}{3}] . f_1 = 1 . \frac{(1+\sqrt{5})\sigma r}{3}$

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

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

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

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 ⊕ constituent around the ⊖ constituent creates the , n Energy-lobes

in a Tank $r = n \frac{\lambda}{2}$ or $\lambda = \frac{2r}{n}$, since the velocity of the wave is $\bar{v} = \lambda/T = \lambda \times f$. The

frequency is $f = \frac{n . \bar{c}}{2\pi . r}$ 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 , $\mathbf{x} = \mathbf{v}_0 . \sin \mathbf{wt} = A . \sin [\sqrt{(\mathbf{a}/\mathbf{Am})} . \mathbf{t} + \pi/2]$ (1) where

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

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

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 → $\partial E / \partial t$, $\partial H / \partial t$ ← and when reduced to one line as , $\mathbf{E} = \mathbf{H} \mathbf{c}$

$$\mathbf{E} \rightarrow \partial \mathbf{E} / \partial \mathbf{t} \rightarrow \mathbf{H} \rightarrow / \partial \mathbf{t} \rightarrow \mathbf{H} .$$

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

$$[E^2 + H^2] = 2 . (2r) . c . \sin 2\phi \dots (2) \text{ on-where exists the Skin-effect . [68-70]}$$

This happens because of the difference in density on **Stress-common-curve** , $\rho = \sigma$ instead – of density $\rho = 0$ as happens at the center of the circle .

This Property in Material-point Launches , **The Inner-Electromagnetic-Wave** , Out of

The-Particle $\equiv [E^2 + H^2] = 2(2r) . c . \sin 2[\phi \equiv \frac{\bar{B}}{\phi}]$, of wavelength λ , **Outward** λ , as **The Outer Electromagnetic-Wave** → {**The-Wave** $\equiv [\epsilon E^2 + \mu B^2] = 2 . \lambda c . \sin 2\phi$ } ← and allows all the **Energy-Wave-Storages** to Propagate any Distance in Vacuum without any dissipation .

This Inner-motion \equiv Work W , from the Wave-Energy-Pattern with Wavelengths λ_n , is created from all ± Points of the Periodic Oscillation in any cave r , and is stored in the n lobes as motion . This motion is conserved and is transported through vacuum at the speed of light c .

Since the **Medium-Field- is the Material-Fragment** $\rightarrow [\pm s^2] = [\text{MFMF}] \equiv \text{The Chaos}$, is the base for all motions so then it is, **the Motion of Photons**: All motions create Work which is conserved. Motion presupposes the velocity vector \bar{v} , which when it is in motion collides with other velocity vectors, creating a Constant Work k .

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

Constant-Work $k = v^2 \cdot r = (w r)^2 \cdot r = \left[\frac{2\pi}{T} r\right]^2 \cdot r = \frac{4\pi^2 r^2}{T^2} \cdot r = \frac{4\pi^2 r^3}{T^2} = 4\pi^2 \cdot \frac{r^3}{T^2} = 4\pi^2 \cdot r^3 \cdot f^2_p \rightarrow$
 which are the universal **Kepler Laws for macrocosm**.

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

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 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 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 λ , as equation $E = h f = h \cdot (c/\lambda)$, 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 \rightarrow Electromagnetic-wave \equiv 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 F , originated in, **Energy-field E**, by any two charges q_1, q_2 and Spread in a Fixed distance, r , occupies velocity $\bar{v} = \bar{c}$ and is equal to distance \bar{r} . The Above vector is $\bar{v} = \bar{r} = \bar{c}$ and is used for the Pointy- caves, one of which is the Atom-Nucleus. [82]

The Eternal-rotation $[\oplus \cup \ominus]$ of the \oplus constituent around the \ominus 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**

$f_p = \frac{\sigma = [\sigma\Phi]}{2\pi r} = \frac{(1+\sqrt{5})\sigma}{4\pi r} = \frac{\sigma \cdot \Phi}{2\pi r}$, from Intrinsic **Angular-Momentum-Vector** relation $\bar{B} = \frac{2L}{w} = \frac{L}{\pi f} = \pi^2 r^4 \cdot f = \left[\frac{h}{2\pi}\right] = \text{SPIN} - S$, of Particles, From $\bar{v} = \frac{G \cdot \Phi}{A} = \sigma \cdot \Phi = \bar{c}$ the **Light-Velocity** and

From $a = \sqrt[3]{1/g f_R^2}$ **The-Hydrogen-cave**, and from $E_R = \frac{1}{a^3} \left[\frac{4\pi^2}{c^2} + \frac{S^2}{2m}\right]$ 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 λ with inner motion the Electromagnetic-Displacement current, while **Outward Propagates** with light-speed as an **Energy-Store** $[\bar{v} \bar{f}_n] \rightarrow \lambda = 2r/n$, and $[+]$ Electric-field as Space-motion and $[-]$ Magnetic-field as Anti-Space-Store $[\bar{v} \bar{f}_n]$. [70]

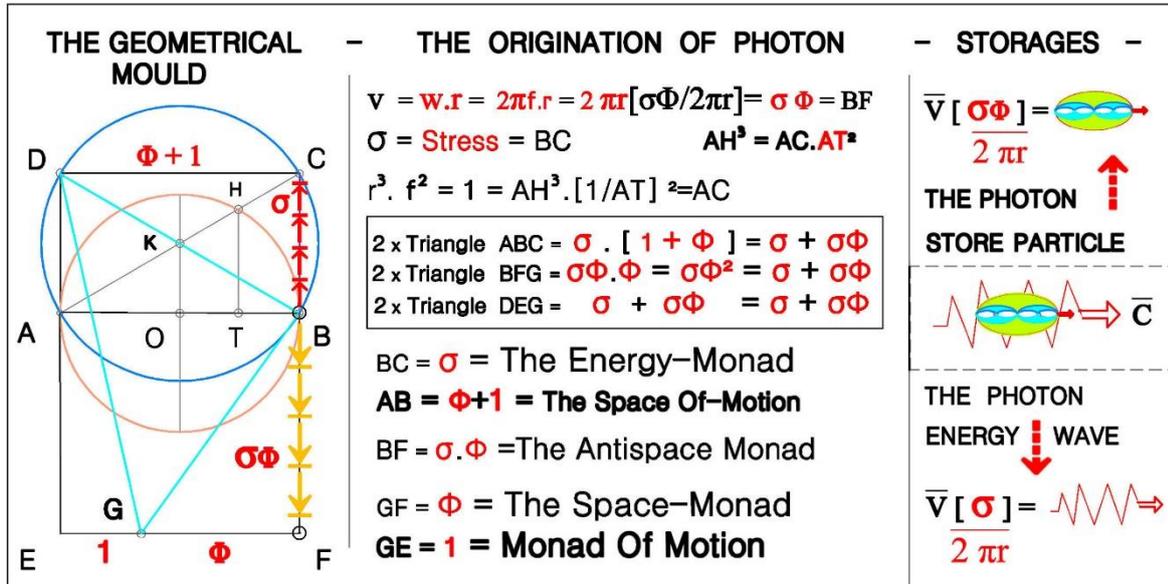


Figure – 5 - : The Material-Geometry Mechanism-of-motion in Photons-Cave :

1d... The Duality Of Isochronous Photons

FROM MECHANICS The **Eternal-Rotation** of the Two Elements , $[\oplus \cup \ominus]$, Up or Down in the Material-Point circles ,Originates the Spins , $\pm \frac{1}{2}$, ± 1 , $\mp \frac{1}{2}$, 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 $\sigma_{1,2} = \pm (\frac{1}{2}) \cdot \sqrt{\sigma_1^2 + 4 \cdot \sigma_1^2} = \sigma_1 \cdot [1 \pm (\sqrt{5})] / 2 = \sigma \cdot \Phi$ 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 σ , 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 σ , so $F_c = mv^2 / r = 1 \cdot (wr)^2 / r = w^2 \cdot r = \pm \sigma = (2\pi \cdot f_1)^2 \cdot r = \sigma_1 \cdot [1 \pm (\sqrt{5})] / 2 = \Phi \cdot \sigma$, and since $m = \frac{\sigma}{w^2 \cdot r} = \frac{\sigma}{w \cdot c} = \frac{\bar{B}}{r \cdot c}$ then , $\pm \sigma = \frac{\bar{B}}{r \cdot c}$ 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 $l = 8r$. 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 $AT = g \cdot \sin \varphi$ and since $\sin \varphi = \frac{s}{4r}$ then $AT = g \cdot \frac{s}{4r}$. Since acceleration $a = \frac{d^2s}{dt^2} = \frac{dv}{dt} = \frac{d}{dt}(\frac{ds}{dt}) = -g \cdot \frac{s}{4r}$ then $\frac{d^2s}{dt^2} = -g \cdot \frac{s}{4r}$ or $\{\ddot{s} = -w^2 \cdot s \text{ where } w = \frac{2\pi}{T} = \frac{g}{4r}\}$... (a) which is a Harmonic Oscillatory motion showing that Acceleration is proportional to displacement and is directed towards the origin with a period $T = \frac{2\pi}{w} = 2\pi \cdot \sqrt{\frac{4r}{g}} = 4\pi \cdot \sqrt{\frac{r}{g}}$, or and $w^2 = [\frac{g}{4r}]^2$, where $w = 2\pi f$.

Origination of Frequency , or Period , happens from above Property where $[\frac{g}{4r}] = 2\pi f$. In Material-Point the Cycloidal-acceleration g_{cyc} is transformed as Centrifugal acceleration $g_{cyc} = \frac{(v)^2}{R} = \frac{g}{4r}$, where r = the Radius of the Cycloidal-circle and R = the radius of curvature In Cycloid velocity-vector $\bar{v} \equiv \bar{\sigma}$, the Glue-Bond-Stress between the Opposites \oplus , \ominus so

$$\bar{v} = \bar{w}.r = 2\pi. \bar{f}.r = \bar{\sigma} = \sigma \Phi, \text{ Frequency } \bar{f} = \frac{\bar{\sigma} = [\sigma\Phi]}{2\pi r} \text{ and Total-Energy } 2L = J.w^2 = 4\pi^2.f^2$$

$$w^2 = \frac{(\sigma\Phi)^2}{r^2} = [2\pi f]^2, \text{ or } \underline{\text{Frequency of Photon}} \mathbf{f}_p = \frac{\sigma\Phi}{2\pi r} = \frac{[1+\sqrt{5}]\sigma}{4\pi r} = \frac{\sigma.\Phi}{2\pi r} \dots(\mathbf{a}) \text{ i.e.}$$

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 $L = B w = \frac{J.w}{2} w = \frac{J.w^2}{2}$ then $2L = J.w^2$, and $\bar{B} = r.mv = r \frac{\pi.r^4}{2} 2\pi f r = \pi^2.r^4.f$
 From momentum relation $\bar{B} = m r v = m r^2 w = m r^2 (2\pi f) = \frac{J.w}{2} = \left[\frac{\pi r^4}{2}\right]. [2\pi f]$ then **Spin S** \equiv

Angular-momentum $\bar{B} \equiv \bar{S} = \frac{J.w}{2} = \frac{\pi r^4}{2} [2\pi f] = \pi^2.r^4.[f] \equiv \frac{[1+\sqrt{5}].\sigma.\pi.r^3}{4} = \frac{\pi r^3 \Phi \sigma}{2} \dots(\mathbf{b})$

Frequency of Photon is $f_n = \frac{[(1+\sqrt{5})\sigma]}{4\pi r} = \frac{\sigma\Phi}{2\pi r}$, where $\Phi = \frac{(1+\sqrt{5})}{2} = 1,6180339887$ and, $2r$ is The Diameter of Energy-Cave $AB = 2r$ of circle (O,OA) = Monad $\rightarrow \oplus \leftrightarrow \ominus \equiv 1 + \Phi$ and

- BC = $|\sigma|$ = The **Glue-Bond-Vector** from the main-Stresses 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 $\rightarrow r d\phi$, following equation $1 = k.f^2_u r^3$, 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** $\equiv [\oplus \leftarrow r \equiv \Phi \rightarrow \ominus]$ + **Motion M** $\equiv [\bar{v} - \text{Vector}]$ and from Figure-4-

Triangle 2(BFG) = FB.FG = $\sigma.\Phi[\Phi] = \sigma.\Phi^2 = \sigma.[\Phi+1] \equiv \sigma.\Phi + \sigma \equiv \mathbf{S}_{\text{storage}} + \mathbf{M}_{\text{motion}}$
 Triangle 2(DEG) = EG.ED = $\sigma + \sigma \Phi = \sigma.[1 + \Phi] \equiv \sigma.\Phi + \sigma \equiv \mathbf{S}_{\text{storage}} + \mathbf{M}_{\text{motion}}$ and
 since Energy = motion / T $\equiv \left(\frac{v}{2\pi r}\right) . [\sigma + \sigma \Phi] = \bar{v} . \left[\frac{\sigma}{2\pi r} + \frac{\sigma\Phi}{2\pi r}\right] \equiv \bar{v} . \left[\bar{f}_n\right] + \mathbf{f}_n \equiv$

Moving - Storage $\rightarrow [\bar{v} . \bar{f}_n] \leftarrow$ + Moving-Frequency $\rightarrow [\bar{v} . \mathbf{f}_n] \leftarrow \equiv$ Material-Point i.e.

The Energy produced in Photon-Cave is consisted of **Two-moving-Storages**, that travelling

as Particle $[\bar{v} . \bar{f}_n] \rightarrow [\bar{v} = \bar{c} = \lambda \frac{f}{\Phi}] \rightarrow [S \equiv EM-R \equiv f_{1=N}, f_2, f_3, f_D, f_n = w^2]$ and,

as Wave $[\bar{v} . \mathbf{f}_n] \rightarrow [f_1 = (E^2+H^2) = n \frac{(1+\sqrt{5})\sigma}{4\pi r} = \frac{\bar{B}}{\pi^2 r^4}] \rightarrow \{W \equiv EM-R \equiv [\epsilon E^2 + \mu B^2] = 2.\lambda c. \sin. 2\phi\}$

and as Duality of an **Energy-Storage S** $\equiv \{[\oplus \leftarrow r \rightarrow \ominus] + \text{Motion M} \equiv [\bar{v} - \text{Vector}]\}$

Therefore \rightarrow Photon is travelling as Particle and as Wave, as

- 1.. **Energy-Storage S** $\equiv [\oplus \leftarrow r \rightarrow \ominus] \equiv$ **Particle** $[\bar{v} . \bar{f}_n] \rightarrow [\bar{v} = \bar{c} = \lambda \frac{f}{\Phi}] \rightarrow$ 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** $\equiv [\bar{v} - \text{Vector}] \equiv$ **Wave** $[\bar{v} . \mathbf{f}_n] \equiv [f_1 = (E^2+H^2) = n \frac{(1+\sqrt{5})\sigma}{4\pi r} = \frac{\bar{B}}{\pi^2 r^4}] \rightarrow$ i.e. **a Propagating Wave** $\{W \equiv EM-R \equiv [\epsilon E^2 + \mu B^2] = 2.\lambda c. \sin. 2\phi\}$.

The Physical-Interpretation of f_{photon} :

Using the Material-Geometry-Vectors for the Anti-Space-Action then ,

From Force $G_{ON-Antispace} = \overline{AB} \times \overline{BF} \equiv [\Phi+1] \times \{ |\overline{\sigma}| \cdot \Phi \equiv \sigma \cdot \Phi \} = \Phi^2 \cdot \sigma \Phi = \sigma \cdot \Phi^3$ or ,

$$G_{AN} \equiv \overline{AB} \times \overline{BC} \equiv \sigma \cdot \Phi^3 \equiv \boxed{\overline{\sigma} - \text{Stress}} \quad \boxed{[\oplus \leftarrow \Phi \rightarrow \ominus]} \quad \boxed{[\oplus \leftarrow \Phi \rightarrow \ominus]} \quad \boxed{[\oplus \leftarrow \Phi \rightarrow \ominus]}$$

and $\rightarrow \rightarrow \rightarrow$ **Primary-Energy** $\equiv G \cdot f_p \equiv h$ and **OR** $G^{-1} \times \sigma \times \Phi^3 \equiv 1 \leftarrow \leftarrow \leftarrow$ where

$G \equiv$ The Newton`s-Universal Force = $6,680561 \cdot 10^{-11} \text{ m}^3/\text{Ns}^2$

$\sigma \equiv$ The Glue-Bond-Stress in Material-Points $\sigma = \frac{2\pi r f}{\Phi} = 1,85 \cdot 10^{-11} \text{ Kg/m}^2$ and , f ,
in Planck`s length $r = L_p = e^{-i \cdot (5\pi/2) \cdot 10}$ is Frequency $f_{\text{Plank}} = \frac{c}{2\pi r} = 2,95236210^{42} \text{ H}$,
in Planck`s Length $L_p = e^{-i \cdot (5\pi/2) \cdot 10} = \{ \sqrt{3} \cdot \pi \cdot 1,616199 \cdot 10^{-35} \text{ m} \}$

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

It is seen that , in Universe exists the only one Force $G \equiv \sigma \cdot \Phi^3$, which is Acting on all **Quantized-Quantities** $\rightarrow G \equiv \sigma \cdot \Phi^3 \equiv \Phi^2 \cdot \{ \sigma \cdot \Phi \} \equiv 2\pi f_p r \equiv w r \equiv \bar{v} \equiv m a = \bar{c} \mid \leftarrow$ and
From $\sigma \times \Phi^3 \equiv G \rightarrow [1,846462 \cdot 10^{-11}, [3,618033989] = 6,680561 \cdot 10^{-11} \text{ o.}\epsilon.\delta.\text{(q.e.d)}$

i.e. Universe is a Monad , Becoming from a **HUGE-MAGNET** of Opposites \oplus , \ominus which
Forms \rightarrow The **3-Dimentional SPACES** Φ , **ANTI-SPACES** $|\Phi \cdot \sigma|$, and \rightarrow The
ENERGY \equiv **MOTION** through the **G** - Force and Stress - σ becoming from Photon.

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

Remarks on the **Duality-Photon** $\rightarrow \{ \bar{c} \cdot \boxed{\bar{f}_n} + \bar{c} \cdot f_n \} \leftarrow \equiv \rightarrow$ Particle + Wave \leftarrow :

- a.. From equations $f = \frac{\sigma_1 \Phi}{2\pi r}$ and $\sigma_1 \cdot [1 \pm (\sqrt{5})] / 2 = \sigma \cdot \Phi$, then frequency f_p of Photon is Independent of the Amplitude $[\epsilon E^2 + \mu B^2]$ 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_R , as that Energy in [**Bracket – Orbit - Hook**] which **Joints the Atoms to produce the Molecules** .
- 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** .

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 \equiv Energy Storage r , 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 [84-86-89] .

2d... The Origination of Stresses σ :

Gravitational-Constant-Force G , becomes as **Stress** \equiv Force/Area \equiv **g** , as equation

$$G = gk_E = g \cdot [g_E k_E] = \left[\frac{T^2_P}{a^3}\right] \cdot [g_L k_L] = \left[\frac{c \cdot r^3}{a^3}\right] \cdot [g_L k_L] = 9,8076925 * 6,8116.10^{-12} \equiv 6,68056.10^{-11} \frac{m^3}{Ns^2}$$
 , and **Effects on gravity** \rightarrow **g** \equiv 9,8076925 **Stress** $\frac{Kg}{cm^2}$ [73]

The Beyond-Planck-length Force **F** = $\sigma \cdot A$ = The Glue-Bond \equiv Stress x Area \equiv

$$\left[\frac{2\pi f \cdot r}{\Phi}\right] \cdot A = w \cdot r \cdot \left[\frac{A}{\Phi}\right] = \bar{v} \left[\frac{A}{\Phi}\right]$$
 , and becomes a moving Storage $\frac{A}{\Phi}$ travelling with velocity

n times that of light-velocity **c** , as equation $\bar{v} = n \cdot c$.

The Beyond-Planck-Length Force is \rightarrow **F** = $\Phi^3 \cdot \left[\oplus \sigma \ominus\right] = \sigma \times \Phi^3$ where ,

$$\sigma \equiv \left[\oplus \sigma \ominus\right] \equiv \text{The Stress of Cave as the Quantized distance } r \rightarrow \left[\oplus \leftarrow r \rightarrow \ominus\right]$$

and $\Phi = \frac{(1+\sqrt{5})}{2}$ is the mould of Quantization , a kind of Impedance as in Electricity , so

from Material-Point frequency $f = \frac{c}{2\pi r} = 2,93949410^{42}$ H , and $\sigma = \frac{c}{\Phi}$. For the Planck

$$\text{length Stress } \sigma = \frac{2\pi r f}{(n)\Phi} = \frac{2\pi r f}{1 \cdot \Phi} = \frac{2\pi \cdot 1,616199 \cdot 10^{-35} \cdot 2,93949410^{42}}{1,6180339} = 1,84456315 \cdot 10^8 \text{ t/m}^2$$

= 1,84456315.10¹¹ Kg/m² , and the Angular velocity , **w** , of Total-Planck Cave is ,

$$|w| = \frac{\sigma}{2r} [1 + \sqrt{5}] = \left(\frac{1,852816510^{11}}{2 \cdot 1,616199 \cdot 10^{-35}}\right) \cdot 1,6180339 = 9.274599 \cdot 10^{46} \text{ rad/sec}$$
 then

Stress Outside Planck`s-Length-cave \rightarrow $\sigma_{PI} = 1,84456315 \cdot 10^{11}$ Kg/m² , and

$$G = \sigma \times \Phi^3 \equiv [1,84456315 \cdot 10^{11}] \cdot [3,6180339887] = 6,673692 \cdot 10^{-11} \frac{m^3}{Ns^2}$$
 , Nevertheless ,

For Earth-System mass $M_E = 5,9723 \cdot 10^{24}$ Kg , and for Area \rightarrow Radius 6378,137 Km

$$= 6,378 \cdot 10^6 \text{ m}$$
 then Earth-constant $k_E = \frac{[6,378 \cdot 10^6]^2}{5,9723 \cdot 10^{24}} = 6,811551810^{-12}$ and Gravitational

$$\text{Force } G = g \cdot k_E \equiv g \cdot [g_L k_L] \equiv \left[\frac{T^2_P}{a^3}\right] \cdot [g_L k_L] \equiv 9,80769 \cdot 6,8115518 \cdot 10^{-12} = 6,68056 \cdot 10^{-11} \frac{m^3}{Ns^2}$$

Remarks :

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

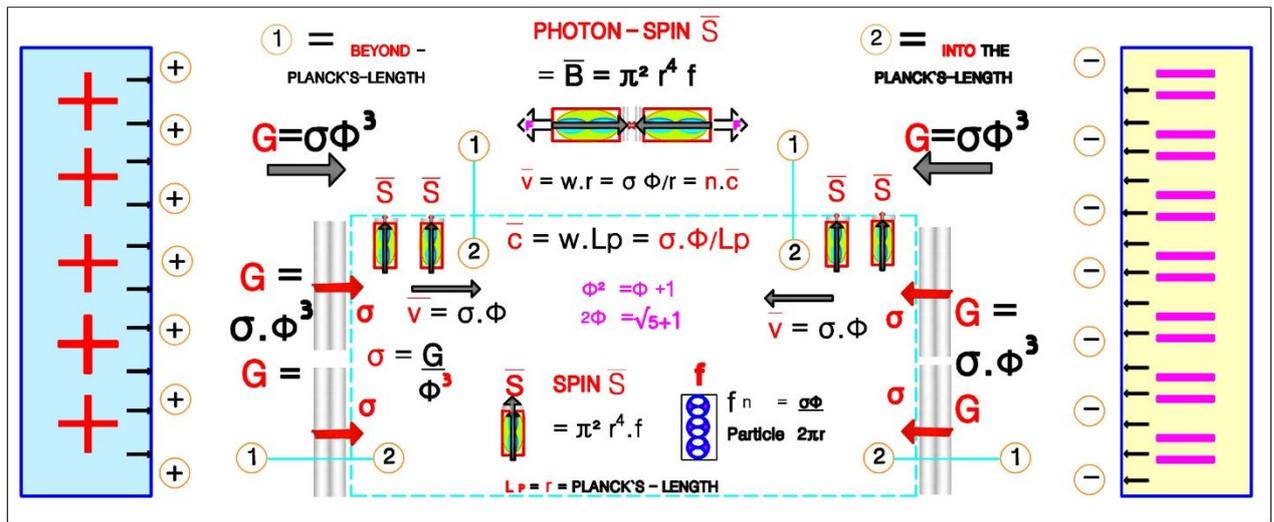
$$\text{Gravitational constant } G \text{ and a cave , } r \text{ , then } \rightarrow \sigma = \frac{G}{4\pi r^2} = \frac{G}{\pi(2r)^2} = \frac{G}{\pi s^2}$$
 , or vector **s** .

Above relation means that Force **G** needs a Vector-surface $\pi \cdot s^2$ to be spread as Stress σ which is the case of Constant-light-velocity **c** as the next .

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 ,

$$\text{i.e. } G \equiv \sigma \cdot \Phi^3 \equiv \Phi^2 \cdot \left\{ \sigma \Phi \right\} \equiv 2\pi f_p r \equiv w r \equiv \bar{v} \equiv m a = \bar{c}]$$

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



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

Figure – 6 - : 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 ≡ Energy** with light-velocity and its Duality is in frequency where $\bar{v} = \bar{c} . [\bar{f}_n] + f_n$.The Material-Points with velocities $n . \bar{c}$, are as $\bar{v}_m = n . \bar{c} \{ \bar{f}_n + f_n \}$, where \bar{f}_n is the Stationary-Storage and $[f_n]$ is the Propagating Electromagnetic-Radiation where $\bar{E} = \bar{B} c$.

In (2).. Is the Planck`s-length-Region in-where **Exist** → The Photon **Particle + Wave ≡ Energy** ,with light-velocity and the Duality in frequency as $\bar{v} = \bar{c} . [\bar{f}_n] + f_n$ → The Primary- Particles Fermions and Bosons , with their Spin \bar{S}_F and according to the frequency f_F their velocity → The Constant-Light-velocity $\bar{c} = \frac{G}{\Phi^3 L_p}$ → The Hydrogen Cave He from $g . r^3 . f_p^2 = 1$ → The Electron-Charge and Electron from $4\pi^2 f_e^2 . m_e = k = \pi g$ and from Kepler`s relation $4\pi . f_e^2 . m_e = g$.
The Proof :

It was shown That → **The Cycloidal-acceleration** $g_{cycloid}$ is transformed as Centrifugal acceleration and becomes the frequency of **Photon** as $f_p = \frac{\sigma = [\sigma\Phi]}{2\pi r} = \frac{\sigma . \Phi}{2\pi r}$, and Stress σ becoming from Space \oplus to Anti-Space \ominus as $\sigma = \frac{2\pi r . f}{\Phi} = \frac{w r}{\Phi} = \bar{v}$ (a)

It was proved that → **Photon-Travels** with velocity $\bar{v} . [\bar{f}_n] + f_n$, which is a Moving Stationary-Wave ≡ Storage → $[\bar{v} . \bar{f}_n]$ ← Plus a Propagating-Electromagnetic -Wave ≡ Storage → $[\bar{v} . f_n]$ ← which is Material-Point i.e. From **Photon** → $\{ \bar{c} . \bar{f}_n + \bar{c} . f_n \}$ ←
The **Energy** produced in **Photon - Cave** is consisted of **Two-Storages** , that are travelling ,
as Particle $[\bar{v} . \bar{f}_n]$ → $[\bar{v} = \bar{c} = \lambda \frac{f}{\Phi}]$ → $[S \equiv EM-R \equiv f_{1=N} , f_2 , f_3 , f_D , f_n = w^2]$ and ,
as Wave $[f_1 = (E^2 + H^2) = n \frac{(1 + \sqrt{5})\sigma}{4\pi r} = \frac{\bar{B}}{\pi^2 r^4}]$ → $[W \equiv EM-R \equiv [\epsilon E^2 + \mu B^2] = 2 . \lambda c . \sin . 2\phi]$
and as Duality An **Energy-Storage S** ≡ $\{ [\oplus \leftarrow r \rightarrow \ominus] + \text{Motion M} \equiv [\bar{v} - \text{Vector}] \}$

It was shown also that \rightarrow **Energy** = motion / T $\equiv (\frac{v}{2\pi r}) \cdot [\sigma + \sigma \Phi] =$ velocity
 $\equiv \bar{v} \cdot [\frac{\sigma}{2\pi r} + \frac{\sigma\Phi}{2\pi r}] \equiv \bar{v} \cdot [\bar{f}_n] + f_n$, consisted of the Two kinds of frequencies ... (b)

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

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

It was shown That \rightarrow **Force F** becomes a Velocity-Vector \bar{v} , as ,

Force = Stress x Area $\equiv \sigma \times A$ and from (1) $\rightarrow F = \sigma \cdot A = [\frac{2\pi r f}{\Phi}] \cdot A = w r \cdot [\frac{A}{\Phi}] = \bar{v} [\frac{A}{\Phi}]$
 and Because by definition **Angular-velocity** $w = 2\pi f$ and **velocity** $v = w r$. i.e.

Stress , σ , enters in Monad-Space Φ as $[\sigma\Phi]$ and **frequency becomes $\bar{f} = \frac{\sigma \cdot \Phi \cdot r}{2\pi \cdot r_n}$**

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

Newton`s gravitational constant **G** is a Force directly proportional to the product of any two masses **m₁** , **m₂** in macrocosm and inversely proportional to the square of the distance between their centres , instead of the microcosms Coulomb`s law of , two charges **q₁**, **q₂**.

From Mechanics , 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 , **ds** , in Calculus , where stresses $\sigma_2 = 0$ and τ_{12} are very small , **it is the equation of stresses $\sigma_{1,2}$** , or is $\sigma_1 / 2 = \pm (\frac{1}{2}) \cdot \sqrt{\sigma_1^2 + 4 \cdot \sigma_1^2} = \sigma_1 \cdot [1 \pm (\sqrt{5})] / 2 = \sigma \Phi$, and is the **Golden-Ratio - Pattern** of the Material-Point as type of a vanishing-shear due to layers laterally shifted .

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

According to Material-Geometry Distance $\equiv [\oplus \leftarrow r \rightarrow \ominus]$, and Stress $\equiv \Phi \cdot [\oplus \sigma \ominus]$
 and for the three-Dimension extreme-cases $\Phi^3 \cdot [\oplus \sigma \ominus]$ is Force $F \equiv \Phi^3 \cdot [\oplus \sigma \ominus]$

i.e. **Forces Beyond-Planck-Length are** $\rightarrow F = \Phi^3 \cdot [\oplus \sigma \ominus] = \sigma \times \Phi^3 \leftarrow$... (d)

Force **G** \rightarrow on Spinning M-Points \bar{S} through $\bar{g} \rightarrow$ on Planck`s - $\bar{B} \rightarrow$ on \mathbf{g}_G , through \mathbf{f}_R .
 $G = \sigma \Phi^3$, and $\sigma = \frac{G}{\Phi^3} = \frac{G \cdot \sigma^3}{c^3}$, or $\rightarrow \sigma^2 G = c^3 \dots$ (e) , where σ is a Stress between frequencies.

From Force-relation $F = \sigma A = (2\pi f r) \frac{A}{\Phi} = w r \frac{A}{\Phi} = \bar{v} \frac{A}{\Phi}$, is seen also force **G** become velocity \bar{v} . In the case of Planck`s-length velocity $\bar{c} = w r = \frac{\sigma \cdot \Phi}{r_p} r = \sigma \times \Phi = |\frac{G \cdot r}{L_p \Phi^3}| \Phi = [\frac{G \cdot r}{\Phi^2 L_p}]$
 and from relation $G \equiv \sigma \times \Phi^3$ then $\rightarrow [\bar{c} = \frac{G r}{\Phi^2 L_p}]$ which is the **Light-velocity vector** .

Since r , becomes from the Beyond-Planck`s-Region then $\rightarrow \bar{v} = \frac{F\Phi}{A} = [\frac{G \Phi}{A}] \dots$ (f)

Equation (f) may be written as Force $\mathbf{G} = \bar{v} \frac{A}{\Phi}$, which is a **Viscus-Damping-Force** where $\frac{A}{\Phi}$ is a constant of Proportionality and the equation of motion is $\mathbf{F}_G = [\frac{A}{\Phi}] \cdot \dot{\mathbf{x}}$ Force \mathbf{G} is applied in all **Quantized-Universe A** as Velocity \bar{c} and as Stress σ on Spaces Anti-spaces as Spaces-relation $\mathbf{L}_p = e^{i(\frac{\pi}{2}+2k\pi).b}$, where from **Material-Geometry [24-58]**, Space $\equiv 1$ and Anti-Space $\equiv \sqrt{-1} = +1, -1$, and $\sqrt{-1} = i =$ The Imaginary Part into the \rightarrow **Anti-Space + Space \equiv motion $\equiv i \equiv \sqrt[2]{-1} \equiv \sqrt[4]{-1} \equiv e^{-i(\frac{\pi}{4}).b} = 0,707106781 \cdot b$.**

The Base \mathbf{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 $x \gg$ and Defining that $\rightarrow \ln(x)$ is the Period-needed to Grow x , as this is in Integration $\int x \cdot e^x$ 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^e , and any $\log_x x$. For $\log_x x$ and Base $x = 10$ then $\log_{10} 10 = 10^{10}$ and for the two elements $[\oplus, \ominus]$ is $10^{[10]^2} = 10^{20}$ Positions \equiv Distances $\equiv r$ and since $10^{-x} = \frac{1}{10^x}$ then $b = 10^{-20}$, and Anti-Space + Space-Positions are, $0,707106781 \cdot 10^{-20} = 1, 0707106781 \cdot 10^{-19}$.

In this Way The Non-Dimensional-number $[0,707106781 \cdot 10^{-1} = 1, 0707106781]$, **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 $\pi \cdot r^2 = 3.601588$ m², and the QUA-Universe is $\mathbf{A} = 3.601588 \cdot 10^{-19}$ m²/s, which are The Space + Anti-Space Positions in Universe ...**(i)****

From (h), light-velocity $\bar{v} = [\frac{G \Phi}{A}] = \frac{6,673692 \cdot 10^{-11} \cdot 1,6180339887}{3,601588 \cdot 10^{-19}} = 2.99819938 \cdot 10^8$ m/s

i.e. Force $\mathbf{G} \equiv$ motion, is Quantized \rightarrow Spread in { **Space and Anti-Space** } or \equiv **QUA \equiv {The Quantized-Units-In-Area of Space and Anti-space}**, and as mould Φ exists in the **Impedance \mathbf{b}** .

Impedance in Mechanics is the **Friction Coefficient**, where for Force \mathbf{G} be Proportional to the Light-velocity $\mathbf{c} = \bar{v}$, then the Harmonic – Oscillation is an **Dumped-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 *Critical Damping*, and which Originates the **Light-velocity \bar{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 $\{\oplus, [\oplus \leftrightarrow \ominus], \ominus\} \equiv [+ , 0 , -]$

The **Permutation, arrangement**, of the Two-Elements $P_1^2 = 2$, is $\rightarrow [\oplus, \ominus] - [\ominus, \oplus]$

The Three-Elements in Space need $P_1^3 = 3.(3-1).(3-2) = 6$ Positions and the same for Three-Elements in Anti-Space need $P_1^3 = 3.(3-1).(3-2) = 6$ Positions , and Total Places $\rightarrow P_1^3 . P_1^3 = 6 \times 6 = 36$ Positions for Spaces and Anti-Spaces as Impedance , and as before for $\log_x x$ and Base $x = 10$ then $\log_{10} 10 = 10^{10}$ and for the two elements $[\oplus, \ominus]$ the Growth is $10^{[10]^2} = 10^{20}$ Positions \equiv Distances $\equiv r$, and since issues $10^{-x} = \frac{1}{10^x}$ then $\mathbf{b} = 36.10^{-20}$, and $\rightarrow \bar{\mathbf{v}} = \frac{F \Phi}{A} = \left[\frac{G \Phi}{A} \right] = \left[\frac{6,673692 \cdot 10^{-11} \cdot 1,6180339887}{36 \cdot 10^{-20}} \right] = 2.9995163 \cdot 10^8 \text{ m/s}$ 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 $\bar{\mathbf{r}}$, where for Stability $\uparrow \bar{\mathbf{r}} \downarrow \bar{\mathbf{r}} = \mathbf{0}$, and which **Gravity-System** interacts with **Hydrogen-Cave-Systems** . The condition for **Irrotational Energy** is $\rightarrow \nabla \times \bar{\mathbf{B}} = \nabla \times \bar{\mathbf{S}} = 0$, or $\nabla \times \bar{\mathbf{B}} = \nabla \bar{\mathbf{r}} + 2\pi \text{mf} \cdot \bar{\mathbf{a}} = 0$, and $\bar{\mathbf{r}} = \pm 2\pi \text{mf} \cdot \bar{\mathbf{a}}$. Vector $\bar{\mathbf{r}}$, occupies Both directions for Rotational-equilibrium , i.e. **The vector $\bar{\mathbf{r}} = \pm \bar{\mathbf{B}} \equiv \bar{\mathbf{S}}_n = 2\pi \text{mf}_n$, and $\mathbf{f}_n = \frac{B}{2\pi m_e} = \frac{E}{h}$, is the Stationary-Filling-Ocean of the Spinning-Gravity-Material Point , in the called Empty-Space** ,with frequency that of Material-Point $\mathbf{f}_n = n \cdot f_1 = \frac{E}{h} = \frac{n \cdot v}{2\pi r} = \frac{n\sigma}{4\pi r} [1 + \sqrt{5}] = \frac{\sigma \cdot \Phi}{2\pi \cdot r_n}$, and from $v = w r = 2\pi f r$ then , $\mathbf{f}_n = v/2\pi r = \frac{(1+\sqrt{5})\sigma}{4\pi r} = \frac{\sigma \cdot \Phi}{2\pi \cdot r_n}$, and $\bar{\mathbf{v}} = \sigma \cdot \Phi \dots (\mathbf{a})$, and \pm Spin $\mathbf{S}_G = \bar{\mathbf{B}} = \mathbf{J} w = \pi^2 \cdot \mathbf{r}^4 \cdot \mathbf{f}_n = \mathbf{g}$ **Gravitational-Constant Force $\equiv \mathbf{G}$, 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 $m_g = J \cdot w^2$ and in Electricity Impedance , where angular-velocity $w = \frac{c}{r}$ and in the 3-Dimensional Space of the Two Elements $[2^3 = (\oplus \leftrightarrow \ominus)^3]$, The Impedance , g_z , of the Space is $\rightarrow \ln(3) \leftarrow$ and of Anti-Space is $\rightarrow \pi\sqrt{3} \leftarrow$ and this because consist the moulds of Growth [45] . From above ,

\rightarrow **The Light velocity vector $\bar{\mathbf{v}} = \bar{\mathbf{c}}$ 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 \mathbf{g} \leftarrow as**

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

$$\text{Gravity} \rightarrow \bar{\mathbf{g}} = 4\sqrt{3} \ln(3) \cdot \pi^2 L_p c^4 \leftarrow \text{Is a Force between The Spinning } S_{pg} = \bar{\mathbf{B}}$$

$$\text{and } F_g = \bar{\mathbf{g}} = 4 \cdot \sqrt{3} \cdot 1,0986122886681 \cdot \pi^2 \cdot 1,616199 \cdot 10^{-35} \cdot [2,99819938]^4 = \mathbf{9, 8076754}$$

i.e. **Gravity $\bar{\mathbf{g}}$, is The effection of \mathbf{G} force , on $\bar{\mathbf{c}}$, light-velocity in the 3-Dimensional Space and Anti-Space , 2^3 , which is the Planck-length $L_p = r$.**

$$\text{Velocity-vector } \bar{\mathbf{v}} \equiv \bar{\mathbf{c}} = \left[\frac{G \Phi}{A} \right] \text{ and Gravity-vector } \bar{\mathbf{g}} \equiv 4\sqrt{3} \ln(3) \cdot \pi^2 L_p c^4$$

are both **Constants** because $\{ \mathbf{G} , \Phi , A \equiv \mathbf{b} \cdot \text{Impedance} \}$ are all constants .

From Inner-velocity equation $v = wr = (2\pi/T) \cdot r = 2\pi \cdot f_1 \cdot r$, wavelength $\lambda = c T = c / f_1$, cave $r = n \cdot [\lambda/2]$, then $r = n \cdot (c/2f_1)$ and $\mathbf{v} = 2\pi \cdot f_1 [n \cdot c/2f_1] = \mathbf{n \cdot \pi \cdot c}$ or $\mathbf{v} = \mathbf{n \cdot \pi \cdot c} \dots (\mathbf{k})$

Showing that velocities in lobes are , $n.\pi$, times that of light 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 $\bar{c} = w r = \frac{\sigma.\Phi}{r_n} r = \sigma \times \Phi = \frac{G.r}{L_p \Phi^3} \Phi = \frac{G.r}{\Phi^2 L_p}$ and from relation $G \equiv \sigma \times \Phi^3$ then $\rightarrow [\bar{c} = \frac{G.r}{\Phi^2 L_p}] \leftarrow$ **which is Light-velocity in L_p** .

For the **Out-Planck`s-length** velocity equation $\bar{v}_m = n.\bar{c}.\{ \boxed{f_n} + f_n \}$ and from equation $\bar{v}_m = w r = n.\pi.c$, $f = [\frac{n.c}{2r}]$, then $\rightarrow \bar{v}_m = n.\bar{c}.\{ \boxed{f_n} + f_n \} \leftarrow$ **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 $f_n = n . f_1 = \frac{E}{h} = \frac{n.v}{4r} = \frac{n\sigma}{8r} [1+\sqrt{5}]$, and **Outward the Storage is the Propagating Electromagnetic- Wave**. $\rightarrow \{[\epsilon E^2+\mu B^2] = 2.\lambda.c.\sin.2\phi\} \leftarrow$ 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 - 6) , i.e.**

Gravity \bar{g} , is The effection of G Force , on c light-velocity , in the 3-Dimensional Space and Anti-Space , 2^3 , of Planck-length $L_p = r$. For more analysis in [69] from relation $\sigma \times \Phi^3 \equiv G \rightarrow [1,845632.10^{11}].[3,6180339887] = 6,673692.10^{-11}$ q.e.d.

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

Electron is created through the vibration , f_n , in the **Energy-Space , $g - \pi$, meters** and follows both Rotational and Linear motion and so **Constant-Energy k** is the same .

From M-Point ,frequency $\rightarrow f_N = n \frac{(1+\sqrt{5})\sigma}{4\pi r}$, and $\rightarrow w = 2\pi.f_N = n \frac{(1+\sqrt{5})\sigma}{2r} = \left| \frac{n}{r} \right| . \frac{(1+\sqrt{5})\sigma}{2}$

The **Spring-like central-force** from a fix point , *the Source* , on an attached , *probe* , mass is $\rightarrow F = - k r = - k r.\bar{r}$ as equation $\ddot{x} + w^2 x = 0 \dots (1a)$ with a general solution $x = A \sin w_n t + B \cos w_n t$, where A , B are constants and evaluated from the initial conditions and which become $x = [x(0) / w_n] . \sin w_n t + x(0) . \cos w_n t \dots (1)$

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

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

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

From Planck`s equation $f_e = E / h = [- 13,6 \times 1,6.10^{-19} = 2,176.10^{-18} \text{ Joule}] / [6,626.10^{-34} \text{ J.s}] = 3, 283998.10^{15}/s$, where min-energy -13,6 eV is Hydrogen-atom

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

$$m_e = \frac{g}{4 \pi f_e^2} = \frac{9,8076754}{4.\pi.[3,28399.10^{15}]^2} = - 7, 2371149.10^{-32} \text{ kg} \dots (2b)$$

$$f_e = 3, 283998.10^{15} /s , \text{ and } L_e = 1, 6819781.10^{-17} \text{ m} \dots (2c)$$

Equations become from relation $\rightarrow 4\pi . f_e^2 . m_e = g \leftarrow$ In Planck`s length .

Electron-Charge , becomes from the *Periodic excitation* of the motion of the \oplus , constituent to the \ominus constituent , **Tack-Geometry** , **Not** in loop ($\oplus \ll \leftrightarrow \ominus$) , **But** through the **One way- N -Electric-Paths** [$\oplus \ll \rightarrow \ominus$] , which formulate the **Electric Field-Pattern** , following charge-equation $\rightarrow \bar{q} \equiv \frac{m_e c^2}{2} = \frac{g c^2}{8\pi f^2}$. From Gravitation $G = k_e \cdot g$, and Voltage $\bar{V} \equiv V_p \equiv \frac{c \cdot \bar{q}}{h}$, Spin = B / π , where Electrons-equation of motion into $\oplus \leftrightarrow \ominus$ is $\ddot{r} + \omega^2 r = 0$ and equation`s Solution $\rightarrow 4\pi \cdot f^2 \cdot m_e = g \leftarrow$ which is the **Electron** , and **Charges** , \bar{q} .

Electron Charge \bar{q} Becomes from Magnetic Field **M** which creates the Electric-Field **E** ,which is acting on Charge \bar{q} , and the acting Force per second creates Work which is conserved and coincide with the Planck`s constant **h** .This is because $h \rightarrow J s = N m s =$ **Power** ,where from, *Energy = Power x Time* , issues the Beyond Planck`s length **L_p** , & Voltage **V** as $\rightarrow \bar{q} \equiv \frac{K_E}{V_p=1} = \frac{m_e c^2}{2} = \frac{g c^2}{8\pi f^2 \cdot 1}$ and $\bar{V} \equiv V_p \equiv \frac{c \cdot \text{Charge}}{\text{Total-Energy} = h} = \frac{c \cdot \bar{q}}{h}$ (3)

Using the two Energy-equations for **Plane-motion** $\rightarrow f_n = \frac{1}{2\pi} \sqrt{\frac{k}{m}}$ and **Orbital-motion** $a = \sqrt[3]{\frac{1}{k \cdot f^2}}$, for **Unit-Energy-Space-frequency** $k = g$, $a = \pi$, then $\rightarrow g \cdot f^2 \cdot \pi^3 = 1$ (4)

Frequency $f_n = \sqrt[2]{\frac{1}{g \cdot \pi^3}} = \sqrt[2]{\frac{1}{9,808238 \cdot \pi^3}} = 1,8133418 \cdot 10^{-3}$, i.e. **The Unit-Charge-Cave** \bar{q} into Hydrogen cave [$a = 1,82043047 \cdot 10^{-12} m$]. [$1,813342 \cdot 10^{-3} / s$] = **3,3010625** . $10^{-15} C$ **From equations** Charge and Voltage is the **Self-Growing** Property of frequency f_n in Material-point , therefore and for Hydrogen-cave is equal to $\rightarrow \bar{q} \cdot \Phi$,

Because Gravitational Force is equal to \rightarrow the Geometric-Resultant of light-velocity **c** , acting on **Electron-Unit-Charge** $\bar{q} \leftarrow$ or , $G = c \sqrt{2} \bar{q}$, then Electron-Charge is

$$\bar{q}_{\text{Electron}} = \frac{G}{c \sqrt{2}} = \frac{6,6736923 \cdot 10^{-11}}{1,41429 \cdot 2,9979346 \cdot 10^8} = 1,574 \cdot 10^{-19} C .$$

For Photon issues that of Gravitation in Planck`s-cave $\rightarrow G = f_n \cdot \sqrt{2} \cdot \bar{q}$ and for Photon is ,

$$\bar{q}_{\text{Photon}} = \frac{G}{\sqrt{2} \cdot f} = \frac{G \cdot h}{\sqrt{2} \cdot E} = \frac{[6,6736923 \cdot 10^{-11}] \cdot [6,62606957 \cdot 10^{-34}]}{\sqrt{2} \cdot E=1} = 3,127 \cdot 10^{-44} C .$$

6d... The Origination of Hydrogen - Cave **H** , **e** :

The Light velocity vector $\bar{v} = \bar{c}$ is Acting on cave , $r = L_p$, 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** $\bar{v} = \bar{c}$ Acting on **an-cave** , $r \neq L_p$, finds The-Impedance **Z_c** of the Velocity \bar{c} , and Becomes the minimum-Energy-cave in L_p , and Equal to $E \equiv r Z_c \bar{c}$ (1) where , **E** = The Planck`s-Total-Energy $E_p = h = 6,62606957 \cdot 10^{-34} J \cdot s$, **r** = The min-Energy cave of Hydrogen , **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 $\rightarrow r Z_c c = h \leftarrow$ (1a)

The **Three Elements** \equiv Digits of Material-Geometry are $\{\oplus, [\oplus \leftrightarrow \ominus], \ominus\} \equiv [+ , 0 , -]$ and as before for $\log_x x$ and Base $x = 10$ then $\log_{10} 10 = 10^{10}$ is the Growth , **Impedance is the Anti-Growth** or **Anti-logarithms** 10^{-10} of their Positions and Antilog $r_{10} = 3$ is $r = 0,477777$. For the three dimensions Total-Impedance $Z_c = (0,477777)^3 \cdot (10^{-10})^3 = 1,045263 \cdot 10^{-31}$ and

$$r = \frac{h}{c \cdot Z_c} = \frac{[6,62606957 \cdot 10^{-34}]}{2,99798 \cdot 10^8 \cdot 1,045263 \cdot 10^{-31}} = 2,11450164 \cdot 10^{-11} \text{ m , and is the Hydrogen cave .}$$

From Kepler third law , Closed-Space-Energy equation of Newton`s Laws of motion is

$$\text{Constant } k = v^2 \cdot r = (w \cdot r)^2 \cdot r = \left[\frac{2\pi}{T} r \right]^2 \cdot r = \frac{4\pi^2 r^2}{T^2} \cdot r = \frac{4\pi^2 r^3}{T^2} = 4\pi^2 \cdot \frac{r^3}{T^2} = 4\pi^2 \cdot r^3 \cdot f_p^2 \dots\dots(k)$$

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

$$\text{is } f_N = n \frac{(1+\sqrt{5})\sigma}{4\pi r} = \frac{2\bar{B}}{\pi^2 r^4} , \text{ and for the Damping-cave } \rightarrow r(t) = r(t+w) \leftarrow \text{ as Planck`s scale is}$$

with **min-Damping = 1** , and **Unit-Energy-Quantity W_u** , (the critical-energy-unit in the

min , r) to be the Unit-Stress-Gravity g , as $k = E = \frac{T^2}{a^3} = g = \frac{1}{f^2 \cdot a^3}$ and for $a = r$ then

$$g \cdot r^3 \cdot f_p^2 = 1 , \text{ which is the Kepler second constant-Unit-law for areas i.e. } \rightarrow$$

Stress g , when is entering into the minimum cave , a , of a minimum Surface , then from the Period of Rotation T , on the Perimeter, is created in Surface the minimum

Quantity of Energy-cave and is that of Hydrogen-Atom , where issues ,

$g f^2 \equiv$ The Energy-Part embodied with stress , g , and

cave $a^3 \equiv$ The Space-Part , in the 3-DOF space , as **Period and Frequency** ,

$$T^2 = g a^3 = 9,8076925 \cdot [2,1145016 \cdot 10^{-11}]^3 = 9,2728158 \cdot 10^{-32} \text{ s , and Period}$$

$$T = 3,04513 \cdot 10^{-16} \text{ s , or frequency } f = 3,2839982 \cdot 10^{15} /s = 3,2839982 \cdot 10^{15} \text{ H}$$

$$\text{From equation } E = h f = 6.62607 \cdot 10^{-34} \cdot 3,2839982 \cdot 10^{15} = 2,175999 \cdot 10^{-18} \text{ J} / (1,6 \cdot 10^{-19})$$

= 13 , 59999 eV a Quantized Energy corresponding to Hydrogen-Atom-cave.

Above Quantity is the Quantum-Energy in the minimum cave of L_p

It was shown that **in Conservative Systems** of Central-Force , the Total energy E is

$$\text{conserved and at Periapsis , Energy } E = \frac{GMm}{2a} \text{ and } e = \sqrt{1 + 2EL^2/G^2M^2m^3} ,$$

$$\text{and for } e = 0 , a \text{ circle , then } \rightarrow E = - \frac{G^2M^2m^3}{2L^2} , \text{ i.e. energy is always Negative .}$$

$$\text{From Hydrogen cave issues } k = E = \frac{T^2}{a^3} = g = \left[\frac{4\pi^2 a}{GM} \right] \text{ therefore , } GM = \frac{4\pi^2 a}{g} \text{ and from}$$

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

$$\text{eccentricity } e = 0 , GMm = - 2aE , \text{ and then } \rightarrow L^2 = GMm^2 \cdot a = - 2aE[a]m = - 2a^2 \cdot Em .$$

i.e. Equation $L^2 = - 2a^2 \cdot Em$, 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 minimum Quantized - Energy of 13,6 eV . In-Spaces or Volumes with the minimum 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 $PNS \equiv$ 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 \mathbf{g} , created from the Rotational-motion and which \mathbf{g} , continually effects on Spins through which force \mathbf{G} , Flows to all Energy Structures .

The **Strong-force** in Nucleus are in , $F_{\text{nucleus}} = h \cdot f_n \equiv h \cdot n \cdot \frac{(1+\sqrt{5})\sigma}{4\pi r} \equiv h \cdot \left[\frac{n \cdot \bar{B}}{\pi^2 r^4} \right] \equiv h \cdot \frac{n\Phi\sigma}{2\pi r} \equiv h \cdot \frac{n\sigma(1+\sqrt{5})}{4\pi r} \approx 1 \cdot 5.10^{10}$ Tesla , and $F_{\text{photon}} = \frac{[\oplus \rightarrow \leftarrow \ominus]}{r^2} = \frac{\sigma \cdot \sigma}{r^2} = \left| \frac{\sigma}{r} \right|^2 \equiv \left| \frac{2B}{\pi \cdot r^4 \Phi} \right|^2$

From $r_{\text{min}} = 1,07 \cdot 10^{-7}$ m and $\mathbf{f}_p^2 = \frac{1}{r^3}$ or $f_{\text{min}} = 2,839844 \cdot 10^{10}$ H , then Bonding Energy $L = h \cdot f_N = 6.62607 \cdot 10^{-34} \cdot 2,8398447 \cdot 10^{10}$ J / $1,6 \cdot 10^{-19} = 1,176063 \cdot 10^{-6}$ eV

$E = -L^2 / 2a^2 m$ and for $a = r \rightarrow a^2 = L^2 / 2Em = \frac{[1,17606 \cdot 10^{-6}]^2}{2(13,6)1 \cdot 10^{-12}} = 5,08501 \cdot 10^{-4}$ and then ,

$r = a = 2,2549966 \cdot 10^{-2}$ m , meaning The **Spin-Polhode** of the Hydrogen-cave .

From Orbit equation $a = \sqrt[3]{\frac{1}{g \cdot f^2}} = \sqrt[3]{\frac{1}{9,808[2,8398447 \cdot 10^{10}]^2}} = 5,018918 \cdot 10^{-8}$ m , \rightarrow are

the Brackets \equiv [**Proton-Electron-Hook**] \equiv {**Electric-Field-Loops**} \rightarrow **H-Atom-Radius** .

E.. : THE ORIGIN OF SPIN AND ENERGY :

It is an Application to Material-Points [$\oplus \leftrightarrow \ominus$] , by considering the Positive-constituent with angular velocity $\bar{w} = \bar{v} / r = \frac{\sigma}{2r} [1 + \sqrt{5}] \dots(1)$ [70] and for an angle 45° from , \mathbf{x} ,axis, where then the Ellipsoid of Angular-velocity is perpendicular to the Plane of motion .

Moment of Inertia to , \mathbf{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 , $J_1 w_1^2 + J_2 w_2^2 + J_3 w_3^2 = 2E \dots(2)$

The Energy-Ellipsoid as $\bar{B} \equiv$ Spin is $\rightarrow \mathbf{w}_1^2 + \mathbf{w}_2^2 + \mathbf{w}_3^2 = \frac{2E}{J} = \frac{4E}{(\pi r^4)^2} = \frac{B^2}{J^2}$.

Angular-momentum \equiv Spin $\equiv \bar{B} \equiv [\pi \sigma \cdot r^3 (1+\sqrt{5}) / 4]$ $\dots(3)$ In Figure -6- and for the center , K , of \oplus sphere , issues $\bar{v}_K = [\bar{w} \cdot \bar{r}_K] = [\frac{\sigma[1+\sqrt{5}]}{2r} 2r] = \sigma [1+\sqrt{5}]$ and $\bar{B} = \bar{S} = [\bar{r} \cdot m\bar{v}] = [r \cdot m \cdot \sigma(1+\sqrt{5})]$ and for $m = 1$ then $\bar{B} = [r \sigma (1+\sqrt{5})]$. 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 $3J w^2 = C$ and $3B^2/J = C$ and since for circle $J = \frac{\pi r^4}{2}$ then $\frac{3\pi r^4}{2} w^2 = C = \left(\frac{3\pi r^4}{2}\right) w^2 = \left(\frac{3\pi r^2}{2}\right)(rw)^2 = \left(\frac{3\pi r^2}{2}\right)[\sigma (1 + \sqrt{5})]^2 = 3\pi r^2 \sigma \cdot [3+\sqrt{5}] \rightarrow$ **The Ellipsoid of Angular-velocity, \bar{w}** , and $3B^2/J = \frac{3(rmv)^2}{J} = \frac{3(rv)^2}{J} = \frac{3r^2 \cdot \sigma^2 [3+\sqrt{5}]}{4} \left[\frac{2}{\pi r^4} \right] = \frac{3 \cdot \sigma^2 [3+\sqrt{5}]}{2\pi r^2} \rightarrow$ **The Momentum-Ellipsoid, \bar{B}** .

The Angular-momentum In Planck`s-Length \equiv Spin $\equiv |\bar{B}| \equiv \pi^2 r^4 f \dots\dots(3)$

The value of $|\mathbf{B}| = [2 \cdot 8,79455 \cdot 10^{-35} \cdot 1 \cdot 1,6180339] = 2,845976 \cdot 10^{-34}$ {Kg/m/s}. For Planck-Length $r_p = 1,61623 \cdot 10^{-35} \sqrt{3}\pi = 8,79455 \cdot 10^{-35}$ m , velocity $|\bar{v}| = \frac{\sigma}{r} [1 + \sqrt{5}]$

and from (3) then \rightarrow **Planck-cave-Stress $\sigma = \frac{\bar{B}}{r \cdot \Phi} = 1$, Total-Energy $2E = [J w]^2$,**

From $|\bar{v}| = \frac{\sigma}{r} [1 + \sqrt{5}] = c = 3 \cdot 10^8$ m/s then , $\sigma = \frac{3 \cdot 10^8}{3,679551 \cdot 10^{34}} = 8,1477332 \cdot 10^{-27}$ Kg/m²

$|\mathbf{w}| = \frac{\sigma}{2r} [1 + \sqrt{5}] = \left(\frac{8,1477332 \cdot 10^{-27}}{2 \cdot 8,7945510^{-35}}\right) \cdot 3,2360675 = 1,499 \cdot 10^8$, or $|\mathbf{w}| = 1,5 \cdot 10^8$ rad / sec ,

For $\sigma = 8,147733 \cdot 10^{-27}$ Kg/m² and $\bar{B} = 5,691952 \cdot 10^{-34}$ J then , Period $T = \frac{2\pi}{w} = \frac{2\pi r}{v} =$

$$\frac{4\pi r}{\sigma(1+\sqrt{5})} = \frac{4\pi \cdot 8.79455 \cdot 10^{-35}}{\sigma(1+\sqrt{5})} = \frac{3,4151}{\sigma} 10^{-34} \text{ s, or Period } T = \left[\frac{4,191584}{10^9} \right] \text{ s, and frequency } f = \frac{1}{T}$$

i.e. **Planck-frequency** $f_1 = 2,38573294 \cdot 10^{34} \text{ Hz}$. From above issues ,

a).. The Spin of cave , r , is Equal to the Angular-momentum-Vector $\rightarrow \text{Spin} \equiv |\bar{B}| \equiv r \sigma \Phi$ which contains and is the Golden-Radius-frequency Φ as Pressure , σ , in cave r .

b).. In Planck`s-length [for light velocity $c = 3 \cdot 10^8 \text{ m/s}$] , **velocity** is $|\bar{c}| = \frac{\sigma}{r} [1 + \sqrt{5}] \text{ m/s}$ and in cave $r_p = 8,79410^{-35} \text{ m}$, the **Pressure** $\sigma = \frac{r \cdot c}{[1 + \sqrt{5}]} = 8,147733 \cdot 10^{-27} \text{ Kg/m}^2$.

c).. In Planck`s-length the Period of Oscillation is $T = \frac{4\pi r}{\sigma(1+\sqrt{5})} = 4,192 \cdot 10^{-8} \text{ s}$, and

Frequency $f_p = \frac{1}{T} \equiv \frac{\sigma \cdot (1 + \sqrt{5})}{4\pi r} = 2,3857265 \cdot 10^7 \text{ Hz}$, which is the minimum in Planck-cave .

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

velocity $v = (w = \frac{2\pi}{T})r = 2\pi r \cdot f = [\frac{\sigma}{2}] \cdot (1 + \sqrt{5})$, frequency $f = \frac{(1 + \sqrt{5}) \cdot \sigma}{4\pi r}$, Period $T = \frac{4\pi r}{\sigma(1 + \sqrt{5})}$

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

$f_n^2 = \frac{\sigma^2}{4\pi^2 r^2} \Phi^2 = \frac{1}{g \cdot a^3}$, and $g a^3 \Phi^2 = \frac{4\pi^2 a^2}{\sigma^2}$, or $a = \frac{1}{g} [\frac{2\pi}{\sigma \Phi}]^2$ and from Work in Orbits

$W = 2E = B w = J \cdot w^2$, or $2E = 2\pi f B$ i.e. $\rightarrow \text{Total - Spin*Frequency} \equiv \bar{B} f = \frac{E}{\pi}$, and

Energy \equiv **motion** in Planck-scale-cave $r = L_p$, is $2E = \bar{B} f_n = [\frac{(1 + \sqrt{5})\sigma}{4\pi r}] \cdot \bar{B} = [\frac{\sigma}{2\pi r}] \cdot \bar{B} \Phi$, or

$$E = [\Phi \frac{\sigma}{4\pi r}] \cdot \bar{B} \equiv \frac{|B|^2}{2 \pi^2 r^4} \dots\dots (4) \quad \text{i.e.}$$

Energy of Particles In-Beyond Planck-cave is dependent on their Spin only , and for the

Electron with cave $r = a_e = 1,6819781 \cdot 10^{-17} \text{ m}$, and Principal-stress $\sigma = 1$, then ,

$$E = [\Phi \frac{\sigma}{4\pi r}] \cdot \bar{B} = 1,6180339 \left[\frac{1}{4\pi \cdot 1,6819781 \cdot 10^{-17}} \right] \cdot 2,845976 \cdot 10^{-34} = \frac{2,17872 \cdot 10^{-18}}{1,602 \cdot 10^{-19}} = 13,6 \text{ eV}$$

All above equations define \rightarrow **The Ubiquity of Golden-Ratio- Φ** \leftarrow 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** \equiv **Energy** and **Space** \equiv **Displacement** .

In Mechanics Work \equiv Energy \equiv 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 [\leftrightarrow] or , **Reciprocating-motion** , and the Revolving motion [$\oplus \cup \ominus$] 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 \equiv Energy \equiv Force \times Orbit-ray .

Motion occurs from Electrons with Impedance $Z_c \equiv$ mass [m] executing Circular and Elliptical-Plane-Orbits from Nucleus mass [M] obeying **Kepler`s laws and Newton`s Lagrange laws** for Mechanics in an Equivalent System. Lagrange equations of motion

in any Potential is , $\frac{d}{dt} \left[\frac{\partial L_a}{\partial \dot{q}_i} \right] - \frac{\partial L_a}{\partial q_i} = 0$ where , Lagrangian $L_a = (T_K - L)$ (1) and

L = The Potential Energy \equiv Pointy motion \equiv Spin
 T_K = Kinetic-Energy \equiv Linear or Rotational-motion

$T_K = T(q_1, q_2, \dots, q_N, \dot{q}_1, \dot{q}_2, \dots, \dot{q}_N)$
 q_i = the generalized coordinates,
 \dot{q}_i = the generalized velocities . $i=1,2,\dots,N$
 θ = The $r \rightarrow v \uparrow$ angle on Orbit-Nucleus
 The Lagrangian of motion is (1) \downarrow as

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

Equations of motion $\rightarrow \frac{d}{dt} \left[\frac{\partial L_a}{\partial \dot{r}} \right] - \frac{\partial L_a}{\partial r} = 0$ and $\frac{d}{dt} \left[\frac{\partial L_a}{\partial \dot{\theta}} \right] - \frac{\partial L_a}{\partial \theta} = 0 \dots\dots(2)$

Angular momentum vector $\bar{L} = r \times m v = m.r.r \dot{\theta} = (mr^2.\dot{\theta})$ and $r^2.\dot{\theta} = \frac{L}{m} \dots\dots (2a)$

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

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

Lagrange`s equation (2) for the r, θ , coordinates becomes,
 $\frac{d}{dt} [m.\dot{r}] - [m.r.\dot{\theta}^2] + \frac{\partial V}{\partial r} = 0$ and integrating $\frac{1}{2} m \dot{r}^2 + \frac{1}{2} \left[\frac{L^2}{m r^2} \right] + V(r) = E \dots\dots(4)$
 where E is the Energy = the motion in cave Atom, r . Solving (4) to velocity then

Velocity $\dot{r} = \sqrt{\frac{2}{m} [E - V(r) - \frac{L^2}{2m r^2}]} \equiv \sqrt{\frac{2}{m} [E - \{ \frac{k}{r} + \frac{L^2}{2m r^2} \}]} \dots\dots(5)$ **i.e.**

Electron`s Velocity $\bar{v}_e = \dot{r}$, the motion, is depended on the Total 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 $E = T_K + L \equiv$ The constant of Integral.
- 2.. Spin \equiv Torsional motion $\equiv L \equiv B = \text{constant}$
- 3.. Potential Energy $U = V(r) + \frac{L^2}{m r^2} = - \frac{k}{r} + \frac{L^2}{m r^2}$, where k = a constant, and then,
 - a... As $r \rightarrow 0$, then $U = - \frac{k}{r} + \frac{L^2}{m r^2} = \frac{1}{r^2} \left[\frac{L^2}{2m} - k r \right] \equiv \infty \rightarrow$ Strong-Forces
 - b... As $r \rightarrow \infty$, then $U = - \frac{k}{r} + \frac{L^2}{m r^2} = \frac{1}{\infty^2} \left[\frac{L^2}{2m} - k r \right] \equiv 0 \rightarrow$ PNS-Field
 - c... As $r \rightarrow \infty$, then $U = - \frac{k}{r} + \frac{L^2}{m r^2} = - \frac{1}{\infty} \left[- \frac{L^2}{2m r^2} + k \right] \equiv < 0 \rightarrow$ Black Hole
 - d... As $r \rightarrow \frac{L^2}{2 k m}$, then $U = \frac{4k^2 m^2}{L^4} \left[\frac{L^2}{2m} - \frac{L^2}{2m} \right] = 0 \rightarrow$ Turning-Points
 - e... As $r \rightarrow \frac{L^2}{2 k m}$, then $U = \frac{4k^2 m^2}{L^4} \left[\frac{L^2}{2m} - \frac{L^2}{2m} \right] = 0 \rightarrow$ Black-Hole **i.e.**

For a, The Potential-Energy becomes infinite (∞), as $r \rightarrow 0$, 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 $r \rightarrow \infty$, 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 $r \rightarrow \infty$, for any L and r .

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

Energy $E = \frac{1}{2} m \dot{r}^2 + \frac{L^2}{2 m r^2} - \frac{GmM}{r}$, $L = m.r^2 . \dot{\theta}$ (7) and is the **Energy in Atom**

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 $U = \frac{L^2}{2 m r^2} - \frac{GmM}{r} = 0$, and $U' = \frac{\partial U}{\partial r} = -\frac{k}{r} = f + \frac{L^2}{2 m r^3} = 0$,

$U'' = \frac{\partial^2 U}{\partial r^2} = -\frac{\partial f}{\partial r} + \frac{3L^2}{m r^4} > 0$,(8) and ,

$\frac{\partial f}{\partial r} < \frac{3L^2}{m r^4}$ becomes according to position r_o , $\frac{\partial f}{\partial r_o} < -\frac{3f(r_o)}{r_o}$ (8a)

3e.. The Boundedness of Orbits :

The general solution of (5) is $\frac{1}{r} = \frac{Gm^2M}{L^2} + c_1 . \cos \vartheta \dots(5a)$, where c_1 is a constant and

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

to prior then $c_1 = \pm e \frac{Gm^2M}{L^2}$ and $\frac{1}{r} = \frac{Gm^2M}{L^2} \pm e \frac{Gm^2M}{L^2} = \frac{Gm^2M}{L^2} [1 \pm e] \dots\dots\dots(9)$ and

Semimajor axis $a = \frac{L^2}{G m^2 M (1 - e^2)} \equiv \frac{GM m}{2 E} \dots\dots\dots(9a)$

Total-Eergy $E = \frac{G^2 m^3 M^2}{2 L^2} (e^2 - 1) \equiv \frac{GM m}{2 a} \dots\dots\dots(9b)$

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

Spin $\rightarrow \bar{B} \equiv L = \sqrt{(1 - e^2) . GMm^2 . a} \dots\dots\dots(9d)$

Energy in Orbit. $E = -\frac{GM m}{2 r_p} (e - 1)$ and $L = \sqrt{(1 + e) . GMm^2 . r_p} \dots\dots\dots(10)$

From Orbit-Geometry is $g . f^2 . a^3 = 1$, $g . f^2 . \pi^3 = 1$, and $E = h f \dots\dots\dots(11)$

Using the known equations for Spin then Spin $= \bar{B} = (\pi^2 r^4) . f_n =$ The Energy

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

$\bar{B} = [\pi . r^3 . \sigma(1 + \sqrt{5})/2]$, Total - Energy $2L = 2n(3 + \sqrt{5}) [\frac{\sigma^2}{\pi r^2}] \equiv [\frac{nh\sigma . \Phi}{2\pi r^1}] \dots\dots\dots(13)$

From relation $f_1 = [\frac{1}{\pi^2 r^4}] . \bar{B}$ and $\bar{B} = \frac{\pi r^3 \sigma . (1 + \sqrt{5})}{4}$ then $\bar{B}^2 = [\pi^2 . r^4 . f_1]^2 \dots\dots\dots(14)$

4e.. The Euler-Analysis of Motion in Orbits : Figure -7- 1,2,3 :

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

$J_1 . [\bar{k} \frac{d^2 \bar{k}}{dt^2}] + J_3 . w_3 . \frac{d\bar{k}}{dt} + \bar{s}_o . Q [\bar{k} \bar{k}] = 0 \dots\dots\dots(15)$ where ,

$J_1 , J_2 , J_3 \rightarrow$ Are the Moments of Inertia of Ellipsoid related to Principal axis .
 $\bar{w} [w_1 , w_2 , w_3] \rightarrow$ Is the constant Angular-Velocity-Vector with respect to changes in $\bar{i} , \bar{j} , \bar{k} \rightarrow$ The Unit constant-vector of the moving Body-System . { the Origin }.

$\bar{i}, \bar{j}, \bar{k} \rightarrow$ The Unit constant-vectors of Body-System .

$\bar{s}_0, \bar{s} \rightarrow$ The Unit motion vector on the common section of Planes $i - j, i - k$.

$\varphi, \theta, \psi \rightarrow$ The Three axial angles of vectors $\bar{i}, \bar{s}_0 - \bar{i}, \bar{s}_0 - \bar{k}$.

$Q \rightarrow$ The weight of the Rigid-Body = $m g$.

$\frac{d\varphi}{dt}, \frac{d\theta}{dt}, \frac{d\psi}{dt} \rightarrow$ The Angular-velocities of angles φ, θ, ψ

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

Energy Relations :

$$\bar{B} = J_1 w_1 \bar{i} + J_2 w_2 \bar{j} + J_3 w_3 \bar{k} \dots\dots\dots (16)$$

$$B^2 = J_1^2 w_1^2 + J_2^2 w_2^2 + J_3^2 w_3^2 \dots\dots\dots (16a)$$

$$\bar{B}w = Jw^2 (= 2L) = J_1^2 w_1^2 + J_2^2 w_2^2 + J_3^2 w_3^2 \rightarrow \text{Ellipsoid of Angular-velocity}$$

$$L = \frac{B_1^2}{2J_1} + \frac{B_2^2}{2J_2} + \frac{B_3^2}{2J_3} = \text{The Constant-Angular-velocity-momentum-Ellipsoid} \dots(17)$$

i.e. \rightarrow For any radius OP of \bar{w} -vector exists another radius of \bar{B} -vector Perpendicular to , The \bar{w} -edge Tangential-Plane of the Angular-Vector-Ellipsoid , and The \bar{w} -vector is Perpendicular to the \bar{B} -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- \bar{w} -Vector -Ellipsoid [OP] in E-Tangential to Ellipsoid [$\bar{B} = OT \perp E$] Vector . [70]

5e.. : 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 ,

$$G \equiv g.k_E \equiv g . [g_L k_L] \equiv \left[\frac{T^2_P}{a^3} \right] . [g_L k_L] \equiv 9,8078925 * 6,8116.10^{-12} \equiv 6,68056.10^{-11} \frac{m^3}{Ns^2}$$

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 \bar{B} and rotates according to equation $\frac{dB}{dt} = [u\bar{B}] = uB.[\bar{k}\bar{k}]$ in Gravitational Potential $U_g = [mg].s.\cos\theta = -sQ.[\bar{k}\bar{k}]$,so the change of \bar{B} is $\rightarrow \frac{dB}{dt} = u = \frac{s.Q}{B} = \frac{s.Q}{J_3.w_3}$ and from 1-degree equation of motion , $u, \ddot{u} + w^2 u = 0$,then

Period of Nutation $T = \frac{2\pi}{u} = \frac{2\pi.J_3.w}{s.Q}$, and **N-Frequency** $f_N = \frac{s.Q}{2\pi.J_3.w} \dots\dots(1)$

With Total Energy of Nutation [70] , $E_N = \frac{J_1}{2} [w_1^2 + w_2^2] + \frac{J_3}{2} w_3^2 \dots\dots(2)$

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 g_G . **The Light velocity vector $\bar{v} = \bar{c}$** , 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

$$f_R = \frac{(1+\sqrt{5}).\sigma}{4\pi r}$$

of c and \bar{B} of The-Stationary-Photon-cave , where $\bar{B} \equiv \bar{S} \equiv$ Spin .

The Moving Electron in Orbit of charge $\bar{q} \equiv \ominus$ with the **Orbit-Velocity-Vector \bar{v} is**

$\bar{v} = \sqrt{\frac{2}{m} [E - \{ \frac{k}{r} + \frac{L^2}{2m r^2} \}]}$, **Creates IN Orbit** , **r** , the Varying and Perpendicular Magnetic-Field , \bar{B} , which in time-turn **Creates** an Electric-field $\bar{E} \perp \bar{B}$, with resultant force **F** acting on Electron .Velocity \bar{v} is composed of V_p , Perpendicular to the Magnetic-circles $O \perp B$, and V_v , Parallel to the Magnetic-field-Vector $|\bar{B}|$, tending such that $L \equiv S \equiv \text{Spin}$. The resulting motion of Electron is the Helical motion.

Since **Work** is **Produced** during motion , The **Conservation exist in Orbit** [p↔ e] , so the **Orbit occupies Energy as frequency quite differing that of those of Energy-levels** . Since frequency $f_N = f_R = 2, 8398447.10^{10} \text{ s}^{-1}$ {C-5} and exists in all Atoms , *due to the Hydrogen first cave* , then is the **Resonance-frequency** between all **Atoms and Molecules**.

Energy from equation $E = h.f_N = 6.62607.10^{-34} . 2,8398447.10^{10} = 18,817009. 10^{-24} \text{ J} / (1,6. 10^{-19}) = 1,174463 .10^{-4} \text{ eV}$, is conserved as **Thermal-Energy** E_T in kilo Cal and is $E_T = 18,817009. 10^{-24} \text{ J} / [(4,19. 10^3) = \text{kcal}] = 4,49093. 10^{-27} \text{ kcal}$. This happens because of the closed Energy-Orbit-Rims , **r** , and of the constant light velocity **c** , and from **Spin** equation $S = r m c$. Taking into consideration the Thermal - Energy of a Photon when it is pressing 1 m2 surface for 60s and which is $E_p = 20 \text{ kcal} = 20. (4,19. 10^3) = 8,3777.10^4 \text{ J}$ the ratio , $[E_T / E_p] = 4,49093 . 10^{-27} / 20 = 2,24546 . 10^{-28}$, is a Quantity **Not-detected** . Hydrogen caves created in Sun **1 Million-years-ago** $= 10^6.365.24.3600 = 3,1538.10^{13} \text{ sec}$, is accumulated Thermal-Energy of $E_T = 3,1538.10^{13}.4,49093.10^{-27} = 1,41625.10^{-13} \text{ kcal}$ i.e. The Stationary Hydrogen-wave-cave Thermal-Energy needs 1-Quadrillion years to be 1-kcal.

For Half-frequency $f_R / 2 = 1,4199223.10^{10} \text{ s}^{-1}$, the Kinetic Energy is Zero and Potential-Energy is , $U = E = h f = 6,62606957.10^{-34} . 1,4199223.10^{10} = 9,4.10^{-24} \text{ J} = 5,8722.10^{10} \text{ eV}$, which agree with Bohr-Magneton .

The Produced-Work in Orbit as Frequency $f_N = \frac{sq}{2\pi.I_3w} = 2,8398447. 10^{10} \text{ s}^{-1}$ 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 $w_0 = \gamma. \beta_0 / 2\pi$, and for Hydrogen at 1,5 T Magnet , $\gamma = 2,675. 10^8 / \text{sT}$, $\beta_0 = 1,5 \text{ T}$ 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 $E = B c$.
- 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-dimensioned , Φ^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 Bonds.

6e.. The Spin , and Magnetic-moment Relation-Analogous .

- 1.. Magnetic Dipole - moment ($\bar{\mu}$) , 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 \ominus constituent around the \oplus *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 ,

$$\text{Magnetic - moment .} \quad \bar{\mu} = I . A \quad \dots\dots\dots(a)$$

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

$$\text{Angular momentum } \bar{B} = \frac{2L}{w} = \frac{2L}{2\pi f} = \left[\frac{L}{\pi} \right] . \left[\frac{1}{f} \right] = \frac{4r.L}{(1 + \sqrt{5}) . \sigma} = [\pi r^3 \sigma (1 + \sqrt{5}) / 2] = \frac{\pi^2 r^4 . f}{2} \dots(b)$$

From (a) , (b) the Angular - velocity - Ellipsoid \bar{w} , is the analogous to circular current , I , and Angular - Momentum-Ellipsoid \bar{B} , is the analogous to the Torque , $\bar{\mu}$, on this circular

$$\text{loop so } \bar{\mu} = I . A = \frac{\text{Energy=Motion}}{\text{Unit-Time}} = \frac{I.A.s}{s} = \bar{B} = \frac{2L}{w} = \frac{2L}{2\pi f} = \left| \frac{L}{\pi} \right| . \left| \frac{1}{f} \right| = \frac{4r.(hf)}{(1 + \sqrt{5}) . \sigma} = \left[\frac{h}{2\pi} \right] = \text{SPIN} \dots(c)$$

i.e. The Magnetic - moment $\bar{\mu}$ of Material - point = $\left[\frac{h}{2\pi} \right] \equiv \text{SPIN}$, and also equal to

$$\text{the Angular-Momentum-Vector } \bar{B} = \pi^2 . r^4 . f = \frac{\pi r^3 \sigma}{2} [1 + \sqrt{5}] \equiv \pi r^3 . \sigma \Phi \equiv \left[\frac{h}{2\pi} \right] \equiv \frac{2L}{2\pi f} .$$

The effect of Magnetic-moment on an **External** magnetic field \bar{P} is the Torque acting on the Dipole $\bar{\tau} = \bar{\mu} \times \bar{P}$, representing the lowest Energy configuration , and has a Potential energy $U = - \bar{\mu} . \bar{P}$ with force in the loop $\rightarrow F_{\text{loop}} = \nabla(\bar{\mu} . \bar{P})$ and for Dipole $\rightarrow F_{\text{dipole}} = (\bar{\mu} . \nabla) . \bar{P}$ or

$$F_{\text{loop}} = F_{\text{dipole}} + \bar{\mu} . [\nabla \times \bar{P}] .$$

The Potential energy associated with the magnetic moment is $U = - \bar{\mu} . \bar{P}$ so that the difference in Energy Aligned and Anti-aligned is $\Delta U = 2 \bar{\mu} . \bar{P}$. From Physics , The intrinsic magnetic

moment , $\bar{\mu} = \frac{g_s . q}{2m} . S$, where g_s = a dimensionless quantity q = the charge , m = the mass ,

S = the Spin of particles and from (c) , $L = B w / 2$, and since $B = S$ then ,

$$\bar{\mu}_{\text{intrinsic}} = \frac{4r.L}{(1 + \sqrt{5}) . \sigma} = \frac{2wr.B}{(1 + \sqrt{5}) . \sigma} \text{ and } \bar{\mu} = \frac{g_s . q}{2m} . S , \text{ or } g_s = 2 \left(\frac{m . \bar{\mu}}{q . S} \right) , \text{ and because charge } q \text{ is}$$

$$\text{equivalent to Angular-velocity-Vector , } \bar{w} , \text{ then } g_s = 2 . \left(\frac{m . \bar{\mu}}{w . S} \right) = 2 . \left[\frac{m . (\bar{\mu} = 2L)}{w . S = 2L} \right] \dots(d)$$

i.e. Dimensionless quantity g_s , is related to \rightarrow mass m , charge q , Spin S , and Intrinsic magnetic moment $\bar{\mu}$, or \rightarrow is analogous to mass m , Angular velocity w , and Glue-bond σ . This Intrinsic Angular-Velocity \bar{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 , *either* is anticlockwise in Left-Small-circle , $[S = -1]$, by rotation Up or Down to the circles , *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 Adding the Spins** , so **Complex structure** would have a **Spin of** , $-\frac{1}{2}$, 1 , $+\frac{1}{2}$, **or** $+\frac{1}{2}$, -1 , $-\frac{1}{2}$, **only** .

The specific rotational velocity $v = w r = |w| r = \frac{\sigma}{2r} [1 + \sqrt{5}] . r = \frac{\sigma}{2} [1 + \sqrt{5}] = \sigma \Phi$, is related

Photon Particle , Photon Wave OR The Duality Photon ???

to Glue-bond , σ , only , meaning the **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 \bar{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 , (\oplus) , (\ominus) , 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 **Causes** it to experience a **Force** when placed in an Electromagnetic field , **In contrast to Material-Point** , where Force , \bar{B} , is originated **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 , \bar{q} , is the Electric-Charge contained within the volume defined by the surface , then Electric charge is equivalent to Magnetic moment , or $\bar{q} \equiv \bar{\mu}$, and current equivalent to angular velocity , or $I \equiv \omega$. **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 is applied , while in **Material-Point** , from its **Angular acceleration** , $a_a = \frac{\bar{B} \times \bar{\omega}}{J}$, where

$J = \frac{\pi r^4}{2}$ = The Polar moment of inertia and from Newton equation $2E = m \cdot a_a$ then , $m = \frac{2E}{a_a} =$

$[\frac{\bar{B} \cdot \bar{\omega}}{\bar{B} \times \bar{\omega}}]$. **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 , $m = \frac{2E}{a_a} = [\frac{\bar{B} \cdot \bar{\omega}}{\bar{B} \times \bar{\omega}}] \cdot J \equiv$ *a number measuring Energy-quantities in caves* .

For an inclination of 45° then the Dot Product of $\bar{B} \cdot \bar{\omega}$ is $\rightarrow |\bar{B}| \cdot |\bar{\omega}| = |\bar{B}| \cdot |\bar{\omega}| \cdot \cos 45^\circ$ and the Cross Product of $\bar{B} \times \bar{\omega}$ is $\rightarrow |\bar{B}| \times |\bar{\omega}| = |\bar{B}| \times |\bar{\omega}| \cdot \sin 45^\circ$ equal to Dot Product , and

In Planck`s – length - cave $r = 4,453 \cdot 10^{-35}$ then mass becomes \rightarrow

$$m = \frac{1}{1} \cdot J = \frac{\pi r^4}{2} = 617,63 \cdot 10^{-140} = 6,1763 \cdot 10^{-138} \text{ Kg , and}$$

$$\text{The Ellipsoid of Angular-velocity remaining } \frac{w_1^2}{2} + \frac{w_2^2}{2} + \frac{w_3^2}{1} = \frac{2L}{J_3}$$

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 $\bar{B} = r m v = m r \omega r = m \cdot \omega \cdot r^2$, **mass** $m = \frac{\bar{B}}{\omega r^2} = \frac{2 \cdot B}{\sigma \cdot r(1 + \sqrt{5})} = [\frac{1}{2\pi f}] \frac{\bar{B}}{r} = \frac{1}{\omega} \frac{\bar{B}}{r} = \frac{2\bar{E}}{r}$ or $\rightarrow m = \frac{2E}{r}$, and $E = \frac{B}{2c} \dots [m]$ *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 $f^2_n a^3 = k = \text{Quantum-of motion}$.

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 \vec{B} , in the Self rotating Material point [$+s^2 \leftrightarrow -s^2$] } \rightarrow explains the **Why Galaxies**, and the clusters of Galaxies **remain stable**. In Caves of ($\oplus \equiv +s^2$), ($\ominus \equiv -s^2$), 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 $\rightarrow m = \frac{1}{1} \cdot J = \frac{\pi r^4}{2} = 389,80218.10^{-248} = 3,898.10^{-246}$ Kg.

7e.. The Atoms Precession :

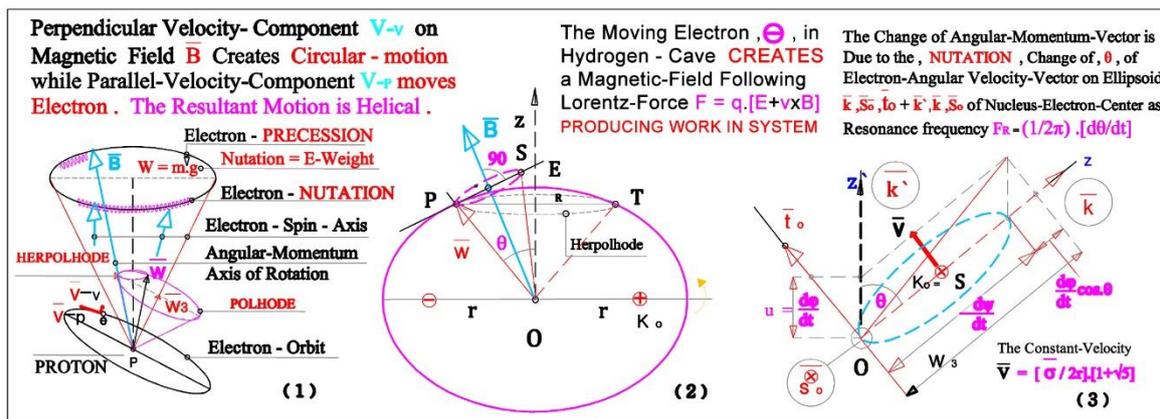


Figure – 7 - : The Electron's Nutation in Precession :

- In (1) **The Electron-motion creates a Magnetic-Field \vec{B} , in which is Stored Work.** { Velocity vector V_e is composed of the V_{-v} Perpendicular- constituent which stores motion in circular-Helix-paths and the Parallel- constituent 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{w} , of Electron at Point P and Proton at Point O, are Perpendicular each other and forming the Herpolhode, $OPT \perp OB$, where Polhode, $PS \perp OP$, perpendicular to Ellipsoid.**
- In (3) **The Change of Angular Momentum vector \vec{B} , is Due to the change of θ , angle Nutation, and The Produced Work is Stored in the Nucleus-Electron-Orbit-Slim. Electron Precession is the (change of ϕ) of Angular velocity while Electron-Nutation is the (change of angle θ).**

Precession is the change in ϕ , while Nutation is the change in θ . For $w_3 = \text{constant}$ then $\frac{d\phi}{dt} = \frac{d\psi}{dt} = \text{constant}$ and angular velocity $w = \vec{k} \frac{d\phi}{dt} + \vec{k} \frac{d\psi}{dt}$ in the $\vec{k} \vec{k}$ Plane. After some operations results the equation of motion under above restrictions as,

$$J_1 \cdot u^2 \cdot \cos \theta - J_3 \cdot w_3 \cdot u + s Q = 0 \quad \dots (1) \quad \text{where } u = \frac{d\phi}{dt} = \frac{dB}{dt}$$

with solution $u = \frac{J_3 \cdot w_3}{2J_1 \cdot \cos \theta} \pm \sqrt{\left[\frac{J_3 \cdot w_3}{2J_1 \cdot \cos \theta} \right]^2 - \frac{sQ}{J_1 \cdot \cos \theta}} \quad \dots (2)$ Displacement, u ,

is called \rightarrow **The Regular Precession of the Rigid-Body** \leftarrow

The under root terms are > 0 when $\frac{sQ}{J_1 \cdot \cos \theta}$ is very small or when Angular velocity $w \cong w_3$ where then, angular velocity axis is very closed to the Principal Ellipsoid axis. The change of Angular-momentum is $d\vec{B} = M \cdot dt = [s_0 \cdot Q] dt = s Q \cdot [\vec{k} \vec{k}] dt \dots \dots \dots (3)$

where Kinetic energy during a displacement $2s$, is not changing, while Angular-velocity vector \bar{w} , is placed around \bar{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 \bar{B} , \bar{w} , are very closed each other and to symmetric axis \bar{k} , **Polhode** are narrow closed loop-curves on Poisson-Plane around \bar{B} vector.

The Angular-momentum-vector \bar{B} rotates according to equation $\frac{d\bar{B}}{dt} = [\bar{u}\bar{B}] = u\bar{B} \cdot [\bar{k}\bar{k}]$ in Gravitational Potential $U_g = [mg] \cdot s \cdot \cos \theta = -sQ \cdot [\bar{k}\bar{k}]$, so the change of \bar{B} is \rightarrow
 $\frac{d\bar{B}}{dt} = \mathbf{u} = \frac{sQ}{B} = \frac{sQ}{J_3 \cdot w_3}$ and from 1- degree equation of motion, $\ddot{\mathbf{u}} + \mathbf{w}^2 \mathbf{u} = \mathbf{0}$, then

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

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

An Example :

For Electron radius $s = r_e = 5,82 \cdot 10^{-16} \text{ m}$,

Weight of Electron $Q = m_e g = 9,11 \cdot 10^{-31} \cdot 9,808 = 8,93 \cdot 10^{-30} \text{ Kg}$,

Moment of Inertia-Disk $J_e = J_3 = [\pi a^4/2] = \pi/2 [5,8 \cdot 10^{-16}]^4 = 1,777591 \cdot 10^{-61} \text{ m}^4$,

Angular velocity $w_e = \frac{v}{r_N} = \frac{c}{1836} = \frac{3 \cdot 10^8}{1836} = 1,633 \cdot 10^5 \text{ m/s}$ because of masses analogy

The-Electron-Nutation-frequency $f_N = \frac{sQ}{2\pi \cdot J_3 w} = \frac{5,82 \cdot 10^{-16} \cdot 8,93 \cdot 10^{-30}}{2\pi \cdot 1,777591 \cdot 10^{-61} \cdot 1,633 \cdot 10^5} =$

$$f_N = f_R = 2,8398447 \cdot 10^{10} \text{ s}^{-1} \dots (6)$$

From equation (5) is seen, The **moving Electron** [\ominus charge] creates a Magnetic-field which **Changes** from Total-Kinetic-energy $E = T_K + L$, where $L = S = \text{Spin}$.

What this means? \rightarrow **Work is continually created as Resonance-Frequency** $f_R = f_N$

Since in Universe exist only **Motion**, and **Work** \equiv **Energy** \equiv **Force** x **Displacement**, therefore the continually-Moving Electron **Carries this** \rightarrow [Motion-Box]. How ???

To exist **Work** \equiv **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 $\bar{v}_e = \bar{v}_{e\uparrow} + \bar{v}_{e\rightarrow}$, and 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 -8- as

- 1.. The [Motion Box] which carries, **This Motion** $\mathbf{v} \equiv \dot{\mathbf{r}}$, are **The Magnetic-field-lines** which are circles in field, filled with motion \equiv transportation \equiv Spinning.
 The velocity-component, $\bar{v}_{e\uparrow}$, being Perpendicular to the Magnetic-lines creates Energy-Circles and thus, Motion \equiv Work \equiv 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. The Resulting motion is the Helical and thus Energy is 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 \equiv Energy. 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, Figure -9- .

In Fig-8- is shown the Electromagnetic-Wave Propagation .

The [Magnetic-Fields]≡[Energy-Baskets] is the Way for Energy-Propagation as ,

Strength-field $\vec{B}_F = \left[\frac{2\pi \cdot m \cdot T}{q \cdot r} \right] \cdot \vec{f} \equiv \vec{B} = \frac{\pi r^3 \Phi \cdot \sigma}{4} \rightarrow \text{Wave} \equiv \{ [\epsilon E^2 + \mu B^2] = 2 \cdot \lambda \cdot c \cdot \sin \left[\frac{2\pi c}{\lambda} \right] \}$,

$\vec{w} = 2\pi f = \frac{S_p}{m}$, issuing that Tangent of Ellipsoid $\rightarrow \vec{B} \perp \vec{w}$ Vector \leftarrow and Tangent of Ellipsoid $\rightarrow \vec{w} \perp \vec{B}$ Vector .It is a relation between Angular and Momentum Ellipsoid.

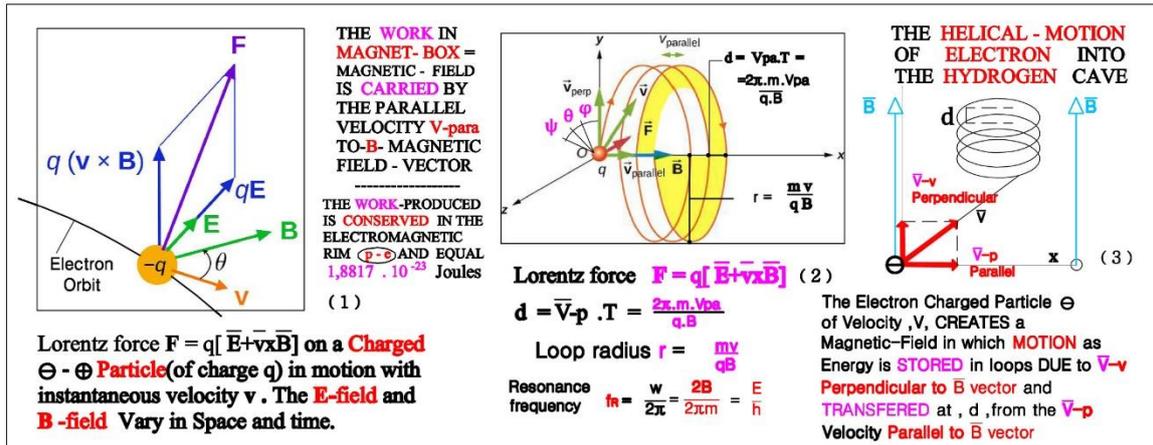


Figure -8- : The How moving-Electrons create Electromagnetic-Wave and Propagate.

In (1), The Moving Electron of charge $\bar{q} \equiv \ominus$ mass m , with the Orbit-Velocity-Vector \bar{v} ,

$\bar{v} = \sqrt{\frac{2}{m} [E - \{ \frac{k}{r} + \frac{L^2}{2m r^2} \}]}$, Creates IN Orbit, r , the Varying Perpendicular Magnetic-Field, \bar{B} , which in time-turn Creates an Electric-field, \bar{E} , Perpendicular to \bar{B} , with resultant force F , acting on Electron.

Velocity \bar{v} is composed of V_p , Perpendicular to the Magnetic-circles $O \perp B$, and V_v , Parallel to the Magnetic-field-Vector B tending to, $L \equiv S \equiv$ Spin. The resulting motion of Electron is the Helical-motion.

In (2), The changing Electron-velocity-Vector, $\bar{v} = \sqrt{\frac{2}{m} [E - \{ \frac{k}{r} + \frac{L^2}{2m r^2} \}]}$, Creates the Perpendicular Magnetic-Field \bar{B} , which Magnetic-lines are the Energy circles O in B , Due to the velocity-constituent V_p , which is Perpendicular to Magnetic lines O . The velocity - constituent 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 \bar{B} , Property answers the Zeeman effect.

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

$\bar{v} = \sqrt{\frac{2}{m} [E - \{ \frac{k}{r} + \frac{L^2}{2m r^2} \}]}$, is forming angle $< \theta$ with \bar{B} Vector, Creates IN

ORBIT, r , the Perpendicular Magnetic-Field \bar{B} , which Magnetic-lines are the Energy circles O in B , Due to the velocity-constituent V_p , Perpendicular to Magnetic-circles O . The velocity - constituent 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 \bar{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** so , Orbit occupies Energy as frequency differing that of Energy-levels . i.e. **Energy \equiv motion** Propagates , *travels* , as **Magnetic - Field B** which is the Box , and as **Electric-Field E** which is **The Thrust** of the Box .

Since this frequency $f_N = f_R = 2,8398447 \cdot 10^{10} \text{ s}^{-1}$ exists in all Atoms , it is The **Resonance - frequency** between All **Atoms and Molecules** in this Cosmos .

For Half-frequency $f_R / 2 = 1,4199223 \cdot 10^{10} \text{ s}^{-1}$, then Kinetic Energy is zero and Potential-Energy is , $U = E = h f = 6,62606957 \cdot 10^{-34} \cdot 1,4199223 \cdot 10^{10} = 9,4 \cdot 10^{-24} \text{ J} = 5,8722 \cdot 10^{10} \text{ eV}$, 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 , $w_0 = \gamma \cdot \beta_0 / 2\pi$, and for the Hydrogen at 1,5 T Magnet , $\gamma = 2,675 \cdot 10^8 / \text{sT}$, $\beta_0 = 1,5 \text{ T}$, then $w_0 = 63,864 \text{ MHz} = 63,864 \cdot 10^9 \text{ Hz}$, frequency $f_N = w/2\pi = 1,016457 \cdot 10^{10} \text{ s}^{-1}$ or is , **The Communication-Tool , The Identity-Card** between all **Atoms relations**.

From Orbit-equation , $\vec{v} = \sqrt{\frac{2}{m} [E - \{ \frac{k}{r} + \frac{S^2}{2m r^2} \}]}$ and for $v = 0$ then $E = \{ \frac{k}{r} + \frac{S^2}{2m r^2} \}$ and for $r_p = L^2 / [GM m^2] = S^2/m^2GM$ then $E = \{ \frac{k \cdot GM \cdot m^2}{L^2} + \frac{S^2}{2m r^2} \} = [\frac{k \cdot GM \cdot m^2}{S^2} + \frac{m \cdot [GMm]^2}{2 \cdot S^2}]$, and Energy $E = [\frac{GM \cdot m^2}{2 S^2}] \cdot [2k + GMm] \equiv \frac{k_0}{2 S^2} \equiv \text{Constant}$ and **Halve-Spin-Inverse-Squared** ,
i.e. Energy \equiv motion , And transported in Caves as their **Spin-Position , S** , which Thus , defines The Identity of Orbits in all Atoms and Molecules .

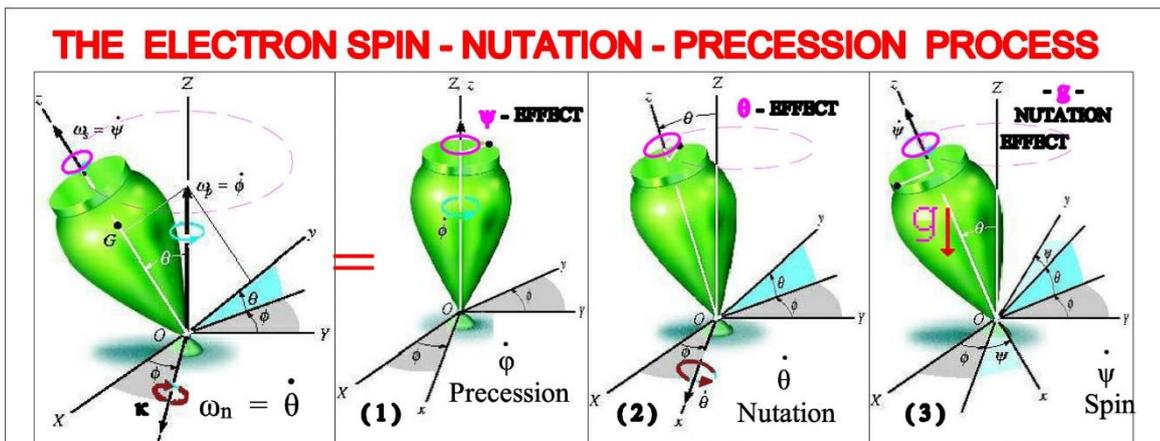


Figure - 9 - The Effect of Gravity ,g, on Electron-mass Originates Electron-Nutation θ , in **Electron-Precession** , ϕ , and changes **Electron-Spin-Direction** , ψ . The **Produced-Energy** is stored in Magnetic field $\bar{B}_p = 2\pi \cdot m_p \cdot f_r / \bar{q}_p$

The Data In A - Cave -Site :

- a).. **Spin** is a **Couple of Forces** [+ F , - F] following the Vectors Rules . Figure-11-
- b).. **Electron** [of - Charge] moving in Orbit around the Nucleus creates a **Magnetic Field tilted** to Electron`s-Spin [$M_0 = S_0$] , therefore it`s **tilted axis precesses** .
- c).. Nucleus-Spin-axis is tilted with Orbit`s-Spin-axis ,but because the two free-Couple Vectors [$M_N = S_N$ and $M_0 = S_0$] may be resolved into component vectors and the **Resultant M_T** ,which is the **Diagonal (Magnitude) of the Parallelogram with sides**

equal to S_N, S_O , **Changes**, according to their rotation axis with an angle, $d\psi$.
 At **Nutation-Period**, M_O is **Swinging** in circular-Magnetic field and angle, ϑ ,
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 [The, m_N, m_O **Current-loop**] \equiv The
Energy-Proton-Cantilever-Vector or the **Hydrogen-Bracket N-O**.

d).. Gravitation-Force through Gravity is continually acting on 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 [The m_N, m_O **Current-Potential-loop** $E = U(x)$] as before.

e).. **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 units.

The Direction x-x, of the two Couples of Oscillation is that of the two masses as are
 $m_N, m_{o \equiv e}$ of **Current-loop** which is continually altered because of the **Polhode**
curve. Since the Total Angular Momentum $M_T = M_N + M_O$ where $M_T = L = S = I \times w$,
 and is Swinging on the **Precession-circle** and **w-Nib on Polhode curve**, therefore the
Resultant M_T , Resonates with the Quantum frequency f_R of the cave to form with $\pm q$
 Charges the Magnetic Field \bar{B}_R . At **Nutation-Period**, M_O is **Swinging** and angle ϑ ,
Decreases or Increases, so the **Diagonal-Resultant** M_T **Increases or Decreases** and the
 Energy is transferred in \rightarrow [m_N, m_O **Current-Potential-loop** $U(x)$] \equiv **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 N-O, which is applied for a short time in Plane \perp to the varied
 \bar{R} vector and which is rotating very near to the Resonance (precession) frequency
 of the **Nucleus Protons**. [$m_N, m_{o \equiv e}$ **Current-loop** Increases its $P_E \equiv U(x)$].

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

Remark-1 \rightarrow 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 \leftrightarrow \ominus 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 N-O.
 This Orbit-Rim which is [The, m_N, m_e , **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, $\bar{\mu}$, 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. The [m_N, m_e , **Current-loop**] consists the **Energy-Bond** between
Atoms and is the **Communication-tool**, *The Resonance Signal*, in all Universe.

Energy equation is $\rightarrow E_{loop} = E_{dipole} + \vec{\mu} \cdot [\nabla \times \vec{P}] \equiv E_{dipole} + \vec{B} \cdot [\nabla \times \vec{P}] \dots (e)$ 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 $f_N = \frac{sQ}{2\pi \cdot J_3 w} \equiv f_R = 2,8398447 \cdot 10^{10} \text{ s}^{-1}$.

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**, $w_0 = \gamma \cdot \beta_0 / 2\pi$, and for Hydrogen at 1,5 T Magnet, $\gamma = 2,675 \cdot 10^8 / \text{sT}$, $\beta_0 = 1,5 \text{ T}$, then an-frequency $w = 63,864 \text{ MHz} = 63,864 \cdot 10^8 \text{ Hz}$, frequency $f_N = 2\pi \cdot w = 4,012575 \cdot 10^{10} \text{ s}^{-1}$.

Remark – 2 .

The Accumulation of Energy as (e) creates the [**The-Proton–Electron-Vector-Bracket**] which is the BONDING - FREQUENCY, $f_N = \frac{sQ}{2\pi \cdot J_3 w}$, 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 **requires more Energy Input** including that of frequency. Nucleus with Spin $S \neq 0$ can absorb and emit Electromagnetic Radiation and undergo, **Resonance**, when placed in a magnetic field. **This Uniform-Magnetic-field of Nucleus-Orbit [p ↔ e] already exists in Protons** which Eternally becomes from the Swinging of the **Electron-Angular-velocity Cone, with Spin-Vector \vec{S}** in the axis of cone as **Angular – Momentum -Vector, the Polhode**, at a fixed Point of the **Central-Cone-circle**. Because of Gravity, g , **SPIN ψ** , is under **NUTATION $\hat{\theta}$** , and the **Response** is the **PRECESSION $\hat{\phi}$** , or **THE → ELECTRON-NUTATION ←** due to Gravity is applied for a short time in the **Plane Perpendicular, ⊥, to the variated Moment-Vector, $|\vec{R}| \equiv |\vec{M}_T| = |\vec{M}_N| + |\vec{M}_O|$** and the Work produced is **Conserved** in → Nucleus-Orbit [p ↔ e] ≡ the [Energy-Box]. **The Angular-velocity-cone, \vec{w} , is 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 **Resonance –Frequency ≡ The Energy**. In figure 9, is shown the **Magnetic-Dipole-moment** of nucleus which is associated with the Orbital Angular Momentum $|\vec{B}|$, *the Spin*, resulting to the $|\vec{R}| \equiv |\vec{M}_T| = |\vec{M}_N| + |\vec{M}_O|$

When an External **Static-Magnetic-field** is present then → **The Spectral-lines ← Split into Multiple-closely-Spaced-lines**, because of the **Released-Energy** in the

Magnetic-Field, Due to the Duality-Photon as, $\vec{v} \left[\frac{\sigma}{2\pi r} + \frac{\sigma\Phi}{2\pi r} \right] \equiv \vec{v} \cdot \left[\vec{f}_n \right] + f_n$,

Above Zeeman-effect, *In Astrophysics*, is the trapping of Magnetic field $\vec{B}_c \equiv \left[\frac{2\pi \cdot m_T}{q_T} \right] \cdot f$ where frequencies are variated from Suns. *In Lasers*, the cooled-velocity-trapping which is related to the Frequencies, *In Electric-Dipole Spin*, is the controlling of the Magnetic moment $\vec{\mu} = \vec{B}$ by flipping the orientation of the Magnetic - Moment.

As was calculated for the **Strength** of an **Magnetic-field** of 1 Tesla the Static-Moment = $1,174462 \cdot 10^{-4} = 11,74462 \cdot 10^{-5} \text{ eV}$. In the Absence of Electron, $|\vec{M}_T| \equiv |\vec{M}_N| \equiv$ 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, *Angular-Momentum* $\vec{B} \equiv \vec{S}$, and that of *Angular-Velocity* \vec{w} , are related in monads as $\vec{B} \cdot \vec{w} = 2L = J \cdot w^2$ Analysis in [90].

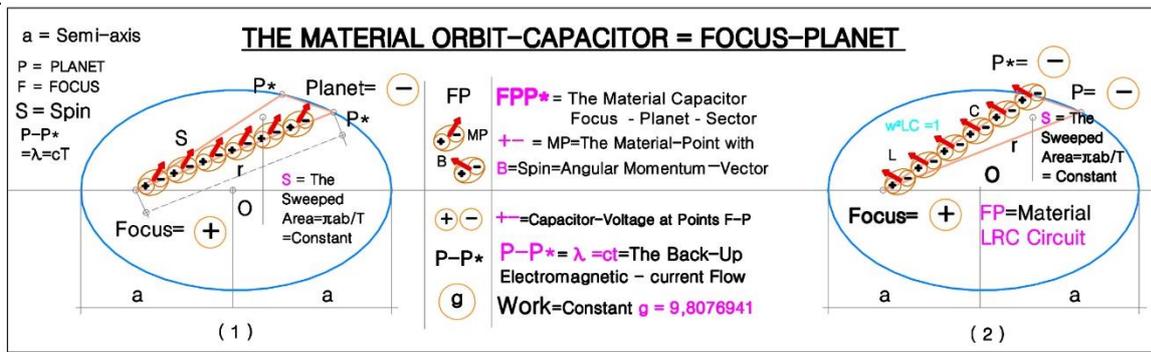


Figure -10- : The Material , LRC Circuit on Orbit , on Focus-Planet-Sector [F↔P] :

8e.. The Focus and the Signals in Orbits

In the Undamped Planck`s - Conservative -System , the Total-Energy in **Hydrogen-cave** is , - 13,6 eV , corresponding to the Natural-frequency of the **Primary-Particle** with the less **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 $\ddot{x} + \omega^2 x = 0$ 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 $\rightarrow \omega_e^2 \cdot m_e = \pi g = \text{constant} \leftarrow \dots (m)$

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 $a^3 \cdot f_n^2 \cdot k = 1$ and is $k a = \frac{1}{a^2 f^2}$, and from velocity $c = \omega a = 2\pi f a$ is , $f^2 a^2 = \frac{c^2}{4\pi^2}$ or $k a = \frac{4\pi^2}{c^2}$ and **Resonance - Energy** $\rightarrow E = \frac{ka}{aa} + \frac{L^2}{2m a^2} = \frac{1}{a^3} \left[\frac{4\pi^2}{c^2} + \frac{S^2}{2m} \right] \dots (re)$

A... The Gravity-System , It is Another Infinite \pm Equilibrium-Rotating vectors \bar{r} , where for Stability $\uparrow \bar{r} \downarrow \bar{r} = 0$, and which **Gravity-System** interacts with **Hydrogen-Cave-System** . The condition for **Irrotational Energy** is $\rightarrow \nabla x \bar{B} = \nabla x \bar{S} = 0$, or $\nabla x \bar{B} = \nabla \bar{r} + 2\pi m f \cdot \bar{a} = 0$, and $\bar{r} = \pm 2\pi m f \cdot \bar{a}$. Vector \bar{r} , occupies Both directions for Rotational - equilibrium , **i.e.** **The vector $\bar{r} = \pm \bar{B} \equiv \bar{S}_n = 2\pi m f_n$** , 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 $\rightarrow f_n = n \cdot f_1 = \frac{E}{h} = \frac{n \cdot v}{2\pi r} = \frac{n\sigma}{4\pi r} [1 + \sqrt{5}]$, and from $v = \omega r = 2\pi f r$ then , $f_n = v/2\pi r = \frac{(1+\sqrt{5})\sigma}{4\pi r} = \frac{\sigma \cdot \Phi}{2\pi \cdot r_n}$, where $v = \sigma \cdot \Phi$, and Spin $S_n = \bar{B} = J \omega = \pi^2 \cdot r^4 \cdot f_n = e$

B... The Hydrogen-Cave-System . From the **Nucleus -Planet** velocity equations $K_E = \frac{mv^2}{2} = E - \left\{ \frac{k}{r} + \frac{L^2}{2m r^2} \right\} = 0$, $4\pi f_e^2 \cdot m_e = g$, and for $E = \frac{\pi g}{r} + \frac{L^2}{2(g/4\pi f^2) r^2} = \frac{\pi}{g r^2} \cdot [g^2 r + 2 \cdot S^2 \cdot f^2] = 0$, then issues $g^2 r + 2 \cdot S^2 \cdot f^2 = 0$ or $f^2 = \frac{r \cdot g^2}{2L^2} = \frac{r \cdot g^2}{2B^2 \omega^2} = \frac{r \cdot g^2}{2B^2 (2\pi f)^2} = \frac{r \cdot g^2}{8B^2 \pi^2 f^2}$, since $2L = B \omega$, then the **Cave-Resonance-frequency** of Nucleus-Planet is $\rightarrow f_c^4 = \frac{r_c \cdot g^2}{8\pi^2 S_c^2} \dots f(c)$ where $r_c = \text{Nucleus -Planet-Segment}$, and $S_c = \text{the Spin of cave}$, consisting the **Cave-System** . Communication between the two Systems happens with their **Resonance-frequency** , and when $f_n^4 = \left| \frac{\sigma \cdot \Phi}{2\pi \cdot r_n} \right|^4 = \frac{r_c \cdot g^2}{8\pi^2 S_c^2}$ or as $\sigma^4 \cdot \Phi^4 \cdot [8\pi^2 \cdot S_c^2] = r_c \cdot g^2 \cdot [16 \cdot \pi^4 \cdot r_n^4]$. Rearranging , $\sigma^4 \cdot \Phi^4 \cdot S_c^2 = r_c \cdot g^2 \cdot 2 \cdot \pi^2 \cdot r_n^4$, or $\left| \frac{\sigma}{r_n} \right|^4 = \frac{2 \cdot \pi^2 \cdot r_c \cdot g^2}{\Phi^4 \cdot S_c^2} = \frac{2 \cdot \pi^2 g^2}{\Phi^4} \left[\frac{r_c}{B^2} \right] = \frac{16 \cdot \pi^4 \cdot f_n^4}{\Phi^4}$, and Resonance

frequency $f^6_{\text{Resonance}} = \frac{g^2}{8\pi^2 r_c^2 B^2}$, and $f^3_{\text{Res}} = \frac{g}{2\sqrt{2}\pi r|B|}$, or $f^2_{\text{Resonance}} = \frac{g}{\sqrt{2}\sigma\Phi|B|} \dots (f.r)$

This **Frequency-Path-way** through the line-Series of the infinite Spins \bar{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 $\rightarrow E = \frac{1}{2}m_1.v_1^2 + \frac{1}{2}m_2.v_2^2$, and because $v_1 = v_2 = v$, then

$E = \frac{v^2}{2}[m_1 + m_2]$, and since $m_1 = \frac{F}{g_1}$, $m_2 = \frac{F}{g_2}$, $\bar{v} = \bar{r}$, and for Unit Work $E = 1$,

becomes,

$$E = \frac{v^2}{2}[m_1 + m_2] = \frac{r^2}{2}[\frac{F}{g_1} + \frac{F}{g_2}] = \frac{F.r^2}{2}[\frac{1}{g_1} + \frac{1}{g_2}] = \frac{F.r^2}{2}[\frac{g_1+g_2}{g_1.g_2}] = \frac{F.r^2}{2}[\frac{2.g}{g^2}] = \frac{F.r.c^2}{g} = 1, \text{ i.e.}$$

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** $g \equiv 9, 8076925$, and is **inverse square to the distance as** $F = \frac{g}{r_c^2} \dots (r) \rightarrow$ is **Newton's and Coulomb Laws**

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 this Reaction and called the **mass**. The Surface-force, **g_G , becoming from the inner acceleration f_n of the Material-Points as Vector**, $\bar{r} = \pm \bar{B} \equiv \bar{S}_n$, is acting on Spins \bar{B} , and all the masses of the universe, or is Action of $G \rightarrow$ on $\bar{g} \rightarrow$ on $\bar{B} \equiv \bar{S} \rightarrow$ on g_G , through **$f_{\text{Resonance}}$**

Since **$f_{\text{Resonance}} = \sigma \Phi^3 = G$** , then $\sigma = \frac{G}{\Phi^3} = \frac{G.\sigma^3}{c^3}$, and $\sigma^2 G = c^3$, where σ , is Stress

σ_{Res} between all frequencies. **Stress $\sigma = \sqrt{\frac{c^3}{G}} = \frac{(2,9982.10^8)^3}{(6,673692.10^{-11})} = 6,3548867.10^{17} \text{ Kg/m}^2$**

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, $w^2 = [k/m]$ the equation, $m \ddot{x} + w^2 x = 0$,

with solution \rightarrow the Period $T = 2\pi\sqrt{\frac{m}{k}}$, frequency $f_H = \frac{1}{2\pi}\sqrt{\frac{k}{m}}$, and Energy = $h f_H \dots (1)$

From Orbit-equation $\bar{v} = \sqrt{\frac{2}{m}[E - \{\frac{k}{r} + \frac{S^2}{2m r^2}\}]}$ and for $v = c$ then, $E = \frac{mc^2}{2} + \frac{k}{a} + \frac{L^2}{2ma^2} = hf_R$

Hydrogen Diameter $a_H = \sqrt[3]{\frac{1}{g f^2}} = \sqrt[3]{\frac{h^2}{g E^2}} = \sqrt[3]{\frac{[6,62606957..10^{-34}]^2}{9,808.(13,6.1,60218.10^{-19})^3 J}} = 2,1145016.10^{-11} \text{ m}$

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 LRC Circuit, with Impedance \equiv 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 $Z_T = \sqrt{R_T^2 + [L_T - C_T]^2}$, where $(w_0)^2 = LC$

2.. Total-Resistor $R_T = [\frac{1}{m_1} + \frac{1}{m_2} + \frac{1}{m_3} + \dots \frac{1}{m_n}]$, Total-Inductance $L_T = \{[\frac{1}{q_1} + \frac{1}{q_2} + \dots \frac{1}{q_n}]\} . w_0$

3.. Total-Capacitance $C_T = \frac{1}{C_T} = [\frac{1}{n_1} + \frac{1}{n_2} + \dots \frac{1}{n_n}] . w_0$, and supply the Current $I_s = \frac{V_s}{Z_T}$. and

4.. $f_{\text{Reson}} = \sqrt[4]{\frac{1}{4\pi^2 m . a^3}}$, with **Impedance \equiv Resistor** and $w_0=1$ **System-Resistor unaffected.**

F.. : THE NEW ATOMS -STRUCTURE .

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

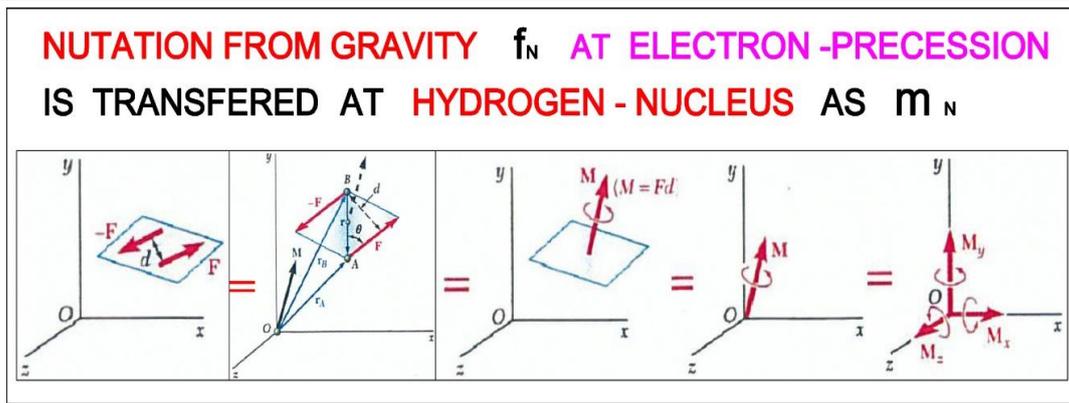


Figure - 11 - : The Orbit-Electron-Spin is applied on the Nucleus-Proton-Spin :

Spin is a Free-Vector of Electron and can be applied at **Any-Point** with the same effect.

Couple \equiv Moment $\mathbf{M} = \mathbf{F} \times \mathbf{d} \rightarrow$ Vector, and may be resolved into **Component-vectors**

Electron-Nutation-Vector \mathbf{M}_0 is the Resolved **Component-vector** $\mathbf{M}_N + \mathbf{M}_0$ at Nucleus.

Atom Structure is The Quantization - Process of frequency f_{ph} and Gravity g , 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 $a = \sqrt[3]{1/g f^2} = 2,1145016 \cdot 10^{-11}$ m, in the Planck cave $\mathbf{L}_p \equiv e^{-i \cdot (\frac{5\pi}{2}) \cdot 10} \equiv \sqrt{3} \cdot \pi \cdot \mathbf{1}, 616199 \cdot 10^{-35}$ m. The why such, was prior referred in 6d.

The Quantization of **Energy \equiv Angular-Momentum $\equiv r m v$** , which consists the three Elements \mathbf{r} = The Planet-Focus line, \mathbf{m} = The masses, \mathbf{v} = The velocity of mass which follow Kepler-second-law where for radius \mathbf{r} , sweeps out Equal-Areas in equal times and

consequently **Energy-Quantization** becomes from equation $a^3 \cdot f_n^2 \cdot k = 1$ where $k = [\frac{4\pi^2}{GM}]$.

The Unit-Work occurs in Hydrogen cave following Kepler-first law in Orbits, $4\pi^2 \cdot r^3 f_p^2 = k$,

which $k =$ The **Quantized Work** $W = v^2 [\frac{h}{2\pi}]$ or $Work = k = 4\pi^2 \cdot r^3 f_p^2$ and being equal to

the Unit-prior and so $k = 4\pi^2 \cdot r^3 f_p^2 = \frac{1}{f^2 r^3}$ which results to the Resonance frequency f_R

as $f_R = \sqrt[4]{\frac{1}{4\pi^2 m r^3}}$ of cave \mathbf{r} , and from f_R the **Resonance Step-cave** $\rightarrow a = \sqrt[3]{\frac{1}{g f_R^2}} \dots (1)$

Atom-Cave is a, **Heap of Masses** M_T , *Protons Electrons and Neutrons*, and Charges Q_T ,

Protons and Electrons, following the Lorentz force equation $\mathbf{F} = q \cdot [\mathbf{E} + \mathbf{v} \times \mathbf{B}]$ where $\mathbf{E} = 0$

and Force is $\bar{\mathbf{F}} = q \cdot \bar{\mathbf{v}} \times \bar{\mathbf{B}}$. The Created Magnetic-Field $\bar{\mathbf{B}}_F = |\frac{2\pi \cdot M_T}{Q_T}| f$, where in it **Energy**

\equiv **motion** is **Quantized**, i.e. Magnetic-Field $\bar{\mathbf{B}}_F$ is the Store of Energy in motion $\dot{\mathbf{x}} + \omega^2 \mathbf{x} = 0$

The Resonance Energy \mathbf{E}_R , becomes from **The Moving Electron in Orbit** of charge $\bar{q} \equiv \ominus$

with the **Orbit-Velocity-Vector** $\bar{\mathbf{v}} = \sqrt{\frac{2}{m} [E - \{ \frac{k}{r} + \frac{L^2}{2m r^2} \}]} = 0$, and this because charge \bar{q}

Creates IN Orbit, \mathbf{r} , the Varying and Perpendicular Magnetic-Field, $\bar{\mathbf{B}}$, which in time-turn **Creates** the Electric-field $\bar{\mathbf{E}} \perp \bar{\mathbf{B}}$, with resultant force \mathbf{F} acting on Electron. **For $\mathbf{c} = 0$ then**

In Orbit exists **Only-Potential-Energy** of Orbit , and $E = \frac{k}{a} + \frac{L^2}{2m a^2}$, and using Kepler`s law for equal-areas $k = \frac{L}{2m}$, and constant Planets relation $\frac{T^2}{a^3} = k = [\frac{4\pi^2}{G.m}] = 2,97.10^{-19}(s^2/m^3)$ in Planck`s length $a = \sqrt[3]{\frac{1}{k.f^2}}$ then $k = 1/a^3 . f^2$, and **Energy** $E = \frac{1}{a^3.f^2} [\frac{1}{a}] + \frac{L^2}{2m a^2} = \frac{1}{a^4.f^2} + \frac{L^2}{2m a^2} = \frac{1}{a^2} [\frac{4\pi^2}{c^2} + \frac{L^2}{2m}]$, or $E = \frac{1}{a^2} [\frac{4\pi^2}{c^2} + \frac{L^2}{2m}]$, $a^2 = [\frac{1}{E}].[\frac{4\pi^2}{c^2} + \frac{L^2}{2m}]$, and **Stored in the Magnetic field** i.e. Exists only **Potential-energy L** and the **Orbit is that of Circle** .

and the Resonance-Energy $E_R = \frac{1}{a^2} [\frac{4\pi^2}{c^2} + \frac{L^2}{2m}]$ (2) and it is a **Signal** .

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

a-**Proton** ⊕ → mass $m_p = 1,672.10^{-27}$ Kg → Charge $C_p = 1,602.10^{-19}$ C → $d = 8,4.10^{-16}$ m

b-**Electron** ⊖ → mass $m_e = 9,11.10^{-31}$ Kg → Charge $C_e = 1,602.10^{-19}$ C → $d = 5,0.10^{-17}$ m

c-**Neutron** [⊕ ↔ ⊖] → mass $m_n = 1,672.10^{-27}$ Kg → Charge $C_n = 0,0$ C → $d = 1,7.10^{-15}$ m

d... **Newton`s law** for masses is → Force → $F_N = G \frac{m_1.m_2}{r^2}$,

e... **Coulomb law** for Charges is → Force → $F_c = C \frac{q_1.q_2}{r^2}$,

f – **Kepler laws** for **Planets** and **Constant-Areas** is , $4\pi^2.m.f^2_n = k$, $k.f^2_n . a^3 = 1$

g – **Magnetic-fields laws** for **Charges** and **Periods** is , $T = \frac{2\pi.m.T}{q.B_F}$, $\bar{B}_F = \frac{2\pi.m.T}{q.T} = \frac{|2\pi.m.T|}{Q_T} f$

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 $f_R = \sqrt[4]{\frac{1}{4\pi^2 m . a^3}}$ between Charges and masses .

The Total-energy for Unit-mass $E_T = K_E + P_E$, is from equation $\dot{x} \equiv \sqrt{\frac{2}{m} [E - \{\frac{k}{a} + \frac{L^2}{2m a^2}\}]} = c$

where for → $K_E = 0$, $c = 0$, $E = \frac{m.c^2}{2} + \{\frac{k}{a} + \frac{L^2}{2m a^2}\} \leftarrow$ Energy becomes $E = \frac{k}{a} + \frac{L^2}{2m a^2}$

or , Above configuration of , masses m_L , Charges q_L in a Hydrogen cave a , **Forms** an 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-Mechanic-equation → $q . \bar{B}_L = [2\pi.m_L] . f_R \leftarrow$ 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. \bar{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- → **1-Proton** [⊕] , **1-Electron** [⊖] , **1-Newtron** [⊕ ⊃ ⊖ ⊕] – [⊕ ↔ ⊖] :

The Nucleus Total-Harmonic mass ≡ M_T is → $\frac{1}{M_T} = \frac{1}{m_p} + \frac{1}{m_n} + \frac{1}{m_e} = \frac{10^{27}}{1,672} + \frac{10^{27}}{1,672} + \frac{10^{31}}{9,11}$
 $= \frac{10^{31}}{8360} + \frac{10^{31}}{9,11} = \frac{10^{31}}{9,100084}$, and **The-One -Total-mass** $M_T = 9,100084.10^{-31}$ Kg ... (a)

The Nucleus - Orbit Total-Charge ≡ Q_T is → $\frac{1}{Q_T} = \frac{1}{q_p} + \frac{1}{q_e} = \frac{10^{19}}{1,6022} + \frac{10^{19}}{1,6022} = \frac{10^{19}}{0,8011}$
 and Total-Charge $Q_T = 8,011. 10^{-20}$ C(b)

The frequency of the Closed-Nucleus-Orbit-System becomes from Kepler second Planetary law equation , $4 \pi^2 m f_o^2 = k$, and constant law of Areas $l = k . f_o^2 . a^3$. Their common k ,

is Constant-Energy → $k = 4 \pi^2 m f_o^2 = \frac{1}{f_o^2 a^3}$ or , $f^4 = \frac{1}{4\pi^2 m a^3}$ and $f = f_R = \sqrt[4]{\frac{1}{4\pi^2 m a^3}}$

With this way , **Impedance** ≡ **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 $m = M_T = 9, 100084.10^{-31}$ Kg . The Resonance-Cave-frequency is as (c) ,

$$f = \sqrt[4]{\frac{1}{4\pi^2 m a_H^3}} = \sqrt[4]{\frac{1}{4\pi^2 9,100084.10^{-31} (2,1145016.10^{-11})^3}} = \sqrt[4]{2,94439610^{60}} = 1,3099329.10^{15} \text{H..(c)}$$

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 . and is Universal law such in microcosm or as in all macrocosm , and this because of G .

The System $M_T = \text{masses}$, $Q_T = \text{Charges}$ creates a constant **Magnetic-field** $\bar{B}_F = \left| \frac{2\pi.M_T}{Q_T} \right| f$

The Magnetic-field-Strength $\bar{B}_F = \left| \frac{2\pi.M_T}{Q_T} \right| f = \frac{2\pi.9,100084.10^{-31} [1,3099329.10^{15}]}{8,011.10^{-20}}$ (Kg/Cs) =

$9,3492068.10^4$ Tesla(d) i.e. $\bar{B}_F = 93,492068$ 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 $a = \sqrt[3]{T^2/g} = \sqrt[3]{1/g f^2} = \sqrt[3]{1/g [1,3099329.10^{15}]^2} = \sqrt[3]{7,78342. 10^{-33}}$

= $1,9817863.10^{-11}$ 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} , mass $M_T = 9,100084.10^{-31}$ Kg of System ,

$c \equiv 2,998.10^8$ m/s . $E = [2,5461638.10^{22}] \times [4,392086.10^{-16} + 1,780111.10^{-37}] =$

$$= 1,118297.10^7 \text{ J} + 4,5324541.10^{-15} \text{ J} \quad \text{.....(e)}$$

i.e. **Energy in Electron-Orbit is 1,118297.10⁷ J , or 11,2 Million Joules** ,

2.... Case -B. → **1-Proton** [⊕] ≡ An **Ion-nucleus** :

The Nucleus Total-Harmonic mass ≡ M_T is → $\frac{1}{M_T} = \frac{1}{m_p} = \frac{10^{27}}{1,672}$ and $M_T = 1,67.10^{-27}$ Kg
 or $M_T = 1,67.10^{-27}$ Kg / **1,66053886.10⁻²⁷ amu = 1 amu**

The Nucleus-Orbit Total-Charge ≡ Q_T is → $\frac{1}{Q_T} = \frac{1}{q_p} = \frac{10^{19}}{1,6022}$ and $Q_T = 1,6022. 10^{-19}$ C.

The Resonance-Cave-frequency is $f = \sqrt[4]{\frac{1}{4\pi^2 m a_H^3}} = \sqrt[4]{\frac{1}{4\pi^2 1,672.10^{-27} 8.(2,1145016.10^{-11})^3}} = \sqrt[4]{2,0031592. 10^{60}} = 1,189676.10^{15}$ H(1). **The System** $M_T = \text{masses}$, $Q_T = \text{Charges}$

creates a constant Magnetic-field $\bar{B}_F = \left| \frac{2\pi.M_T}{Q_T} \right| f$, of **Strength** $\bar{B}_F = \left| \frac{2\pi.M_T}{Q_T} \right| f$ as ,
 $\bar{B}_F = \frac{2\pi.1,672.10^{-27}.[6,32705.10^{14}]}{1,6022.10^{-19}}$ (Kg/Cs) = 4,1464883.10⁷ Tesla(2) i.e.

$\bar{B}_F = 4,1464883.10^7$ Tesla \rightarrow *the Strength of a Non-magneton neutron-Star,*

Energy in an Proton-cave of Proton radius $r_p = 8,42.10^{-16}$ m , follows Energy-equation

$$E = \frac{1}{a^3} \left[\frac{4\pi^2}{c^2} + \frac{L^2}{2m} \right] , \text{ where } L = \text{the Spin } S = 5,691952. 10^{-34} \{ \text{Kg/m/s} \} , c \equiv 2,998.10^8 \text{m/s} .$$

mass $M_T = 1,67.10^{-27}$ Kg of System , and 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** $E = \frac{k}{a} + \frac{L^2}{2m a^2} = \left[\frac{L}{2m} \right] \cdot \frac{1}{a} + \frac{L^2}{2m a^2} = \frac{L}{2a.m} \left[1 + \frac{L}{a} \right]$ where a_p is Proton-cave

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

$$E = \frac{5,691952.10^{-34}}{2.1,67.10^{-27}.8,4.10^{-16}} \left[1 + \frac{5,691952.10^{-34}}{8,4.10^{-16}} \right] = 2,028782.10^8 + 1,3747296. 10^{-10} \text{ Joule} .$$

i.e. Energy of **Charge-Proton** is 0, 203.10⁹ J , or 0,203 Giga-Joules
 and , it is about equal to the **Reduced Planck energy** .

Remark : Cave is composed of One mass in its Proton-cave with an **Magnetic-field Strength**

$\bar{B}_F = 4,1464883.10^7$ Tesla = **41,464883Mega-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 happening because of the Two-Magnetic-fields in Atom . Birefringence also split X- ray Photons into two

3f.. The New Electromagnetic-Structure of Atom .

n... Case -N. \rightarrow **n-Proton** $[\oplus]$, **n-Electron** $[\ominus]$,**n-Neutron** $[\oplus \cup \cup \ominus]$ - $[\oplus \leftrightarrow \ominus]$:

From a **Set of infinite rest , or , moving Units** choosing **Two of them** , is consisted , and *is found* , the Mendelejev Periodic table in Planck`s level 10^{-35} m (*this Property issues in all Geometrical caves and in a cave of, 10^{-62} m, which is the Gravity level in which Gravity - Field exists*) , and also all models of the atom as follows ,

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

1	for Material-Point ,	\rightarrow	1	Point.	$x 2 =$	2	Elements ,
2	for Line-sector ,	\rightarrow	2	Points	$x 2 =$	4	
3	for Plane ,	\rightarrow	3	Points	$x 2 =$	6	
4	for Volume ,	\rightarrow	4	Points	$x 2 =$	8	
m	for m , Spaces.	\rightarrow	m	Points	$x 2 =$	2m	

b... Elements \rightarrow The maximum number of **Elements** \equiv **Digits** in Material - Point is **2** ,

[1 Positive \oplus and 1 Negative \ominus] consisting the \rightarrow Unit-M-P $\equiv \{ [\oplus \leftrightarrow \ominus] , \oplus , \ominus \}$

The possible Repetitive-Permutations for moulds and Elements are **Mould**^{Elements} = **m²**,
 for every mould , so the **Available -Extrema-Positions for each mould is $2m^2$ and for ,**

Point E-Elements , Material-Point , Permutations , m-Cave Shapes, **are for ,**

Point	→ m=1	2	2	→ 2	Sphere ≡ S
Line-sector	→ m=2	4	8	→ 2+8	S +Lissajous Figures
Plane	→ m=3.	6	18	→ 10+18.	Two-Spheres
Volume	→ m=4.	8	32	→ 28+32.	Three - Spheres
m-Space	→ m = m	2xm	2xm ²	→ 2m ² +2(m-1) ²	m-Spaces-Volume

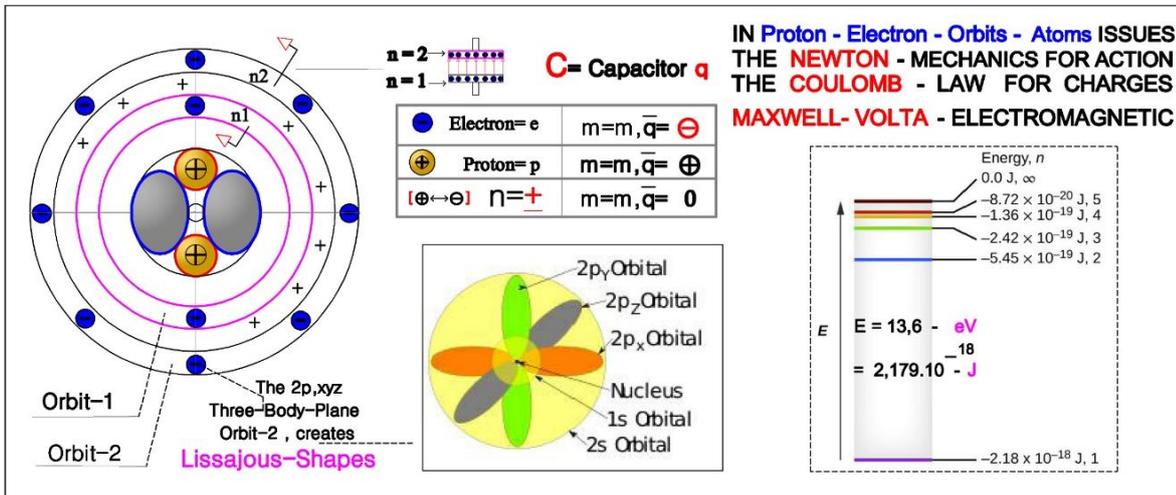


Figure-12- :The Analogous RLC-Electric-Circuit of Atom's Structure and Mechanics :

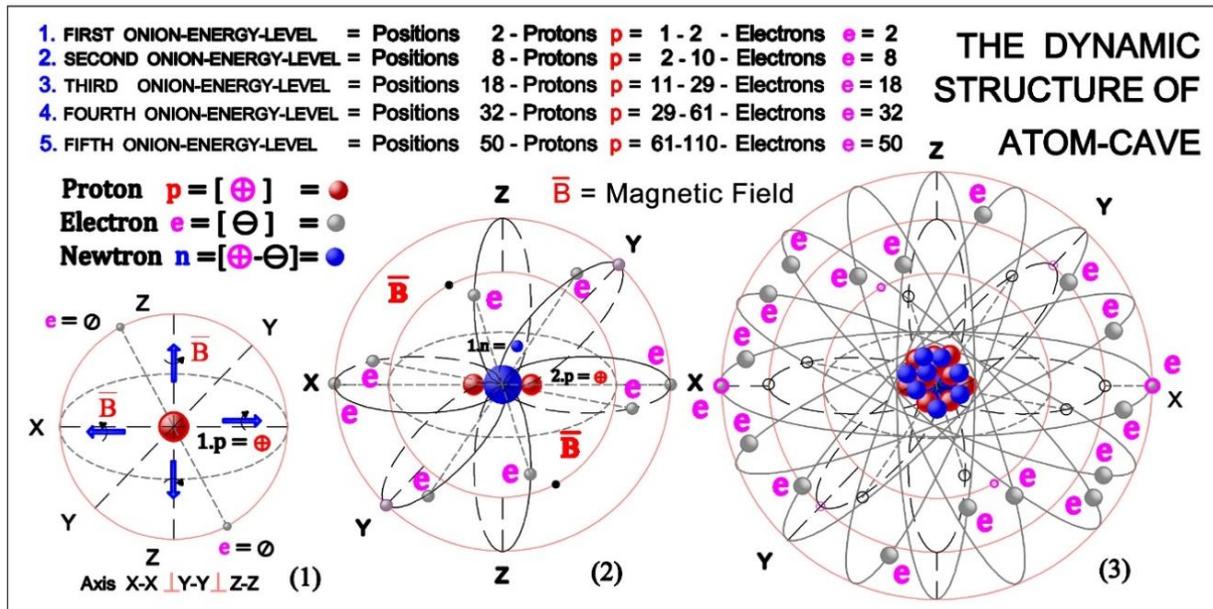


Figure-13- : The New Energy-Atom-Cave Pattern , In minimum Energy-Space , $p \leftrightarrow e$:
 1..Hydrogen-Cave becomes from Gravity , g , entering the minimum cave a of $g \cdot a^3 \cdot f_p^2 = 1$ relation ,with the minimum Energy -13,6 eV .The Presence of a **Proton-Positive-Charge** $\bar{q}_p \equiv \oplus$, creates in cave a the **Uniform-Magnetic-Field** \vec{B}_p , [The-Material-Space] as equation $\bar{q}_p \cdot \vec{B}_p = 2\pi \cdot m_p \cdot f_p$ which is the **Storage of Energy** in Hydrogen-Cave . In this UMF , Charges \bar{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 the , Electrons $\rightarrow \bar{v}_e = 2\pi r \cdot f_e$ and , Photons $\rightarrow \{ \bar{c} \cdot \bar{f}_n \} + \bar{c} \cdot f_n \} \leftarrow$

2.. The Presence of a **Negative-Electron-Charge** $\bar{q}_e \equiv \ominus$ in the Uniform-Magnetic-field $-\bar{B}_p$ experiences a Force , *The-Lorentz-Force* , when entering the Magnetic-field and since it occupies the constant-energy , $\bar{q}_e \equiv \frac{G}{c\sqrt{2}} = 1,59.10^{-19}$ C , then follows a **Complete-circle** *The-Material-Space* is \bar{B}_p , and 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 $\{ \bar{c} \cdot \boxed{f_n} + \bar{c} \cdot f_n \}$,Storage + Energy allows The **Work** \equiv Energy produced by **Electrons** , be Stored in **Photons - Storages** .

3.. The Heap of Masses $m = M_T$ follow Newton laws , Charges $[\oplus, \pm \bar{q}_p, \ominus]$ the Coulomb law , Zero-Electron Charge $[\oplus \leftrightarrow \ominus] \equiv \pm \mathbf{0}$ the Material-Geometry-Rules , Arrangements *Positions* , n , the Material-Geometry Rules of Permutations as follows ,

a.. The **Three Elements** \equiv Digits of Material-Geometry are $\{ \oplus, [\oplus \leftrightarrow \ominus], \ominus \} \equiv \{ +, 0, - \}$

b.. The **Permutation** , *arrangement* , of the Two-Elements is $P_1^2 = 2$, and these are two as $\rightarrow [\oplus, \ominus]$ and $[\ominus, \oplus]$. The number of **Permutation** with **Repetition** of the **Two-Elements** in $n = 2$ in the Sub-Spaces is $P_{Elements}^{Moulds} \equiv RP_1^2 \equiv 2$, because the numbers in Material Geometry do Not begin with zero $[\oplus \leftrightarrow \ominus]$, as this happens in Euclidean-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** $\equiv 2n$ Elements in Regular Solids , [63]

d.. The number of **Permutation** with Repetition of the **Two-Elements** in the **n-Spaces** and in the Two **Sub-Spaces** is $P_1^2 \cdot RP_2^n \equiv 2n^2 \equiv$ **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.

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 $P_1^2 \cdot RP_2^n + P_1^2 \cdot RP_2^{n-1} + \dots \equiv 2[n^2 + (n-1)^2 + (n-2)^2 + \dots]$ denoting the Total-number of Positions in Hydrogen-Caves .

f.. In Fig-13, *The Elements* \rightarrow **Proton** $\equiv \oplus$, **Electron** $\equiv \ominus$, is **The-Energy-Part of Atom**, while Neutron $\equiv [\oplus \leftrightarrow \ominus]$, **The-Space-Part of Atoms** as $0 \equiv [\oplus \leftarrow r \rightarrow \ominus]$, 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 Mega -Tesla and 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 **Lissajous – Eight - Shapes** . Because of the Linear-Vibrations $[\ddot{x} + w^2 x = 0]$ of the three-masses , Occur on the Two **Perpendicular each other** , Line-Vectors of $x \perp y$, Plane above Shapes which for ,

a.. Difference of Phase $d_\phi = 90^\circ$ emission is \rightarrow The Eight-Shapes ∞ .

b.. Difference of Phase $d_\phi = 0^\circ$ emission is \rightarrow The Ellipse-Shapes \propto .

c.. Difference of Phase $d_\phi = 45^\circ$ emission is \rightarrow The Double-Saddle-Shapes . \mathfrak{S} , \mathfrak{G} .

For **One-Nucleus-mass** and **One-Orbit-mass** is produced the **Atom-Nucleus-Orbit-Hook** + Plane + [ANO] , which accumulates the Nutation-frequency used for Atoms-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 **Orion Plane-Energy-Volume** ,enveloping the Priors ,**Vector-Space-Cave** - m + Plane + Vector + Point + [ANO] , and For the **n-Proton** $[\oplus]$, **n-Electron** $[\ominus]$, **n-Neutron** $[\oplus \cup \ominus]$, issues the logic for Total number of Positions in the Hydrogen-Caves .

In (3) is ,The **Volume-Space-Cave** $m = 3$, with $[11 \times 2] = 22$ -Nucleus-masses of **11-Charges** and $2m^2 = 18$ Permitted-Orbit-Positions , per 2 Electrons for Stability → consists the Third **Orion Space-Energy-Volume** ,enveloping the Priors ,**Vector-Space-Cave**- m + Volume + Plane + Vector + Point + [ANO] , and for The Total Positions cave-number is filled with The **Permutation** number with Repetition of the **Two** - Elements in the **n-Spaces** and the Two **Sub-Spaces** which is $P_1^2 \cdot RP_2^n \equiv 2 n^2$.

In (3) is , The **mth-Volume-Space-Cave** with , $m = m$, with $\sum_1^n [m_n - 1]^2 = M$ -Nucleus-masses of $\{M/2\}$ **Charges** and with $2m^2$ Permitted-Orbit-Positions , per 2 Electrons for Stability, and consists the **mth - Orion -Space -Energy-Volume -Cave** , enveloping the Priors → Volume + Plane + Vector + Point + [ANO] ← with the **Three-Elements Space** \oplus , **Anti-Space** \ominus , **Material-Point** $[\oplus \leftarrow r \rightarrow \ominus]$, of **Material-Geometry**.

Because \bar{B}_F is **Independent** of the **Electron-velocity** v_e and of the **Cave-radius** r ,therefore electron is not accelerated in Magnetic-Field , but its Strength is **Dependent on f** , and **q** only. Because of this Velocity-lag allows the in Hydrogen-Storage without Inverse Impedance which exists in M-Point . Above Property makes Hydrogen-Cave a **Uniform-Magnetic-field** , \bar{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 $[E^2+H^2] = 2(2r).c.\sin 2\phi$ with **n-Lobes** representing the **Normal mode vibration** with frequencies $f_n = n.f_1 = \frac{E}{h} = \frac{n.v}{4r} = \frac{n\sigma}{8r} [1+\sqrt{5}]$ and **Outward the Storage** is *the Electromagnetic-Wave* → $\{[\epsilon E^2 + \mu B^2] = 2.\lambda c.\sin.2\phi\}$ ← 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 $f = \text{Energy } E / \text{Planck-constant } h$, or $f = E / h$ which Photon-velocity $\bar{v} \equiv \bar{c} . [\frac{\sigma}{2\pi r} + \frac{\sigma\Phi}{2\pi r}] \equiv \bar{c} . [\boxed{f_n} + f_n] \dots (f.v)$

From relation Force $G = \sigma A = (2\pi f r) \frac{A}{\Phi} = w r = \bar{c} . \frac{A}{\Phi}$, i.e. Action of $G \rightarrow$ on \bar{c} and , Following relation $\sigma \times \Phi^3 \equiv G$, from Energy-force F_g in $r = L_p$ Planck`s scale of mass $m_g = J.w^2$, where angular-velocity $w = \frac{c}{r}$ and , The 3-Dimensional $[2^3 = (\oplus \leftrightarrow \ominus)^3]$

Impedance g_z , of Space $\ln(3)$ and Anti-Space $\pi\sqrt{3}$,Centrifugal-Force $F_g = \bar{g} = m_g [\frac{c^2}{r}] = m_g [\frac{c^2}{r}] = J w^2 . \frac{c^2}{r} . g_z = [\frac{\pi r^4}{2}] . [\frac{c}{r}]^2 . [\frac{c^2}{r}] . 2^3 . \ln(3) . \pi\sqrt{3} \} = 4\sqrt{3} . \ln 3 . \pi^2 r c^4 = 9,8076754 \text{ m/s}$

i.e. Gravity \bar{g} , Is The effect of **G Force** , on \bar{c} light-velocity , 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 $\{ \bar{c} . \boxed{f_n} + \bar{c} . f_n \}$ Material-Geometry in [57-58]

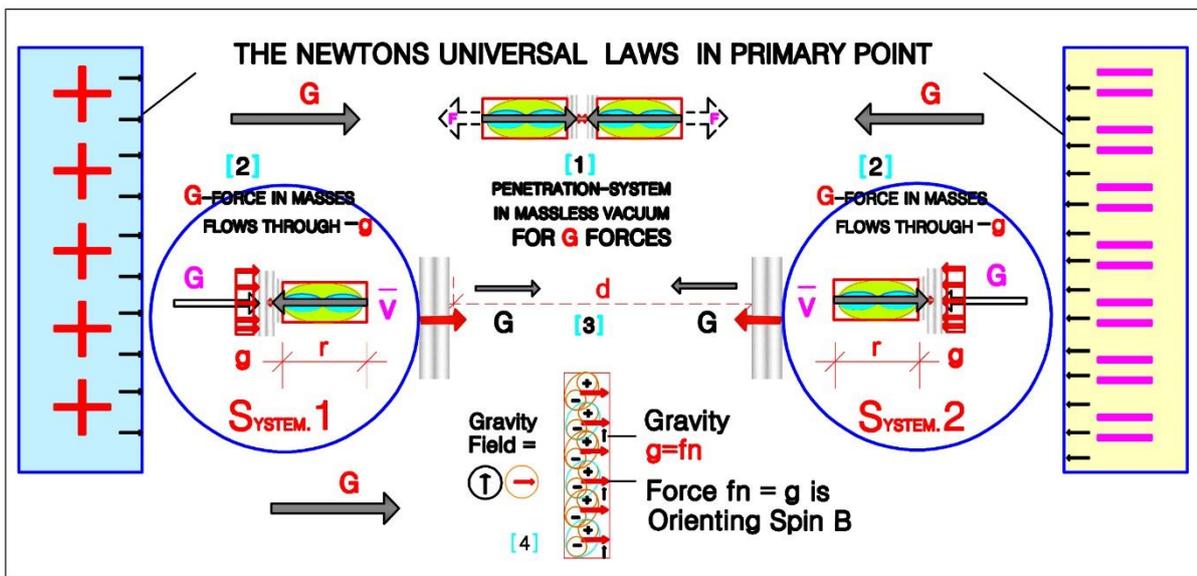


Figure – 14. The Newton`s Universal Laws in **Primary-Material-Points** :

Above , is consisted of Two-Primary-Opposite-Spaces ,{+}→←{-},The Poles with Infinite points for Parallel-lines such that **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* .

G ... THE GRAVITATION CONSTANT G .

1g.. The Gravitation Constant G and Photon :

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 **F** produces the Work **W** ,when it removes the point of action from a Position , *A* , to another Position , *B* , as the equation , **W = F.ds** , where *ds* = the displacement $|AB|$. This right definition automatically defines that all this work in universe , **which is Space and Energy** , has been produced by this Unique force **G** . 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 is motion is kept in Massive-Box-*B_p* called **Photon** or **Energy-Storage** .

The velocity of Photon is $\bar{v} \cdot [\frac{\sigma}{2\pi r} + \frac{\sigma\Phi}{2\pi r}] \equiv \bar{v} \cdot [\bar{f}_n + f_n]$, a Dual motion as ,

- 1.. **Energy-Storage S** $\equiv [[\oplus \leftarrow r \rightarrow \ominus]] \equiv \text{Particle } [\bar{v} \cdot \bar{f}_n] \rightarrow [\bar{v} = \bar{c} = \lambda \frac{f}{\Phi}] \rightarrow$ 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** $\equiv [\bar{v} - \text{Vector}] \equiv \text{Wave } [\bar{v} \cdot f_n] \equiv [f_1 = (E^2+H^2) = n \frac{\Phi \cdot \sigma}{2\pi r} = \frac{\bar{B}}{\pi^2 r^4}] \rightarrow$ i.e. a **Propagating Wave** $\{ W \equiv EM-R \equiv [\epsilon E^2 + \mu B^2] = 2 \cdot \lambda c \cdot \sin.2\phi \} .$

**In both cases carry the in box Golden-ratio-frequency Φ ,
Everywhere and Anywhere such in microcosm and as in macrocosm.**

Gravitational force **G** , in order to communicate with another velocity-vector \bar{v} which is axial also , **is needed to Have a Reaction to this motion** , i.e. Gravitational-Energy **G** through Waves $f_n \rightarrow [\text{on Material-Point Unit Spin } S \approx g]$ is acting on Stress $g \rightarrow \bar{g}$. 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 **g** on \bar{S} as Stress *g* , It was proved that the **Electron-Spin** is $\rightarrow S / 2 = 1,4603748 \cdot 10^{-34}$ Joules , which is

the same to the Material-point-Periodic-motion-Spin so ,from **Bonded Tack-Geometry** as .

- 1.. **A Charged-Particle** , is a Particle with an electric charge , \oplus or \ominus , 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 Direction \leftarrow of the Field $\vec{E} \leftarrow$ and Negative charges $-\vec{e}$ accelerate in a Direction Opposite \rightarrow to that of the field \vec{E} .
- 2.. **A moving Charged-Particle** , \oplus 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 perpendicular to the Direction of their Velocity-vector , therefore *Velocity* does not change and only the *Direction* of the Velocity-vector changes .
- 3.. **An accelerated-Charged-Particle** , $\vec{\oplus}$ or $\vec{\ominus}$, 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 . The oscillation frequency , f , is the same to the E-M-Wave and which wavelength $\lambda = c / f$. E-M-Waves transport Energy through Space and may be delivered any distance away from the Source .
- 4.. **Accelerated-Charges** produce , Changing Electric and Magnetic-fields alternately , which leads to the Propagating-Electromagnetic-Waves . The Un-bonded-Force \vec{G} , or **Gravitational-constant G** , was shown to be the **Electric-Field-lines** , i.e. the **SPACE** of a **Huge-Electrostatic-Magnet** from the **Infinite-Dipole-Opposite-Primary-Charges** which is **The-ENERGY - PART** , of the Two-Primary-Points $\vec{\oplus}$ to $\vec{\ominus}$.[84-86]

2g.. The Electron and Photon charges :

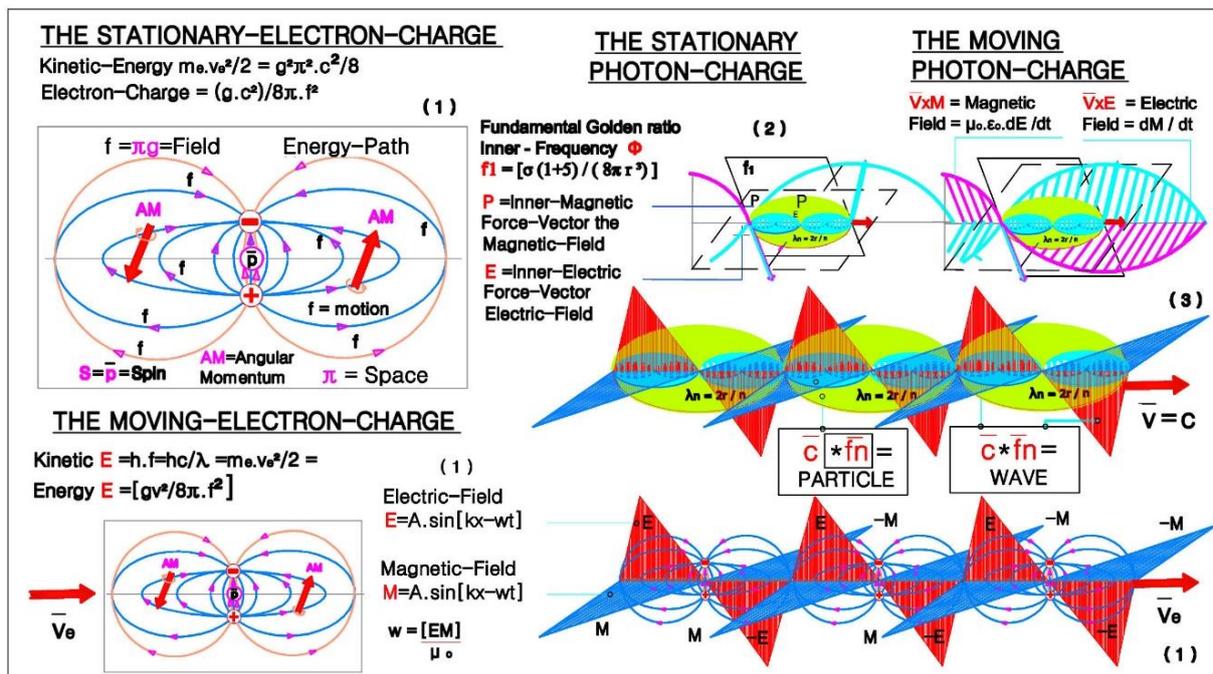


Figure 15. Conservation of **motion ≡ Energy** in the **Primary-Material-Point-Field-lines** :
Photon ≡ Energy ≡ motion / T ≡ $(\frac{v}{2\pi r}) . [\sigma + \sigma \Phi] = \vec{v} . [\frac{\sigma}{2\pi r} + \frac{\sigma \Phi}{2\pi r}] \equiv \vec{v} . [\vec{f}_n] + f_n] \equiv$
Moving - Storage $\rightarrow [\vec{v} . \vec{f}_n] \leftarrow +$ Moving-Frequency $\rightarrow [\vec{v} . f_n] \leftarrow \equiv$ 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 , $\mathbf{g} \cdot \mathbf{f}^2 \cdot \pi^3 = \mathbf{1}$, where π is the Closed Space , $\pi\mathbf{g}$ is the Stationary-Electric-Lines , and $\mathbf{f}^1 = \sqrt[2]{\mathbf{g}^{-1}\pi^{-3}}$, the motion = Energy = **the Stress** in the Two and Opposite-Spaces , [{+} → {-}] , or in the consisted Poles , with Infinite Points and Parallel-lines such as \mathbf{G} which is as An-Uniform-Pointy-Force . Electrons can be spinning clockwise or anti-clockwise and propagate on a Spiral trajectory.

The Electron-velocity is → $\bar{v}_e = 2\pi r \cdot [f_e = \sqrt[2]{\frac{\mathbf{g}}{4\pi^2 \mathbf{m}}} = \frac{1}{2\pi} \sqrt[2]{\frac{\mathbf{g}}{\mathbf{m}_e}}] \equiv r \cdot \sqrt[2]{\frac{\mathbf{g}}{\mathbf{m}_e}}$, while the , Photon velocity is $\bar{v} [\frac{\sigma}{2\pi r} + \frac{\sigma\Phi}{2\pi r}] \equiv \bar{v} \cdot [\boxed{f_n} + f_n]$, where $\bar{v} \cdot [\boxed{f_n}] \equiv$ The Particle-Photon and $\bar{v} \cdot f_n \equiv$ The Wave-Photon .

A true definition of what is Electric-Charge and Electricity based on above follows .

In [1] **The-Stationary-Electron-Charge** Becomes from E-equation $\bar{q} \equiv \frac{m_e c^2}{2} = \frac{g c^2}{8\pi f^2}$

while for Photon is directly from $G = F = \sigma A = (2\pi f r) \frac{A}{\Phi} = w r \frac{A}{\Phi} = \bar{v} \frac{A}{\Phi} = \sigma \Phi^3$, 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 Φ and Energy-Field σ* and when these Pass from \mathbf{g} ocean then continue to be *Straight-lines* , and this because Total-work $W = F \cdot s = F \cdot 0 = h f = 0$.

The Geometry of cave (Tack-Geometry) **controls the Electric-field** and the Stability from \mathbf{g} while equilibrium from $\mathbf{g} f^2 \pi^3 = \mathbf{1}$, and created from the two opposite Angular Momentum vectors , M_u , M_d , at distance , r , and thus is created the **E - Spin** as $2S = M_u \times [\{+ \} \rightarrow \{- \}]$, and is acting on [{+} → {-}] axis . **i.e. The Stationary- Electron - Charge is the Storage of $\mathbf{r} \equiv L_p$** , cave in-where the **Space** and **Anti-space** , as $\pi \mathbf{g}$, and as Stationary-Electric-Lines are creating Potential-Energy P_E , with such Geometry that , **to exist from the linear-motion 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 $f_e = B/(\pi^2 r^4)$ of Electron is Energy as angular velocity vector motion in \mathbf{r} cave , and this is because in cave exists **the Natural-Frequency $f_n = \sqrt[2]{\mathbf{g}^{-1}\pi^{-3}}$** of cave in Electric-Field-lines $\mathbf{E} = \mathbf{g} \pi$. Photon Frequency becomes from the Isochronous motion $w = \frac{2\pi}{T} = \frac{g}{4r} = 2\pi f$ which **Amplitude is Independent of motion** , and its velocity $\bar{v} = [\frac{G\Phi}{A}]$, is **Dependent on Impedance Z_p** of Space A .

In [2] the **Electrostatic Unit of Charge \bar{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 [{+} → {-}] 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 \mathbf{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 $f_e = \frac{(1+\sqrt{5})\sigma}{4\pi r} = \frac{\sigma\Phi}{2\pi r} = \frac{\bar{B}}{\pi^2 \cdot r^4}$ 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 , $\mathbf{g} \pi$ **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 [\oplus] constituent towards [\ominus] constituent , [The opposite issues for Rotational motion where in the **Moving-Photon-Tank** and because

of Stress , σ , is created the Centrifugal-Force F_f]. and $\bar{v} = [\frac{G\Phi}{A}]$. Because $f_n = \frac{\bar{B}}{\pi^2 \cdot r^4} = \frac{\sigma^2 \cdot \Phi^2}{4 \cdot \bar{B}}$ so , Stress $\sigma = 0 \rightarrow \sigma$, and $\bar{B} = \text{Angular-Momentum} = \text{AM}$ independent of σ .
 $\rightarrow \text{AM}$, and Spin is equal to $\text{AM} / \text{Unit-Area} = \text{AM} / \pi$, and because of the Closed **One-way-loops** , **Spin is either Positive or Negative** and is $\rightarrow \text{Electric-Charge } E$
 $\bar{E} = \pm \text{AM} / \pi = \text{Electron-Spin} = \text{The } \pm \text{ Electron}$.

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-Electron-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 $E = \frac{m_e v^2}{2} = g \cdot v_e^2 / 8\pi f_e^2 = \bar{q}_e V = h \cdot f_e$, and $g \cdot v_e^2 = 8\pi h \cdot f_e^3$ or $[v_e^2/f_e^3] = 8\pi h / g = \text{constant}$, or $v_e^2 / f_e^3 = k$, and $v_e^2 \cdot T_e^3 = k = \frac{f^3}{f^3} = f^3 (\frac{T}{\lambda})^2 = f^3 \cdot [\frac{1}{\lambda f}]^2 = k$

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 λ interchanged and keeping light-velocity \bar{c} without any other Force acting on them .

This Kinetic-Energy creates angular velocity $\omega = 2E/B = \frac{m_e v^2}{B}$ and the Inwards transverse Electromagnetic-Waves , $\mathbf{E} \perp \mathbf{M}$, travelling with v_e , inner velocity as $E = A \cdot \sin[kx-wt]$ and as $M = A \cdot \sin[kx-wt]$, and $E = M = A \cdot [1 - \sin wt]$, since $\sin kx = 0$.

i.e. **The Moving-Electron-Charge is The Electromagnetic-Wave** , $\mathbf{E} \perp \mathbf{M}$, 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 $\mathbf{g} \equiv \mathbf{r}$ 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 $\mathbf{f} = \mathbf{1/T}$, and which is the Source in cave **r** .

3g.. 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 \equiv 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 $r_{\min} = 1,07 \cdot 10^{-7} \text{ m}$ and $f_p^2 = \frac{1}{r^3}$ then $f_{\min} = 2,839844 \cdot 10^{10} \text{ H}$, and Bonding Energy $L \equiv E = h \cdot f_N = 6.62607 \cdot 10^{-34} \cdot 2,8398447 \cdot 10^{10} \text{ J} / 1,6 \cdot 10^{-19} = 1,176063 \cdot 10^{-6} \text{ eV}$ or in Joule $= 1,8817009 \cdot 10^{-23} \text{ J} = (\text{Kg} \cdot \text{m}^2/\text{s}^2)$. Hydrogen cave was found $a_H = 2,11450164 \cdot 10^{-11} \text{ m}$

and from Orbit-Quantum-Energy $f_H^2 = \frac{1}{g \cdot r^3} = \frac{1}{9,8076754 \cdot (2,1145 \cdot 10^{-11})^3} = 10,784767 \cdot 10^{30}$

or $f_H = 3,284017 \cdot 10^{15} \text{ H}$, while Nutation-Frequency $f_N = \frac{SQ}{2\pi \cdot J_3 \omega} = 2,8398447 \cdot 10^{10} \text{ s}^{-1}$

Energy in caves $E = \left\{ \frac{k}{r} + \frac{L^2}{2m r^2} \right\} = \left\{ \frac{\pi g}{r} + \frac{L^2}{2 \left(\frac{g}{4\pi f^2} \right) r^2} \right\} = \frac{2\pi}{g r^2} [g^2 r + L^2 f^2] \dots (1)$ It was proved also that

magnitude $\bar{L} = \bar{a} \times \bar{v} = \text{Constant}$ for all central motions . For circular orbits gravitational

force G_F equals the centripetal force C_F , so $C_F = G_F$ and $m_p v^2 / R = [G \cdot m_p m_s] / R^2$ and velocity $v^2 = GM/R$. Substituting the expression into the formula for Kinetic - Energy then , $K_E = \frac{mv^2}{2} = \frac{m \cdot GM}{2 \cdot R} = \frac{GMm}{2 \cdot R}$, or $K_E = (1/2) (-P_E) = -\frac{P_E}{2}$ and $\rightarrow -P_E = 2 \cdot K_E \leftarrow \dots(2)$

The Total-energy $E = K_E + P_E = K_E - 2 \cdot K_E = -K_E$, i.e. **The Potential - Energy P_E is Always - Negative and Twice the Kinetic-Energy While The Total - Energy E , of an Central-Orbiting-System is Negative** . The ratio $L / E \equiv (-P_E) / (-K_E) = (2 \cdot K_E) / (-K_E) \equiv -2$

Placing (2) in (1) then $E = \left\{ \frac{g \cdot \pi}{r} + \frac{L^2}{2m r^2} \right\}$ and , $E = \left\{ \frac{g \cdot \pi}{r} + \frac{E^2}{2m r^2} \right\}$ or $\rightarrow E^2 - 4mr \cdot E + g \cdot \pi = 0 \leftarrow$

An 2nd degree Equation with solution $E = \frac{4mr}{2} \pm \frac{1}{2} \left[\sqrt{16m^2 r^2 - 4\pi g} \right] \dots\dots(3)$

Since E must always be Negative then $16m^2 r^2 - 4\pi g < 0$ or $\rightarrow 32 m^2 r^2 \leq 4 \pi g$

and by placing electron mass $m_e = \frac{g}{4\pi f^2}$ then , $\frac{g}{4\pi f^2} \cdot 4r < \sqrt{2\pi g}$ or $f^4 > \frac{g \cdot r}{2\pi^3} = 0,1581563 \cdot r$

and for Hydrogen cave $r = 2,1145016 \cdot 10^{-11}$ m then $f > 2,8998506 \cdot 10^{-6}$ H i.e.

a frequency corresponding to an energy $E = 12 \cdot 10^{-6}$ eV in a cave $a = \sqrt[3]{\frac{1}{g \cdot f^2}} = 2297$ m .

The kicked-Energy is $\rightarrow \bar{B} \cdot f_n = E \equiv \left[\frac{\sigma \cdot \Phi \cdot \bar{B}}{4\pi r} \right] = 1,4603748 \cdot 10^{-34} \cdot 2,89985 \cdot 10^{-6} = 4,23487 \cdot 10^{-6}$

Equation (3) $0 \leq 4\pi g \leq 0 \equiv 4 \cdot \pi \cdot [4\sqrt{3} \ln(3) \cdot \pi^2 r c^4] \equiv 16\sqrt{3} \ln(3) \cdot \pi^2 L_p c^4 = 0 \dots(4)$

and from $c = \frac{G \Phi}{A} = \frac{G \Phi}{e^{-i \cdot (\frac{\pi}{4}) \cdot b}}$, where $A = \sqrt{-i} = e^{-i \cdot (\frac{\pi}{4}) \cdot b} \gg$ **Anti-Space + Space-Positions**

i.e. **as soon as $A = \{ \text{The Space + Anti-Space Positions in Universe} \}$, become Inadequate**

for **Energy-Storage $A = e^{-i \cdot (\frac{\pi}{2}) \cdot b} = 0,207879576 \cdot b = 3 \cdot 2^2 = 12$ -Times-Less The Necessary ,**

The \rightarrow Velocity-Vectors \equiv motion \leftarrow Burst Into another cave a of L_p , connected to

G , and which Is an Overflow of Energy in , Space + Anti-Space Positions . [58]

Black Holes Follow Kepler laws , where , *On any moving Particle when Tangentially colliding or under any angle ϕ , with a Material-Point executing Circular motion* , then the Total Energy is E , and the Particle follows constant Elliptical Energy - Orbits on the same semi major axis as equation , $\mathbf{1} = \mathbf{c} \cdot \mathbf{f}_n^2 \cdot \mathbf{a}^3$, and of the same constant Energy . Semi major axis , \mathbf{a} , is related to energy as $\rightarrow \mathbf{a} = G M m / 2E$, and for ellipse (a b axis)

$\frac{B^2}{(mab)^2} = -\frac{q \cdot q}{(ma)^3}$ and Spin $|S|^2 \equiv [\bar{B}]^2 \equiv -m q q \left[\frac{b^2}{a} \right]$ or $\bar{B} \equiv \sqrt{maq q \left[\frac{b}{a} \right]} = \bar{B} \equiv \sqrt{maq q}$ for $a=b$

i.e. for very large Energies , semi major axis tents 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 $E = \rightarrow \infty$, which is a Black-hole . [61]**

In **Black-holes** where exists the Rotation-Energy , *the Spin* , velocities follow Quantization of Unit-velocity as $\mathbf{v} = 2\pi \cdot f_1 [\mathbf{n} \cdot \mathbf{c} / 2f_1] = \mathbf{n} \cdot \pi \cdot \mathbf{c}$. From prior relations in B-Holes-Energy is found the SPIN , $S \equiv B$, using equation $\rightarrow [2\bar{B}]^2 = \pi G \Phi^2 r^3 = |\pi r^4 \Phi|^2 \leftarrow$ when radius r , is measured . Angular-Momentum $\bar{B} = \frac{2L}{\omega} = \frac{2L}{2\pi f} = \frac{\pi^2 r^4 \cdot f}{2}$, and vector $\bar{B} = a m v$, becomes

$\bar{B} = a m v = 2,11450164 \cdot 10^{-11}$ m $\cdot 7,237315 \cdot 10^{-32}$ kg $\cdot 2,99798 \cdot 10^8 = 4,5879026 \cdot 10^{-34} / \pi$ and $\rightarrow S/2 = 1,4603748 \cdot 10^{-34}$ which is the E-Spin. From cave-relation , a cave , as $a = d =$

$\sqrt[3]{\frac{1}{9,808 \cdot f_{3M}^2}} = \sqrt[3]{5,6102298 \cdot 10^{-30}} = a = 1,77688867 \cdot 10^{-10}$ m , then **Bracket-length**

$\Delta = 2a = 3,5537772 \cdot 10^{-10}$ m . The Black-Hole-Gravity-equation related to the Inner

Quantum-velocity $v = c$, and to its n , lobes is the frequency squared as ,

$$f^2 = \frac{\pi \cdot g}{[2\pi r]^3} = \frac{\pi \cdot g}{[v=wr]^3} = \frac{\pi \cdot g}{[v = n \cdot \pi \cdot c]^3} = \frac{\pi \cdot g}{[n \cdot \pi \cdot c]^3}, \text{ Energy decreases .}$$

Gravity $g \cong \sigma = \frac{\text{Force}}{\text{Area}} = \frac{\text{Mass}}{\text{Area}} = \frac{G}{k}$, while **Gravity force** $[\nabla i] \equiv F_G \equiv m_G g = g \cdot \nabla \left[\frac{\sigma}{c^2} \right]^2 \cdot r = m_G \frac{v^2}{r} = Jw^2 \cdot g_G = \left[\frac{\pi r^4}{2} \right] w^2 \cdot \frac{v^2}{r} = \frac{v^2}{r} \left[\frac{\pi r^4}{2} \right] \frac{v^2}{r^2} = \left[\frac{\pi r v^4}{2} \right]$ and from Spin-Momentum relation $S = \bar{B} = \frac{E}{w} = \frac{E}{2\pi f} = \frac{Er}{\sigma\Phi} = \frac{rG}{\sigma\Phi}$, then $\bar{B}^2 = \frac{J^2 \sigma^2}{r^2} \Phi^2$, and $\rightarrow [\bar{B}]^2 = \left[\frac{\Phi \sigma}{r} \right]^2 \leftarrow$ while as Centripetal is the \rightarrow **Gravity-force** $F_G \equiv m_G g = g \cdot \nabla[\sigma c] \cdot r = m_G \frac{c^2}{r} = J w^2 \cdot g_G = \frac{v^2}{r} \left[\frac{\pi r^4}{2} \right] \frac{v^2}{r^2} = \frac{\pi r v^4}{2}$ and is **The**

Black-Hole-Gravity-equation related to the Inner Quantum-velocity v to its n lobes .

Gravity-Acceleration is $g_G = s \left[\frac{\pi r v^4}{2} \right] = \left[\frac{3,1415926([\sqrt{5}+1] \cdot \sqrt[4]{2 \cdot 10^{-35}}) \cdot (299793458)^4}{2} \right] \cdot e^3 = 6,044981 \cdot 10^{-35} \cdot 80,776078 \cdot 10^{32} \cdot 20,085536 = g_G = \mathbf{9,8076925}$, is constant .

From the Primary equation of Electron $\rightarrow w^2_e \cdot m_e = \pi g = \text{constant} \equiv \text{Energy} \equiv [\text{meter of area} * \text{meter of force}] \equiv \text{Electrons on Orbits}$, on *Traces* and also the **Unit Space** $\equiv \text{Massive-United-Unit-Space} \equiv \rightarrow [+v \cdot s^2] \leftarrow$ **The Nucleus** jointed through the Neutral Material-Points [(+) [\leftrightarrow] (-)] with the **Strong-force** $\rightarrow S_F = h \cdot f_n \equiv h \cdot \{ [S \equiv B_P$

$\equiv \text{EM-R} \equiv f_{1=N}, f_2, f_3, f_D, f_n = w^2 \} \equiv h \cdot n \frac{(1+\sqrt{5})\sigma}{4\pi r} \equiv h \frac{2 \cdot \bar{B}}{\pi^2 \cdot r^3}$, Energy increases ... (mg)

From relation Force $G = \sigma A = (2\pi f r) \frac{A}{\Phi} = w r = \bar{c} \cdot \frac{A}{\Phi}$, i.e. Action of $G \rightarrow$ on \bar{c} and ,

following relation $\sigma \times \Phi^3 \equiv G$, from Energy-force F_g in $r = L_p$ Planck's scale of mass $m_g = J \cdot w^2$, 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 F_g is ,

$$F_g = m_g \left[\frac{c^2}{r} \right] = J w^2 \cdot \frac{c^2}{r} \cdot g_z = \left[\frac{\pi r^4}{2} \right] \cdot \left[\frac{c}{r} \right]^2 \cdot \left[\frac{c^2}{r} \right] \cdot \{ 2^3 \cdot \ln(3) \cdot \pi\sqrt{3} \} = \mathbf{4 \sqrt{3} \ln 3 \cdot \pi^2 r c^4}$$
 ,

and $F_g = \bar{g} = 4 \cdot \sqrt{3} \cdot 1,0986122886681 \cdot \pi^2 \cdot 1,616199 \cdot 10^{-35} \cdot [2,99793458 \cdot 10^2]^4 = \mathbf{9,8076754}$

i.e. **Gravity \bar{g}** , is The continual - effection of G force, on c light-velocity , in the 3-Dimensional Planck's length Space and Anti-Space , 2^3 , of Planck-length $L_p = r$.

From $\sigma \times \Phi^3 \equiv G \rightarrow [1,846462 \cdot 10^{11}] \cdot [3,61803399] = \mathbf{6,680561 \cdot 10^{-11}} \rightarrow G \text{ o.e.}\delta$.

4g... Applications :

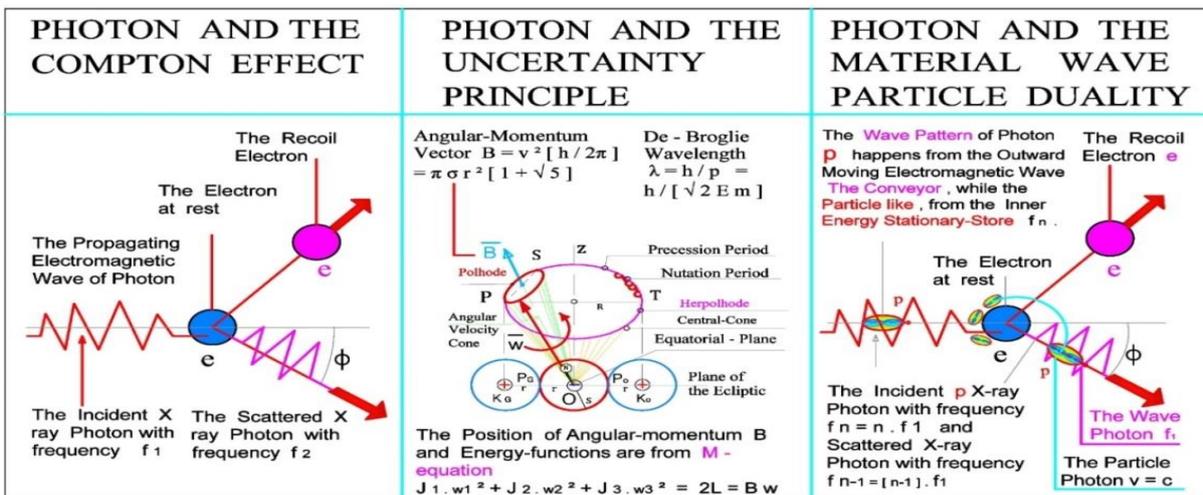


Figure – 16- : The Wave-Particle Duality of Photon as Wave and as Particle :

The equation of Photon is $\rightarrow \{ \bar{c} \cdot \boxed{\bar{f}_n} + \bar{c} \cdot \mathbf{f}_n \} \leftarrow$ i.e. Dual Frequencies ,

The Wave [$\mathbf{f}_1 = (E^2 + H^2) = n \frac{(1+\sqrt{5})\sigma}{4\pi r} = \frac{2\cdot\bar{B}}{\pi^2 r^4}$] - Particle [$\bar{v} = \bar{c} = \lambda \frac{f}{\Phi}$] \rightarrow 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 $\lambda = c T = c / f_p$, **which carries** , Pushes , the Storage B_p .

In Fig-18- Compton-effect is shown the Why Golden-ratio-frequency $f_p = \frac{\sigma \cdot r}{\pi \cdot \bar{B}} = \frac{n \cdot \sigma \cdot \Phi}{2 \pi r}$ 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 Force x Space** , and which is conserved as motion in all Space-Boxes. Potential-Energy $\equiv P_E$ stored in Material-point is the Electric-Field $E = g \pi$, in where [\oplus moves to \ominus] and thus from Geometry-Shape are created the two opposite Angular - momentum vectors and from Dipole the Spin $S = \frac{1}{2}$ 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 \oplus Spring** not as straight-lines because of the voltage between ends of Spaces , and the created motion as an Eternal rotation of the [\oplus] *constituent towards* [\ominus] *constituent* . In both cases Angular momentum \bar{B} , is equal to \pm **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 $\sigma > 0$, Spin \equiv Angular momentum \bar{B} , is equal to AM /Unit-Area = AM / π , and frequency $f_n = \frac{\bar{B}}{\pi^2 r^4}$ so **Spin is either Positive or Negative** and equal to the Electric-Charge

$\bar{E} = \pm AM / \pi$. The Spin becomes from the $\uparrow \leftrightarrow \downarrow$ Antiparallel Angular - Momentum-vectors \bar{B} , which is equal to the **Golden-ratio** , *Spin of cave r* , the **Spinning-Stationary M-point** with

Fundamental frequency f_1 of equation $W = \left[\frac{4\pi r^3}{3} \right] \cdot f_1 = \frac{(1+\sqrt{5}) \cdot \sigma \cdot r^2}{3} = 2L = \bar{B} \cdot \bar{w} = J \cdot w^2$.

This Stationary-Energy-Storage is as **Coulomb Electrical-Force** where the Electrical-Force

$F_{\text{electron}} = k_c \frac{Q_1 Q_2}{d^2} = \frac{[\oplus \leftrightarrow \ominus]}{d^2} = k_c \frac{2\sigma}{|e|^2} = k_c \left[\frac{4\pi f_1}{r\Phi} \right] = k_c \frac{\sigma}{2r^2} = k_c \frac{2\bar{c}}{r^2 \Phi}$ in Box B_e , and for Photon

$F_{\text{photon}} = \frac{[\oplus \leftrightarrow \ominus]}{r^2} = \frac{[\sigma \cdot \sigma]}{r^2} = \left| \frac{\sigma}{r} \right|^2 = \left| \frac{2\pi f_1}{\Phi} \right|^2 = \left| \frac{w}{\Phi} \right|^2 = \left| \frac{2L}{\Phi \bar{B}} \right|^2 = \left| \frac{\bar{c}}{r \cdot \Phi} \right|^2$, in the same Box B_e , since

Angular-momentum \equiv **Spin** $\equiv \bar{B} = \frac{\pi r^3 \sigma}{4} [1+\sqrt{5}] = \left| \frac{\pi r^3 \Phi \sigma}{2} \right| = \left[\frac{\pi r^3 \cdot \bar{c}}{2} \right]$, as Orbit-Forces.

Above relation agrees with **Laplace-equations** for Incompressibility and Irrotationality where $\nabla \times \bar{q} = \bar{r}_x + \bar{v}_y = 0$, and $\nabla \times \bar{v} = \bar{v}_x - \bar{r}_y = 0$, meaning that Space , \bar{r} , and Energy , \bar{v} = motion are Interchanged \rightarrow Because from the first relation the **Magnetic-field-Space** \bar{r}_x creates the **Electric-field-Energy** \bar{v}_y , and from the second \rightarrow **Energy** \bar{v}_x Pushes the **Space** \bar{r}_x . From Electron-Orbit-equation $4 \pi^2 f_e^2 \cdot m_e = k = \pi g$ or $4 \pi f_e^2 \cdot m_e = g$, $k = \pi g$, they

denote \oplus **Space** \equiv Electric-field in-where exist Electric-lines i.e. the tracks of Electron motion of the \ominus **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 [$\oplus \leftrightarrow \ominus$] , **Tack-Geometry** . The **Chains of Stationary-Periodic-Spins** are Pointy-vibrating in Orbit LRC- Circuit with its frequencies $\{f_1 = \frac{(1+\sqrt{5}) \cdot \sigma}{4\pi r}\}$ x $\bar{B} = [\sigma \Phi \pi r^3]$ $f = \frac{\bar{B}^2}{\pi^2 \cdot r^4} = |\frac{\sigma^2 \Phi^2}{2\pi \cdot c}| \bar{B}$, filling up the entire universe .

Stationary-Electron-Charge $q \equiv \ominus$, with **Orbit-Velocity-Vector** $\bar{v} = \sqrt{\frac{2}{m} [E - \{\frac{k}{r} + \frac{L^2}{2m r^2}\}]}$ occupies Zero Kinetic-energy between Q_1, Q_2 therefore , $K_E = \frac{mv^2}{2} = E - \{\frac{k}{r} + \frac{L^2}{2m r^2}\} = 0$ or $E = \{\frac{k}{r} + \frac{L^2}{2m r^2}\} = \frac{\pi g}{r} + \frac{S^2}{2(g/4\pi f^2) r^2} = \frac{2\pi}{g r^2} [g^2 r + S^2 \cdot f^2]$... (s) Equation (s) issues for Spinning Points , and Atoms-Stationary-nucleus and is **the Strong-Force** between **Nucleus-Protons**.

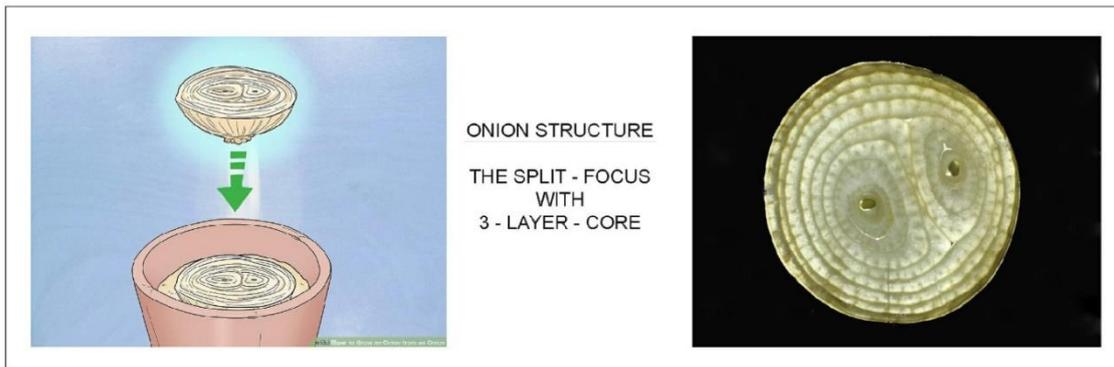


Figure – 17. The Newton`s Universal Laws in Atoms and in Onion - Structures .

The Slit-Focus-Atom structure with the three Hydrogen – Orbitals .
 The Neutral Material-Points [(+) [\leftrightarrow] (-)] with the **Strong –Nuclear - Force**
 $S_F = h f_n \equiv h \cdot \{[S \equiv B_p \equiv EM-R \equiv f_{1=N}, f_2, f_3, f_D, f_n]\} \equiv h \cdot n \frac{(1+\sqrt{5})\sigma}{4\pi r} \equiv h \frac{n\sigma \bar{B}}{8 r^2}$
 are so because $f_n = |\frac{\sigma^2 \Phi^2}{2\pi \cdot c}| \cdot \bar{B}$, and it is the DNA of all Energy-Structures .

In Fig-17- , 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 \rightarrow **Lissajous – Eight - Shapes** . The Linear-Vibrations [$\ddot{x} + w^2 x = 0$] 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 \rightarrow The Eight-Shapes ∞ on Nucleus .
- b.. Difference of Phase $d_\phi = 0^\circ$ emission is \rightarrow The Ellipse-Shapes α , after 1st curve.
- c.. Difference of Phase $d_\phi = 45^\circ$ emission is \rightarrow The Double-Saddle-Shapes . \wp , \wp , 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 $\bar{v} = \bar{c}$ Acting on **an-cave** , $r \neq L_p$, faces-to the Impedance Z_c from Velocity \bar{c} , and Becomes the minimum-Energy-cave in L_p , and Equal to $E \equiv r Z_c \bar{c}$, and

$$r = \frac{h}{c \cdot Z_c} = \frac{[6,62606957 \cdot 10^{-34}]}{2,99798 \cdot 10^8 \cdot 1,045263 \cdot 10^{-31}} = 2,11450164 \cdot 10^{-11} \text{ m , which is the Hydrogen cave .}$$

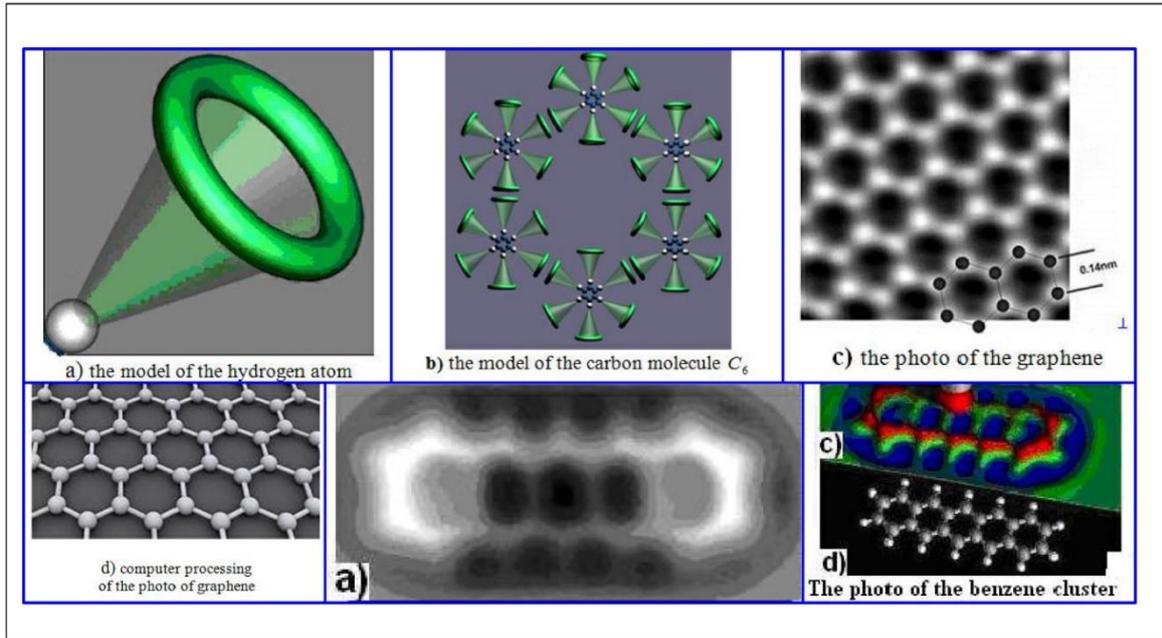


Figure – 18 - : Photo from → RESOLUTION OF THE RUSSIAN THEORY OF MICROWORLD :
By Professor Ph. M. Kanarev [kanarevfm@mail.ru]

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 $3 \times 2 = 6 (\pm)$ elements ,is the Regular-Hexagon-Plane-Bonding .The Hydrogen-Light-Photon-cave $2,114501610^{-11} \text{ m}$ 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] .

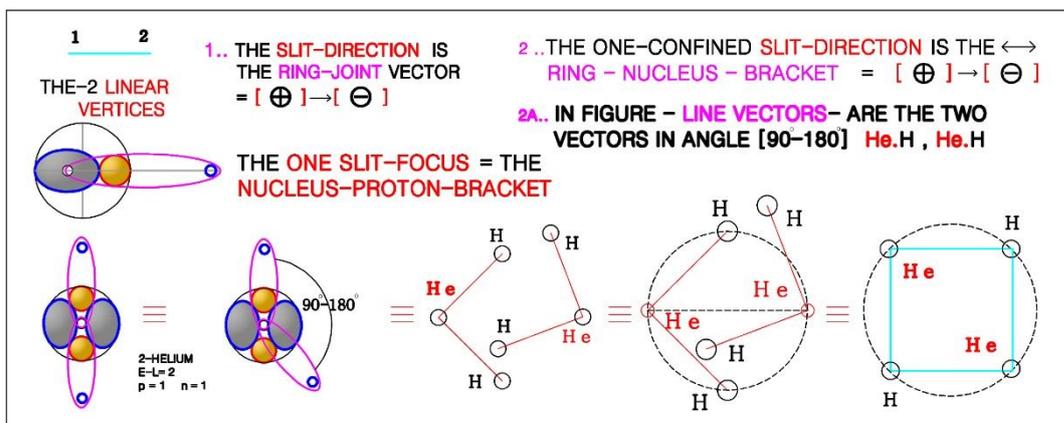


Figure – 19 - : The One **HYDROGEN-SLIT** is The First – Nucleus-Bracket-Bond
The One **HYDROGEN-ORBIT** is the **First PROTON-ORBIT-HOOK** on the

Helium -Atom-Nucleus-Bracket and exist , **Two -Slit -Directions** . The One **Helium-Atom-Orbit** is for , **Two Proton-Hook-Directions** (90 -180°) so the Two Points-Hooks (H – H) > can Bond from **Square** bonding to any Rhombus Shapes .

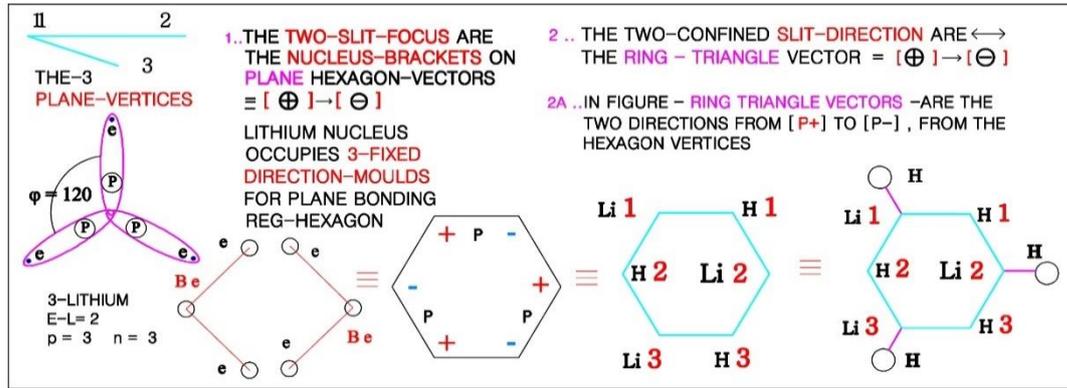


Figure – 20 - : On The Lithium-Atom with the Three of angle **120°** -Plane Directions of the Orbit-Hooks can Bond , *on Plane Directions* , in Steady – Triangle - Shape which is The **Regular-Hexagon-Plane-Bonding** .

The size of Atom-Carbon :

The classical way of measuring depends on Avogadro`s number concerning atomic mass and

$$\text{Carbon-density } C_L = \frac{\text{mass of molas(gm)}}{\text{Density}(\frac{\text{gr}}{\text{cm}^3}) \text{Avogadro-N}} = \frac{12 \text{ gr}}{2,1(\text{gr/cm}^3)6,02214 \cdot 10^{23}} = 9,454184 \cdot 10^{-24} \text{ cm}^3$$

$$\text{and } C_L = 2,11 \cdot 10^{-8} \text{ cm} = 2,11 \cdot 10^{-10} \text{ m} = 10 \cdot [2,11450164 \cdot 10^{-11} \text{ m}] = 10 \cdot [\text{Hydrogen-cave}]$$

It was prior found that Bracket-length $B_L = \Delta = 2a = 3,5537772 \cdot 10^{-10} \text{ m}$, so

Above relations $C_L = 10 \cdot H_L = B_L$ allows the Strong Carbon-Hydrogen Bonds .

5g... The Periodic motion in all Displacements :

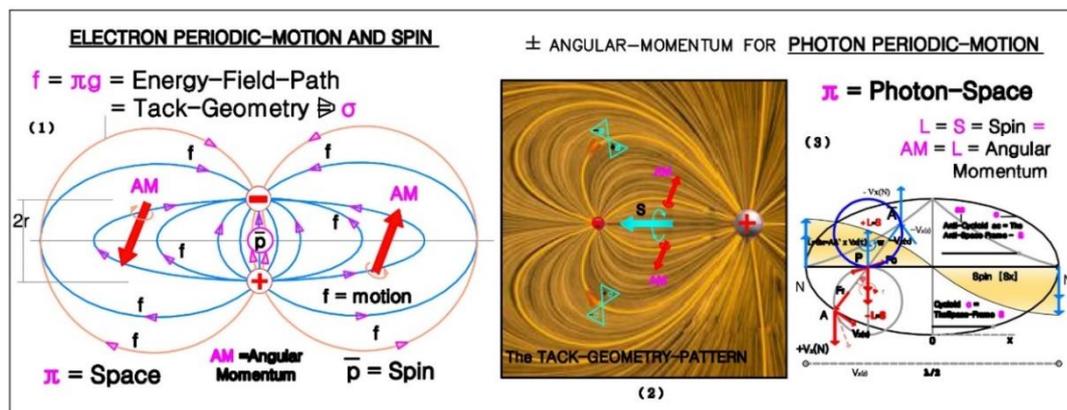


Figure – 21- : The Two Possible motions in caves , **The Periodic and The Rotational** :

In (1). Is formatted the Energy-Space of the **Orbital-Periodic-motion** $[\oplus \leftrightarrow \ominus]$ in **Tack-Geometry-Pattern** (1) and (2) formulation , where Hydrogen minimum cave **a** is

$$a = \sqrt[3]{\frac{1}{k \cdot f^2}} = \sqrt[3]{\frac{1}{g \cdot f^2}} , \text{ and for } k = g , \text{ and } f = E / h = 13,6 \text{ eV/h} = \text{Unit-Energy-Space-frequency}$$

$f = 3,28393 \cdot 10^{15} / \text{s}$, of cave $a = 2,11450164 \cdot 10^{-11} \text{ m}$. From Linear-Periodic-motion

$$\frac{w_n}{2\pi} = f_e = \frac{1}{2\pi} \sqrt{\frac{k}{m}}, \text{ or } 4\pi^2 f_e^2 \cdot m_e = k = \pi g, \text{ then for Electron } m_e = \frac{g}{4\pi f_e^2} \text{ so,}$$

$$m_e = \frac{g}{4\pi f_e^2} = \frac{9,808238}{4 \cdot \pi \cdot [3,28399 \cdot 10^{15}]^2} = -7,2373149 \cdot 10^{-32} \text{ kg, } f_e = 3,283998 \cdot 10^{15} /s,$$

The Spin-Cave is equal to The Moment of couple from two $\uparrow \leftrightarrow \downarrow$ Angular-momentum Vectors as $\bar{B} = a m v = 2,11450164 \cdot 10^{-11} \text{ m} \cdot 7,2373149 \cdot 10^{-32} \text{ kg} \cdot 2,99798 \cdot 10^8 = 4,5879026 \cdot 10^{-34} / \pi$, and Spin $\rightarrow S/2 = 1,4603748 \cdot 10^{-34}$ which is the **Electron-Spin**.

The $k = \pi g$, denotes the \oplus **Space** \equiv Electric-field in-where exist the Electric-lines the tracks for the motion of electrons \ominus **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** $[\oplus \cup \otimes \cup \ominus]$ directed to $[\oplus \rightarrow \ominus]$ as it is **Tack-Geometry**.

For Quantum-Energy equal to g then $k = g$, and $\rightarrow a = \sqrt[3]{\frac{1}{k \cdot f^2}} = \sqrt[3]{\frac{1}{k \cdot f^2}} = \sqrt[3]{\frac{h^2}{k \cdot E^2}} \text{ or } = \sqrt[3]{\frac{h^2}{g \cdot E^2}}$

the corresponding cave a is for Energy-monads,

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 $[E^2+H^2]=2 \cdot (2r) \cdot c \cdot \sin 2\varphi$ 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 a continuous $-S + S = 0$, Torsional and Point-equilibrium, where Charge is equal to the Angular Momentum-vector per Unit-Plane or $\rightarrow S = AM / \pi = r m v = [a m c] / \pi \rightarrow$

$$\text{Spin } S = \left[\frac{amc}{\pi} \right] = \bar{B} = \frac{2L}{w} = \frac{2L}{2\pi f} = \frac{\pi^2 r^4 \cdot f}{2} = \text{The Spin of Particle-cave.}$$

Above **Double-Orbital-Periodic motion** $[\oplus \leftrightarrow \ominus]$ in a Material-Point is the eternal-Plane-Curve-motion of the \oplus constituent to the \ominus 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, w , and velocity, v , under the condition $y(2r,0) = 0$, then

leads to Energy-equation $\sin \frac{2rw}{v} = 0$, or $w_n \frac{2r}{v} = n \frac{4\pi r}{\lambda} = \frac{4\pi r f}{v}$, 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** $\rightarrow f_n = \frac{v}{2\pi r} = \frac{\sigma}{4\pi r} [1 + \sqrt{5}] \dots(n)$

Above **Double-Orbital-motion** is in a Uniform-Energy-Point-Space as this is for Spin $S = \bar{B}$ and then Issues $\bar{B} = \bar{r} m \bar{v} = \sqrt{\bar{r}^2 + m^2 \bar{v}^2}$, because the vector $\bar{r} \equiv$ **Space**, is Perpendicular to $m\bar{v} \equiv$ **The Energy**. Laplace Energy-equation for **Incompressible Space** \bar{r} , is $\rightarrow \nabla^2 E = -\nabla E = -\nabla \bar{B} = -\nabla \sqrt{\bar{r}^2 + m^2 \bar{v}^2}$ and squaring $-\nabla \bar{r}^2 + [2\pi m f \bar{a}]^2 = 0$ issues $\bar{r} = -2\pi m f \cdot \bar{a} \dots(1)$ The condition for **Irrotational Energy** is $\rightarrow \nabla \times \bar{B} = \nabla \times \bar{S} = 0$, or $\nabla \times \bar{B} = \nabla \bar{r} + 2\pi m f \cdot \bar{a} = 0$, and vector $\bar{r} = 2\pi m f \cdot \bar{a} \dots(2)$. Relations (1), (2), $+\bar{a}$ and $-\bar{a}$, denote the **Alternative-Positions of Magnetic Field** in the **Two-transverse-Positions** as in Fig 20-(2).

For Photons which force is $F_{\text{photon}} = \frac{[\oplus \leftrightarrow \ominus]}{r^2} = \frac{[\sigma \cdot \sigma]}{r^2} = \left| \frac{\sigma}{r} \right|^2 = \left| \frac{2\pi f \cdot \bar{a}}{\Phi} \right|^2 = \left| \frac{2\bar{B}}{\pi \cdot \Phi \cdot r^4} \right|^2$, issue above.

Since for Electron $4\pi^2 f_e^2 \cdot m_e = k = \pi g$, then for Gravity issues, $-\nabla E = -\nabla g = 4\pi \cdot m_e f_e^2$.

$$\bar{q}_{\text{Photon}} = \frac{G}{\sqrt{2} \cdot f} = \frac{G \cdot h}{\sqrt{2} \cdot E} = \frac{[6,680561 \cdot 10^{-11}] \cdot [6,62606957 \cdot 10^{-34}]}{\sqrt{2} \cdot E=1} = 3,13 \cdot 10^{-44} \text{ C}.$$

All above Physical Structures Vibrate, In-Sectors with minimum Energy, and form the → Electron-charge ←In Surfaces with minimum Energy, and thus forming the Orbits.

The Orbit relation $r^3 f_p^2 = \text{Constant}$, as multiplication of Space-cave r and frequency f , as the Energy, the **Work** \equiv motion, is conserved in orbit, r , as the, n , frequencies f_n .

Remarks :

1.. From Light-velocity-equation $\bar{v} = [\frac{G \Phi}{A}] = \bar{c}$, Force \bar{G} and velocity vector \bar{c} are **Aligned** therefore Photon $\{ \bar{c} \cdot \boxed{f_n} + \bar{c} \cdot f_n \} \equiv$ Particle + Wave, follows the **Rectilinear motion**.

In Planck's length L_p , The light velocity **vector** $\bar{c} = \frac{G L_p}{r \cdot \Phi^2}$ 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** $\bar{v} = \bar{c}$ Acting on **a-cave**, $r \neq L_p$, finds The-Impedance Z_c of the Velocity \bar{c} , and becomes the minimum-Energy-cave in L_p , which is $E = r Z_c \bar{c} = h$, and $r = \frac{h}{c \cdot Z_c} = 2,11450164 \cdot 10^{-11} \text{ m}$. From Kepler-second law of Areas, $g r^3 f_p^2 = 1$, the frequency $f = 3,2839982 \cdot 10^{15} \text{ H}$ and Energy $E = h f = \mathbf{13,6 \text{ eV}}$, which is that of Hydrogen cave.

2.. From Electron-velocity-equation $\bar{v} = w r = 2\pi f r$ and from Kepler $4 \pi^2 f_e^2 \cdot m_e = k = \pi g$ then $v_e = r \cdot \sqrt{\frac{g}{m_e}}$, therefore Electron follows, **Curvilinear motion** and that of Gravity.

From Force $G = \sigma A = [\frac{2\pi r f}{\Phi}] \cdot A = w r \cdot [\frac{A}{\Phi}] = \bar{v} [\frac{A}{\Phi}]$, then is → The moving \bar{c} in Storage $\frac{A}{\Phi}$

3.. Since $G \equiv \sigma \cdot \Phi^3 \equiv \Phi^2 \cdot [\sigma \Phi] \equiv 2\pi f_p r \equiv w r \equiv \bar{v} \equiv m a \equiv m g = \bar{c}$] and Nutation-Frequency

$$f_N = \frac{r_e \cdot Q_e}{2\pi \cdot J_3 w} = 2,8398447 \cdot 10^{10} \text{ s}^{-1}, \text{ then } f_N = \frac{r_e^2 \cdot \Phi \cdot Q_e}{2\pi \cdot J_3 G} \text{ related to } G.$$

AKNOWLEDGE

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 becoming from the Eternal-motion of the Opposites which are the only elements of this cosmos, 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 Mechanic so that the Reader can understand the Deep-meaning of equations. Articles [89] - [90] 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 [87R], will Share this Knowledge of Electromagnetism into Material Geometry to all Readers, becoming from the One - Force of Energy-Space-Universe and which is that of Newton's Gravitational-Constant G only. Markos Georgallides 1/3/2020.

F.. REFERENCES :

- [1] Matrix Structure of Analysis by J.L.MEEK library of Congress Catalog 1971.
- [2] Der Zweck im Rect by Rudolf V. Jhering 1935.
- [3] The great text of J. L.Heisenberg (1883-1886) English translation ,Richard Fitzpatrick
- [4] Elements Book 1.
- [5] Wikipedia.org, the free Encyclopedia.
- [6] Greek Mathematics, Sir Thomas L.Heath, Dover Publications, Inc ,New York. 63-3571
- [7] [T] Theory of Vibrations by William T. Thomson (Fourth edition).
- [8] A Simplified Approach of Squaring the circle,
<http://www.scribd.com/mobile/doc/33887739>
- [9] The Parallel Postulate is depended on the other axioms,
<http://vixra.org/abs/1103.0042>
- [10] Measuring Regular Polygons and Heptagon in a circle,
<http://www.scribd.com/mobile/doc/33887268>
- [11] The Trisection of any angle ,<http://vixra.org/abs/1103.0119>
- [12] The Euclidean philosophy of Universe, <http://vixra.org/abs/1103.0043>
- [13] Universe originated not with BIG BANG,
<http://www.vixra.org/pdf/1310.0146v1.pdf>
- [14] Complex numbers Quantum mechanics spring from Euclidean Universe,
<http://www.scribd.com/mobile/doc/57533734>
- [15] Zeno`s Paradox, nature of points in quantized Euclidean geometry,
<http://www.scribd.com/mobile/doc/59304295>
- [16] The decreasing tunnel, by Pr. Florentine Smarandashe,
<http://vixra.org/abs/111201.0047>
- [17] The Six-Triple concurrency line – points, <http://vixra.org/abs/1203.0006>
- [18] Energy laws follow Euclidean Moulds, <http://vixra.org/abs/1203.006>
- [19] Higgs particle and Euclidean geometry,
<http://www.scribd.com/mobile/doc/105109978>
- [20] Higgs Boson and Euclidean geometry, <http://vixra.org/abs/1209.0081>
- [21] The outside relativity space – energy universe,
<http://www.scribd.com/mobile/doc/223253928>
- [22] Quantization of Points and of Energy, <http://www.vixra.org/pdf/1303.015v21.pdf>
- [23] Quantization of Points and Energy on Dipole Vectors and Spin ,
<http://vixra.org/abs/1303.0152>
- [24] Quaternion`s, Spaces and the Parallel Postulate, <http://vixra.org/abs/1310.0146>
- [25] Gravity as the Intrinsic Vorticity of Points, <http://vixra.org/abs/1401.0062>
- [26] The Beyond Gravity Forced fields, <http://scribd.com/mobile/doc/203167317>
- [27] The Wave nature of the geometry dipole, <http://vixra.org/abs/1404.0023>
- [28] Planks Length as Geometrical Exponential of Spaces. <http://vixra.org/abs/1406.0063>
- [29] The Outside Relativity Space – Energy Universe,
<http://www.scribd.com/mobile/doc/223253928>
- [30] Universe is built only from Geometry Dipole, Scribd :
<http://www.scribd.com/mobile/doc/122970530>
- [31] Gravity and Planck`s Length as the Exponential Geometry Base of Spaces,
<http://vixra.org/abs/1406.0063>
- [32] The Parallel Postulate and Spaces (IN SciEP)
- [33] The fundamental Origin of particles in Planck`s Confinement. On Scribd & Vixra (FUNDAPAR.doc)
- [34] The fundamental particles of Planck`s Confinement. www.ijesi.com (IJPST14-082601)

- [35] The origin of The fundamental particles
www.ethanpublishing.com(IJPST-E140620-01)
- [36] The nature of fundamental particles, (Fundapa.doc).ijesit.com–Paper ID :
IJESIT ID: 1491
- [37] The Energy-Space Universe and Relativity IJISM, ijism.org–Paper ID:
IJISM – 294 [V2,I6,2347-9051]
- [38] The Parallel Postulate, the other four and Relativity (American Journal of
modern Physics , Science PG – Publication group USA) ,1800978 paper .
- [39] Space-time OR, Space-Energy Universe (American Journal of modern Physics ,
science PG Publication group USA) 1221001– Paper.
- [40] The Origin of ,Maxwell`s-Gravity`s, Displacement current . GJSFR
(Journalofscience.org) , Volume 15-A, Issue 3 , Version 1.0
- [41] Young`s double slit experiment [Vixra: 1505.0105] Scribd :
<https://www.scribd.com/doc/265195121/>
- [42] The Creation Hypothesis of Nature without Big-Bang.
Scribd : <https://www.scribd.com/doc/267917624/>
- [43] The Expanding Universe without Big-Bang . (American Journal of modern
Physics and Applications Special issue
: <http://www.sciencepublishinggroup.com/j/>
Science PG-Publication group USA – 622012001– Paper.
- [44] The Parallel Postulate and the other four , The Doubling of the Cube , The
Special problems and Relativity. <https://www.lap-publishing.com/>.
E-book. LAMBERT Academic Publication .
- [45] The Moulds for E-Geometry Quantization and Relativity , International Journal
of Advances of Innovative Research in Science Engineering and Technology
IJIRSET : <http://www.ijirset.com/..Markos Georgallides>
- [46] [M] The Special Problems of E-geometry and Relativity
<http://vixra.org/abs/1510.0328>
- [47] [M] The Ancient Greek Special Problems as the Quantization Moulds of
Spaces. [www.submission.arpweb.com\(ID-44031-SR-015.0](http://www.submission.arpweb.com(ID-44031-SR-015.0)
- [48] [M] The Quantization of E-geometry as Energy monads and the
Unification of Space and Energy . [www.ijera.com\(ID-512080.0](http://www.ijera.com(ID-512080.0)
- [49] [51] The Why Intrinsic SPIN (Angular Momentum) $\frac{1}{2}$ -1 ,Into Particles .
[www.oalib.com\(ID-1102480.0](http://www.oalib.com(ID-1102480.0)
- [50] [M] The Kinematic Geometrical solution of the Unsolved ancient –Greek
Problems and their Physical nature <http://www.jiaats.com/paper/3068.ISO 9001>
- [51] [M] The Nature of Geometry the Unsolved Ancient-Greek Problems and
their Geometrical solution [www.oalib.com\(paper.ID-1102605.0](http://www.oalib.com(paper.ID-1102605.0)
<http://www.oalib.com/Journal:paper/1102605>
- [52] E-Geometry , Mechanics-Physics and Relativity,
<http://gpcpublishing.com/GPC> : **volume 4, number 2** [journal homepage](#)
- [53] Material-Geometry and The Elements of the Periodic-Table
[www.ijerm.com\(ID-0306031.0\)](http://www.ijerm.com(ID-0306031.0)
- [54] The Material-Geometry Periodic Table of Particles and Chemistry .<http://ijemcs.in/>
- [54] The Material-Geometry A-Periodic Table of Particles and Chemistry.
www.iosrjournals.org)
- [55] Material-Geometry, the Periodic Table of Particles and Physics. <http://ephjournal.com>
- [56] Big-Bang or the Glue-Bond of Space , Anti-space ?? . (www.TechnicalDean.org)
- [57] The Eternal Glue-Bond of Space ,Anti-space ,Chemistry and Physics

- www.globaljournals.org .
- [58] Big-Bang or the Rolling Glue-Bond of Space ,Anti-space ,
book@scirp.org ,<http://www.scirp.org/>
- [59] STPL Mechanism is the Energy – Space Generator . <http://vixra.org/abs/1612.0299>
- [60] The Chaos becomes Discrete through the STPL mechanism which is
Energy-Space Generator (<http://www.ijrdo.org/>)
- [61] The How Energy from Chaos , becomes Discrete Monads .
<http://www.ephjournal.net/>
- [61-A] The How Energy from Chaos , becomes Discrete Monads . <http://www.ijrdo.org/>
- [62-B] The Geometrical solution of All Regular n-Polygons . <http://www.irjaes.com/>
- [62] The Geometrical Solution of All Odd – Regular – Polygons , and the Special
Greek problems <http://www.irjaes.com/>
- [63] The Geometrical Solution of All Odd – Regular – Polygons , the Special
Greek Problems and their Nature . <http://www.ijerd.com/>
- [63] [A] The Geometrical Solution of The- Regular – Polygons , the Special
Greek Problems and Their Nature . <http://vixra.org/>
- [63] [B] The Geometrical Solution of The- Regular – Polygons , the Special
Greek Problems and Their Nature .(<http://iosrmail.org/>)
- [64] [A] The How energy from chaos becomes the \rightarrow Spin , of the Discrete
Elementary monads . <http://www.i-b-r.org/> .??
- [64] The How energy from chaos becomes the \rightarrow Spin , of the Discrete
Elementary monads : (<http://www.ijrdo.org/>)
- [65] The Spin of monads and their Energy-Stores . www.ajer.org .
- [66] The Energy-Stores in Photon . <http://www.i-b-r.org/> .???
- [67] The Energy Structure of Atoms and Photon . <http://vixra.org/>.
- [68] The Moving Energy - Storages and Photon . www.sfjqp.com
- [69] The Moving and the Stationary Particles . <http://science MPG>
- [70] The How Energy from Chaos becomes the Spin of Monads and Photon
<http://www.ijrdo.org/>
- [70] The How Energy from Chaos becomes the Spin of Monads and Photon .
<http://science MPG>
- [70] The How Energy from Chaos becomes the Spin of Monads and Photon .
www.ijera.com .
- [71] The Gravity and Photons . <http://asir@sholink.org>
- [72] The origin of Gravity and universe . [<mailto:editorusa@globaljournals.org>]
- [72A] [M] The Origin of Gravity Gravitational Constant and Universe .
: <http://saiconference.com/FTC>
- [73] [M] Planck`s Constant , The Gravitational and Gravity Constant .
: <https://ijrdo.org/index.php/mce/issue/current>
- [74] [M] The Newtonian Constant of Gravitation and Gravity Constant . www.iosr.Org
- [75] [M] The Newtonian Constant of Gravitation and Gravity Constant .
The Physical Interpretation <http://science MPG>
- [76] [M] The Newtonian Constant of Gravitation Gravity Constant , and
The Galileo Principia <http://www.i-b-r.org/> .
- [76A] [M] Origination of The Nutation-motion , and Atom-model .<http://www.i-b-r.org/> .?
- [77] [M] The Newtonian Constant of Gravitation and Gravity Constant .
Their Physical Interpretation . <http://vixra.org/> / 1904.0114v1 .
- [78] [M] The Physical Interpretation of Gravity-Constants , Electron
and Photon <https://saiconference.com/FICC2020/Submit>

- [79] [M] The Planck`s Constant and Speed of light . <http://science MPG>
- [80] [M] The Origination of the Nutation-motion , the New-Energy-Atom-Model and the United-Coulomb-Newton-Laws for Interaction .
<https://www.akinik.com/publishbookchapter/-research>
- [81] [M] [M] The Physical Interpretation of Gravity – Constant , Electron and Photon <http://vixra.org/abs/1906.o468>, <https://www.scribd.com/doc/>
- [82] [M] [M] The Physical Interpretation of Gravity – Constant , Electron and Chemistry <http://science MPG>
- [83] [M] The EPR Argument and The Quantization of Energy in Spaces , <http://www.ajer.org/volume9 issue 1.html>
- [84] [M] The unification of Energy-monads , *Black Holes* ,with Geometry Monads , *Black Matter*, through *Automobile Forces* in monads .
- [85] [M] Quantization of Points and Potential and the Unification of Energy-Space .
- [86] [M] [M] The Physical Interpretation of Gravity – Constant , and Applications in Chemistry <http://science MPG>
- [87] [M] Photon Particle , Photon Wave Or Duality Photon ? and Applications <http://vixra.org/abs/2003.0601>
- [87] [M] Photon Particle , Photon Wave Or Duality Photon ? and Future Technologies <https://www.scribd.com/doc/1/>
- [87] [R] Photon Particle , Photon Wave Or Duality Photon ? An Answer to WHY and HOW is the Objective-Reality <http://science MPG ≡ Markos Georgallides>
- [88] [M] [M] The Origination of Nutation motion and a New Electromagnetic Structure of Atom <http://science MPG>
- [89] [M] The Why Light-velocity is constant and the Duality of Photon <http://science MPG ≡ Markos Georgallides>
- [90] [M] The New-Structure of Atom , the Nutation-motion and their Application . <http://science MPG ≡ Markos Georgallides>
- [91] [M] The Quantization of Points and Potential and the Unification of Energy and Space with The universal principle of Virtual work , of Geometry .

Markos Georgallides comes from Cyprus and currently resides in the city of Larnaca , after being expelled from his home town Famagusta by the Barbaric Turks in August 1974 . He works as a consultant civil and architect engineer having his own business . He is also the author of numerous scholarly articles focusing on Euclidean and Material Geometry , and mathematical to physics related subjects .

He obtained his degree from the Athens , National Technical , Polytechnic University [NATUA] – Athens ,and subsequently studied in Germany , Math theory of Photoelasticity .