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

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Abstract

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

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

From Quaternion Quantum-Mould $[r + \overline{v} \, \nabla i]^{1/w} = e^{-i.(\pi/2+2k\pi).w}$ is created the **min-Space ≡ cave** $r = 1,07.10^{-7}$ m and the **min-Energy** ≡ $\overline{v}$ = w r = 2πr f , The frequency $\mathbf{f_m}$= 2,839844. 10^{10} H . Gravitational-force **G** effecting on light velocity $\overline{c}$ creates Electron-charge $\overline{q}$ and Electron $\overline{e}$, while acting on Planck`s-cave the Gravity $g ≡ ± σ$, as $\mathbf{G} = g \, k = \mathbf{k_E} \, g = \mathbf{k_L} \, σ = g.\mathbf{g_L} \, \mathbf{k_L}$, and $\overline{c}$ effecting on the min-Planck-cave in 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 $\overline{e}$ of *Hydrogen-cave* , **Originates Nutation-motion** in Precession as Resonance-frequency $\mathbf{f_N} ≡ \mathbf{f_R} ≡$ **Work ≡ Energy**, and is stored in the [Nucleus-Electron] **Orbit** , as the $\mathbf{w_L}$ Larmor – frequency giving Photos everywhere . Moreover

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

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

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

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

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CONTENT

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

A.. : GENERAL

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

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

3…The Solution of all the Unsolved-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] = $[\oplus \leftrightarrow \ominus] \equiv f_n$, $[\oplus \leftarrow ds \rightarrow \ominus] \equiv$ ds in Material- Geometry , to the aperon , $\pm \infty$, where , **in The Space $\equiv$ ds** , *nodes distance* , 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 $\bar{q}_{Electron} = \frac{G}{c\sqrt{2}}$ and the Material-Points $\bar{q}_{Photon} = \frac{G}{\sqrt{2}.f}$ while by effecting on the **Whole-Planck**-Cave $L_P \equiv e^{i \cdot (-5\pi/2) \cdot 10}$, creates the Pointy-Gravity Force as this is the **Ocean of Spins** $\bar{g}$,and which Oriented-Spins , **Originate** Gravity g and **Electron $\bar{e}$** [72] **.** L-Velocity $\bar{c}$ Acting on a-cave , $r = \frac{h}{c.Z_c} \neq L_P$ originates Hydrogen-cave.

6…The Rotation of the Two Elements ,$[\oplus \circlearrowright \circlearrowleft \ominus]$, 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 = $d s_m = e^{i \cdot (\frac{N\pi}{2}) b = 10^- N = \pm \infty}$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** $\bar{B} = \frac{2L}{\bar{w}} = \frac{2L}{2\pi f} = [\frac{2L}{2\pi}].[\frac{1}{f}] = \frac{Constant}{2\pi} [\frac{1}{f_m}] =$ **SPIN**   [70]

7…When the Unit-Quantum-Energy in Planck-length is equal to the Stress of Gravity g , and enters the minimum-cave **a** as the **Critical-Unit** in orbit ,then is measured frequency f_p which is giving the **Least-Unit-Energy-cave** and that is of **Hydrogen - Cave H** , [81] , as equations , $r = \frac{h}{c.Z_c}$, g .a³. $f^2_p = 1$ and E = h $f_p = 13,6$ eV .

8…When the Unit-Quantum-Energy k in Planck-length is equal to the Stress of Gravity g and **frequency** f_e becomes from Hydrogen Least-Unit-Energy = πg , then Reaction = mass is that of the **Electron Cave e ,** as , $4\pi^2 f^2_e .m_e = k = \pi g$ and **$m_e = g / [4\pi f^2_e]$** , [82]

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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 m_p and of Charges q_e , **Originates ,** the **Uniform-Magnetic-field** $\bar{B}_L$ **of Atom** , the Spin of Atom connected with that of Electron-Spin , and **Forms** an Harmonic Oscillator with a Natural Frequency f_N with the less Damping-factor by Increasing of Potential Energy in loop due to Nutation-motion . Since Electron is continually-oscillating with the Nutation-frequency f_N , **so** Produces an **oscillating magnetic-field** $\bar{B}_N$, which in turn is the source of an oscillating Electric-field $\bar{E}_N$, which implies the Regeneration each other and which is a Propagating Electromagnetic - Wave where $\bar{E}_N = \bar{B}_N \, c$. and a Phase difference $[\varphi = \frac{\bar{B}}{\Phi}]\}$. [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 G is effecting **on Gravity** g , and in turn **g** is acting on Electron $\bar{e}$ 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** $\bar{B}_F = |\frac{2\pi . M_T}{Q_T}| f_R$ independent of **velocity and cave** , which becomes the **Bond** between the Atoms to be Molecules , i.e. Bonds are the Magnetic - lines of the Uniform-field . [80]

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

13... The Priors :

Article [87] is the completion of [72-80] and [80-86] of the Physical interpretation of the Two constants of nature , that of Newton`s Gravitational constant **G** , and light velocity $\bar{c}$, with Derivatives the Photon-Charge $\bar{q}_{Photon}$ in Material Point cave **r** , Gravity Constant **g** , and Planck constant L_P , with a Rigorous Geometrical and Mechanical logic .
It was shown [33-39] that from < *The Balancing of Space , Anti-Space in a Rotating Sub - Space Common circle* > Un-clashed Fragments through center , O , consist the Medium-Field Material-Fragment $\rightarrow [\pm s^2] = $ [MFMF] $\equiv$ ***The Chaos*** , as base for all motions , and Gravity as force $[\nabla i]$, while the clashed with the constant velocity , $\bar{c}$, consist the Dark matter $[\pm \bar{c}.s^2]$ and the Dark energy $[\bar{c}.\nabla i]$ **,** ***Declaring that*** $\rightarrow$ Antimatter-Galaxies and Antimatter-Asteroids can exist only as Dark-matter or and Dark-Energy and **NOT** as Antimatter light , (**- c**) ,alone , or from $\rightarrow$ velocity - Breakages , $[\pm s^2 = \pm (wr)^2]$ and $[\nabla i = 2(wr)^2]$, 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 S** $\equiv$ $\boxed{[\oplus \leftarrow r \rightarrow \ominus]}$ + **Motion M** $\equiv$ $\boxed{\bar{v} - \textbf{Vector}}$ as [87].

From vibration in Material-Points become , [55]

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

$\{ [\quad (\nabla i),(+s^2),(-s^2),(+cs^2),(-cs^2)] \}$ 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 $[\nabla i] →$ $G_f ≡$ Gravity-Force in DM-DE   Stationary Field .

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

$→$ Gravity Force   DE $≡ [\bar{c}.\nabla i] = \bar{c} [\nabla i] =$ 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

$k = \bar{v}x\bar{v}. \bar{r} = v^2.r. \bar{n}. = v^2. r = (wr)^2.r = [\frac{2\pi r}{T}]^2.r = \frac{4\pi^2 r^2}{T^2}. r = \frac{4\pi^2 r^3}{T^2} = 4\pi^2 \frac{r^3}{T^2} = 4\pi^2.r^3.f^2{}_p$ 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 $4\pi^2 r^2 f^2{}_p ≡ [2\pi f.r]^2 ≡ [wr]^2 ≡ v^2$.

For Photon during Motion in [MFMF] $≡$ Chaos , collides with other Photons by means of Cross - Product and Produces a constant Work which is stored ***into the Only-Four*** <u>Energy - Geometrical - Shapes</u> , 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 <u>Electromagnetic-Wave</u> , which carries <u>the Energy-conveyer</u>,

i.e. The stored energy in the loop is $→$ $W_1 = v^2 [\frac{h}{2\pi}] = 4\pi^2.r^3.f^2{}_p = k$,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** $→ \{ \bar{c} . \boxed{\bar{f}_n} + \bar{c} . f_n \} ←$ is proved   that ,

1.. Energy-Storage   S $≡ \boxed{\boxed{\oplus ← r → \ominus}} ≡$ **Particle** $[\bar{v} . \boxed{\bar{f}_n}] → [\bar{v} = \bar{c} = \lambda\frac{f}{\Phi}] →$

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

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

3.. Gravitational - constant $G ≡ \Phi^2. [\{\sigma \Phi\} ≡ 2\pi f_P r ≡ w r ≡ \bar{v} ≡ m g = \bar{c} = \frac{2.B}{\pi r^3}]$

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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 →
$\pm \bar{\Lambda}$ = $\bar{p}.r$ = (M.c).r = (M.c). $\sqrt{v^2 + c^2}$ and squaring both sites $[\pm \bar{\Lambda}]^2$ = $p^2.r^2$ = $M^2.c^2.(v^2+c^2)$ = $(M^2.v^2).c^2 + M^2.c^4$ = $(p^2.c^2) + M^2.c^4$ = $[pc]^2 + [m_o.c^2]^2$ or is $E_T = E_R + E_K$ i.e.

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

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

     Preliminaries   :

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

    [A] ds = (AB/ n = ∞) = 0 **[B]**   **[A]**   ds = → = AB / n= 1 **[B]**
    ….....……….……………………….   →→→→→→→→→→→
        Continuous as Points **(.)**   ***Discrete as monads (r ≡ ds = 1 → n)***

 Work done (W) by Impulse (P) on a Virtual displacement (ds > 0) is zero , or
 W = ∫A-B = [P.ds] = 0   → [**ds . (P_A + P_B) = 0**] → P_A ≡ **Points i*n* Space [S]**
   and P_B ≡ Anti-Space [AS] *or* [ds . (PA + 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 → ds = 0 and P = ∞) . [70]

It was shown that **in PNS , v = ∞ , 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 = ∞. 0 **. Straight line AB is discontinuous (** *discrete*) **with dimensional Units ds = AB / n** where **n = 1 → ∞** **, and continuous with points [ds = 0] , (** *This is the Dual Nature of lines in ,* *geometry ,* **as discrete and continuous) .** From definition work **W** = Force **x** D = Displacement ≡ Momentum [mv] **x** Distance [r] ≡ **mv. r** or **W ≡ mv. r** , exists Work where **1...→ r** Becomes from Material-Geometry where the Quantization of Space for **the Rotated Energy case (s = 0 and cos φ = 0), In-Primary-Quaternion** $[s + \bar{v} \nabla i]^{1/w}$ =$e^{-i.(\pi/2+2k\pi).w}$ {for angle **φ = π/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^ - (16,1181) = 1 . 10^{-7} or **r = 1,07.10^{-7} m** r_{min} = **1,07.10^{-7} m** → i.e. r_{min}≡ The minimum Energy-Space-Cave ≡ **Space-Quantum** . Placing the→ r_{min} in the Dynamic-**Space-Energy** relation , g .r ³.$f^2{}_p$= 1 , *when g=1* , then , $f^2{}_p = \frac{1}{r^3}$ = 8,0647139.10^{20} m , f_{min}=**2,839844.10^{10} H** , The *Electron-Nutation-frequency*. **2...→ f =** f_{min}=**2,839844.10^{10} H ≡** The minimum Energy in Cave ≡**The-Energy-Quantum**

From wavelength-relation n λ = 2r = n v/f , exists v = λ f or → $\bar{v}$ = $\bar{c}$ = λ f . and since v = w r = [2π/T].r = 2π.f_1.r , wavelength λ = c T = c /f_1 , and from cave r = n.[λ/2] = n.(c/2f_1) then **v** = 2π.f $_1$[**n c/2f_1**] = **n.π.c ,** or **v = n.π.c** . i.e.→ **The Quantum of velocity is constant c.**

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From Constant-Energy Orbit-relation $\mathbf{k} = [\bar{\mathbf{v}} \times \bar{\mathbf{v}}] . \bar{\mathbf{r}} = v^2 r = (w\,r)^2 . r = [\frac{2\pi}{T} r]^2 . r = \frac{4\pi^2\, r^2}{T^2} r = \frac{4\pi^2\, r^3}{T^2} =$
$4\pi^2 r^3 \mathbf{f}^2_{\mathbf{min}} = [2\pi f.r]^2 . r = [\ \mathbf{n.\pi.c}\ ]^2 . \mathbf{r} \equiv$ **Kepler Universal Laws for** *macrocosm and microcosm* .
Frequency $\to \mathbf{f}_{\mathbf{min}}$, becomes from velocity relation $v = w f. r = 2\pi f. r$, as $\mathbf{f}_{\mathbf{min}} = \frac{v}{2\pi r_{min}}$ or

$$\mathbf{f}_{\mathbf{min}} = \frac{v}{2\pi r_{min}} = \frac{n\pi.c}{2\pi r_{min}} = \frac{n.c}{2.r_{min}} = \frac{2{,}99810^8}{21{,}07.10^{-7}} = 1{,}4009345.10^{14}\ \text{H}$$

From momentum relation $\quad B = m\,r\,v = m\,r^2\,w = m\,r^2\,(2\pi f) = \frac{J.w}{2} = [\frac{\pi r^4}{4}].[2\pi f]$, then the Mass

of the elementary particles is $\mathbf{m} = \frac{\pi.r^2}{4} = \frac{\pi.(1{,}07.10^{-7})^2}{4} = 8{,}992023.10^{-15}\ \text{Kg}\quad$ or ,

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

Planck mass $\mathbf{m} = \frac{\pi^2 r^4 f}{2rv} = \frac{\pi^2 r^3 f}{2c} = \frac{\pi^2 (1{,}07.10^{-7})^3 . 1{,}4009345.10^{14}}{2.2{,}99810^8} = 2{,}8248572.10^{-15}\ \text{Kg} = m_{min}/\pi$

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

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

    From [70] the velocity of Elementary particles is the light velocity-vector . $\bar{c} = \bar{v} = 2\pi r. f_e$
and the frequency $\quad f_e = \frac{\bar{c}}{2\pi.r}$ ....(1) . The Balancing of , Space and Anti-Space in a Rotating
Sub-Space Common circle happens from the $[\pm]$ equilibrium- Rotational-Energy as relation
$\bar{B}\,\bar{w} = L = \frac{1}{2} J_1 w_1^2 + \frac{1}{2} J_2 w_2^2 + \frac{1}{2} J_3 w_3^2$, or A-momentum $\bar{B} = \frac{J.w}{2} = \frac{\pi r^4}{4}[2\pi f] = \frac{\pi^2 r^4}{2}[f]$…(2)
Frequency $\mathbf{f = 2B}\,\frac{1}{\pi^2.r^4} = \frac{2B}{\pi^2.r^4} = \frac{[1+\sqrt{5}].\sigma}{4\pi r} = \frac{\bar{c}}{2\pi.r} = \frac{\Phi.\sigma}{2\pi r}$, or $2\bar{c} = [1 + \sqrt{5}]\sigma$…(3) .A-momentum
$\bar{B} = \frac{[1+\sqrt{5}].\sigma.\pi.r^3}{4} = \frac{\pi r^3 \Phi.\sigma}{2}$ ...(4) , where **Unit-energy-constant** is $\frac{T^2}{a^3} = k = [\frac{4\pi^2}{G.m}]$, or $ka^3 f^2 = 1$
The Rotational energy is $\quad\to E_R = \bar{B}\,.\,\bar{w} = 2L = J.w^2 = J\frac{c^2}{r^2} = [\frac{\pi r^4}{2}]\frac{c^2}{r^2} = \frac{\pi c^2}{2} r^2$ ....(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 $\mathbf{r}$ only since , $\mathbf{c}$, is
constant .**Total-Energy $\to \mathbf{E}_{\mathbf{T}} = E_R + E_K = \frac{\pi c^2}{2} r^2 + \frac{1}{2} m.v^2 = 1{,}4118323.10^{16}.r^2 + \frac{1}{2} m.v^2$** ....(5a)
Since Total-Energy $L = B\,w = \frac{J.w}{2}\,w = \frac{J.w^2}{2}$ then $2L = J.w^2$, and $\bar{B} = r.mv = r\frac{\pi.r^2}{2} 2\pi f.r = \frac{\pi^2 r^4}{1} f$
From momentum relation $\quad \bar{B} = m\,r\,v = m\,r^2\,w = m\,r^2\,(2\pi f) = \frac{J.w}{2} = [\frac{\pi r^4}{4}].[2\pi f]$, then the Mass
of the elementary particles is $\mathbf{m} = \frac{\pi.r^2}{2}$, i.e. is dependent on the radius of cave ,and for Gravity
cave $\mathbf{r} = 10^{-62}$ m , then **Material-Points mass $\to \mathbf{m} = \frac{\pi.10^{-124}}{2} = 1{,}570796.10^{-124}$** kg.

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

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

2b.. In Planck`s Scale , length $\quad r = \mathbf{L_p} = 1{,}616199.10^{-35}$ m velocity $\mathbf{v = c}$:

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

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From velocity relation $c = w\,r = 2\pi r\,f$, frequency $f = \dfrac{c}{2\pi r} = \dfrac{2{,}998\,10^8}{2\pi.1{,}616199.10^{-35}} = 2{,}95236210^{42}$ H

and Period $T = \dfrac{2\pi r}{c} = 3,3871185.10^{-43}$ s . **From Angular momentum** $\ \bar{B} = r\,m\,v = \dfrac{\pi^2 r^4}{1}\,f$

then mass $\ \ m = \dfrac{\pi^2 r^4 f}{rv} = \dfrac{\pi^2 r^4 f}{2\pi r^2 f} = \dfrac{\pi.r^2}{2} = \dfrac{\pi.(1{,}616199.10^{-35})^2}{2} = 4,1030756.10^{-70}$ Kg ,

Stress $\boldsymbol{\sigma}$ from above equation $f_p = \dfrac{n\sigma.\Phi}{2\pi r}$ is $\ \ \sigma = \dfrac{2\pi r f}{(n)\Phi} = \dfrac{2\pi r f}{1.\Phi} = \dfrac{2\pi.1{,}616199.10^{-35}.2{,}95236210^{42}}{1{,}6180339} =$

$= 1,846462.10^8$ t/m2 $= 1,846462.10^{11}$ Kg/m2 , and Angular velocity $\ |w| = \dfrac{\sigma}{2r}[\,1+\sqrt{5}\,] =$

$\left(\dfrac{1{,}846462.10^{11}}{2.1{,}616199.10^{-35}.}\right).1{,}6180339 = 1.5007013.10^{46}$, or $|w| = 1,5.10^{46}$ rad/sec , and the constant

figure of Energy is that of Stress $\boldsymbol{\sigma} = 1,846462.10^{11}$ Kg/m2 $= 1,846462.10^{11}$ Joule .

Velocities in caves become from equation $\mathbf{v^2} = \dfrac{2}{m}\left[E - \left\{\dfrac{k}{r} + \dfrac{L^2}{2m\,r^2}\right\}\right] = [4\pi^2.\mathbf{k}].\left[\dfrac{1+e}{r}\right]$ where

constant , $k = a^3 f_p{}^2$, **Is the Energy** executed by the radius , $\mathbf{r}$ = Focus-Planet , in a second ,

and which is **The Quantum of Energy in Cave-Orbit** . From $\ E_T = E_K + E_R$, then the

Total energy in cave is $E = \dfrac{mv^2}{2} + \left\{\dfrac{k}{r} + \dfrac{L^2}{2m\,r^2}\right\}$ where $L = S$ = the Spin of Particles .

From **Mechanics** In the One degree of freedom Vibration of a mass , $\mathbf{m}$, and Stiffness , $\mathbf{k}$, in a

distance , $\mathbf{a}$, is for , $w^2 = [\,k/m\,]$ from equation , $m\,\ddot{x} + w^2 x = 0$, with solution $\rightarrow$ the Period

$T = 2\pi.\sqrt[2]{\dfrac{m}{k}}$, frequency $\mathbf{f_H} = \dfrac{1}{2\pi}\sqrt[2]{\dfrac{k}{m}}$, and Energy $E = h\,f_H$, where , $\mathbf{h}$ = Planck`s constant ,and

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

From Hydrogen Orbit-motion , $r = \sqrt[3]{\dfrac{1}{k.f^2}}$, or $k.f^2.r^3 = 1$ and Constant-Unit-Energy $\mathbf{k} = \dfrac{1}{f^2.\,r^3}$

which **Energy** $\mathbf{k}$, is the , **Quantum of Energy** , in the first Planck-length-cave .

For **Black-Holes** , the Total-Energy $L = \bar{B}\,\bar{w} = \dfrac{J.w}{2}\,w = \dfrac{\pi r^4}{2}[2\pi f]^2 = \mathbf{2\pi^3 r^4 f^2} = r\,mv = r\,m.wr$

and mass $\mathbf{m} = \dfrac{2\pi^3 r^4 f^2}{r^2 2\pi f} = \dfrac{\pi^2 r^2}{1}\mathbf{f} = \left[\dfrac{\pi r.v}{2}\right]\mathbf{v}$,while **Angular-Momentum** $B = r.mv = r\left[\dfrac{\pi rv}{2}\right]v = \dfrac{\pi\,r^2}{2}\,\mathbf{v^2}$

$= \dfrac{\pi\,r^2}{2}\mathbf{v^2} = \dfrac{\pi r^3}{2}[n.\pi.c]^2 = \dfrac{\pi^3 r^3}{2}\,\mathbf{c^2}$, or Black-Hole-Energy $\rightarrow\ \mathbf{B_E = 2.\pi^5.r^3.f^2 = (\pi r)^3.w^2} \leftarrow$

i.e. **Velocity in Black-Holes is Related to Cave** , $\mathbf{r^3}$, **and Energy w² times of light velocity**.
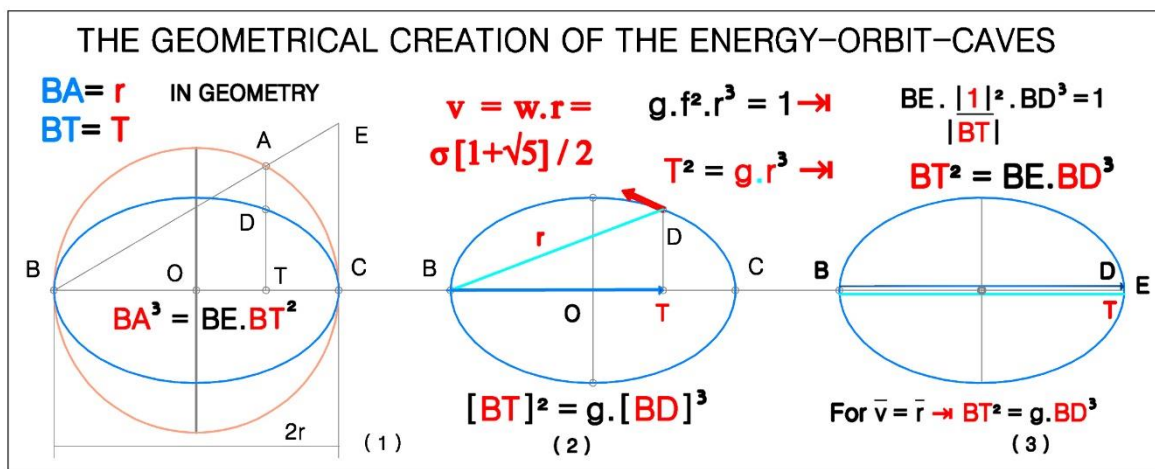
C... THE ENERGY CAVES , AND E - GEOMETRY :

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

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

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

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

To Proof :

The Right-angled-Triangle ABC at A = 90⁰ , lies on [O,OC=OA] circle and CE is the tangent at C . Since angle BAC = 90⁰ of triangle CAE , then angle < CAE = 90⁰ .

Since BA ⊥ AC and AT⊥ BC then , the **Power of Point B on ACT triangle** is BA² = BT.BC

Since BC ⊥ EC then , the **Power of Point B on ACE triangle** is BC² = BA.BE   …..(2)

Squaring the first relation and substituting (2) then [BA²]² = BT².(BC² = BA.BE) and

$BA^4 = BT^2 \cdot BA.BE$, or $\rightarrow$ $\mathbf{BA^3 = BT^2 \cdot BE}$ or $\rightarrow |\frac{1}{BE}| \cdot BA^3 \cdot |\frac{1}{BT}|^2 = 1$ o.ε.δ ≡ q.e.d ...(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 ⊥ y** Plane and follow the Lissajous Shapes , [83] , where for ,

   a.. Difference of Phase $d_\varphi = 90⁰$ emission is → The Eight-Shapes ∞ .

   b.. Difference of Phase $d_\varphi = 0⁰$ emission is → The Ellipse-Shapes ∝ .

   c.. Difference of Phase $d_\varphi = 45⁰$ emission is → The Double-Saddle-Shapes . ʒ , ᙍ .

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

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

$e^{-i.(\pi/2+2k\pi).w} = e^{-i.(\pi/2+2k\pi).b} = e^{-i.(5\pi/2).b} = e^{-i.(5\pi/2).10}$ [86] …... (2)

Equation (2) fits , *as minimum cave* , in the Planck length and is $L_p = e^{-i.(5\pi/2).10}$ .....(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 → $z^{1/w} = (s + \bar{v} \nabla i)^{1/w} = |zo|^{-w}.[\cos.(\varphi + k\pi)/w + i.\sin.(\varphi + k\pi)/w]$

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

$(\bar{v} \nabla i) \neq 0$, where φ = π /2 and then , $z^{1/w} = |zo|^{-w} \cdot e^{i.(\varphi+k\pi)/w} = e^{-i.(\frac{\pi}{2}+k\pi).10}$ 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 $z^{1/w} = |zo|^{-w}$. Lv = E-Monad.

Extending quantization of Energy according to exponential formula→ $L_v = e^{-i.(5\pi/2).10}$ then

L_v on the decimal base   b = 10   and for   k = ± 0 → ± ∞ , are the **Energy caves** as ,

For base   e = 2,71828 and   base   b = 10   then e^ - (13,8155) = **1 .10⁻⁶**   **m**

For base   **e = 2,71828** and k = 0   **Lv = e^i.(± π/2)b** then e^ (-15,7079) = **1,78118 .10⁻⁷ m**

For base   e = 2,71828 and   base   b = 10   then e^ - (16,1181) = 1 .10⁻⁷ or **r = 1,07.10⁻⁷** m.

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Placing **r** , in the Dynamic-Space-Energy relation when g =1 then $r^3 . f^2{}_p = 1$ and $f^2{}_p = \frac{1}{r^3}$ = $8{,}0647139.10^{20}$ m and occurs the , **minimum frequency** $f_m = 2{,}839844. 10^{10}$ **H** …(4)

For Electron radius $r_e = 5{,}82.10^{-16}$ m , Weight of Electron Q = m_e g = $9{,}11.10^{-31} . 9{,}808$ = $8{,}93.10^{-30}$ Kg , the Moment of Inertia-Disk $J_e = J_3 = [\pi a^4/2] = \pi/2 [5{,}8. 10^{-16}]^4 =$ $1{,}777591.10^{-61}$ m⁴, Angular velocity $w_e = \frac{v}{r_N} = \frac{c}{1836} = \frac{3.10^8.}{1836} = 1{,}633.10^5$ m/s because of

masses analogy and **Electron-Nutation-frequency** $f_N = \frac{s\,Q}{2\pi . J_3\, w} = \frac{5{,}82.10^{-16} . \; 8{,}93.10^{-30}}{2\pi 1{,}777591.10^{-61} . 1{,}633.10^5} =$

$$f_N = f_R = 2{,}8398447.10^{10}\ s^{-1} \quad ....(23)$$

The Quantum-Energy E = h f_N = $6{,}62606957.10^{-34}$. $2{,}839844. 10^{10}$ H/ $1{,}6022. 10^{-19}$ eV= = $1{,}17444789844.10^{-4}$ eV , is a small Quantity of Quantum-Energy .
Since this minimum frequency $f_N = f_R = 2{,}8398447.10^{10}\ s^{-1}$ exists in all Atoms , *due to the Hydrogen first cave*, is the **Resonance-frequency** between **Atoms and Molecules** in Cosmos.

i.e.   **THE SPACE** –{ $r_{min} = 1{,}07.10^{-7}$ m } - **ENERGY** – { $f_m = 2{,}839844. 10^{10}$ **H** } IN **QUANTIZED-CAVE** { $g .r^3. f^2{}_R = 1$ } OF **SPACES** { $[s + \bar{v}\,\nabla i]^{1/w} = e^{-i\left(\frac{\pi}{2} + 2k\pi\right).w} =$ = $e^{-i.\left(\frac{5\pi}{2}\right).10}$ } , CONSISTS   The min. **QUANTUM-ENERGY** → **E = 1,1745 eV.**

7... For Energy-Cave equation → $e^{-i.(5\pi/2).10}$ **Formatters min-cave** → $r = 1{,}07.10^{-7}$ m which in turn by the **Unit-Energy** Orbit-Surface-U-Planck-relation , g = 1 ≈ g , and from ,

8… Unit-Energy-Mould $g.r^3. f^2{}_R = 1$ or $f^2{}_R = \frac{1}{r^3}$ **creates** the minimum frequencies , *Energy* , $f_R = 2{,}8398447.10^{10}$ H , between , $1{,}330265.10^{10}$ H and $4{,}1701097.10^{10}$ 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 $f_N = f_R = g\left[\frac{s.m_e.}{2\pi.J_3\,w}\right]$ 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   → $\langle r_{min} | \cup\cup | f_m \rangle \leftrightarrow [f_N] \leftarrow$ 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 .mv =k**= Constant-Area
   2. The **Unit-Cave-Energy Quantization** as Work and is → $W = 4\pi^2.r^3.f^2{}_p = 1$

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

   4. Charges $\frac{1}{Q_T} = \frac{1}{q_P} + \frac{1}{q_e}$ from Lorentz force, F=qE+qvB , in Magnetic-Field $\bar{B}_F = |\frac{2\pi.M_T}{Q_T}| f$

   5. The Resonance Energy $E = \frac{1}{a^3}\left[\frac{4\pi^2}{c^2} + \frac{S^2}{2m}\right]$ **or** $E = \frac{\pi}{g\,r^2}[g^2\,r + 2. S^2.f^2]$ 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 $a = \sqrt[3]{\frac{1}{g.f^2}} = 2{,}1127839.10^{-11}$ m, issues E=hf₁ =13,6 eV/h

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

<div align="center">10</div>

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Electron-Nutation is measured as → k = $\frac{2,1145016.10^{-11}(2,998.10^8)^2}{4\pi^2}$ = 4,81406.10^4 m^3/ s^2

c.. For any Material-Point occupying only **Spin ≡ L** , then $\frac{k}{r}$ [1+2π²mk(1+e)] = 0   or

1+2π²mk(1+e) = 0 and for **Electron**   k = - $\frac{1}{2\pi^2.m(1+e)}$ = - $\frac{1}{(1+e)}$ [6,9999. 10^{29}] N   and

Rotating-Energy due to ***Electron-Spin*** is E = $\frac{S^2}{2m\,r^3}$ = $\frac{(5,691952.10^{-34})^2\ Kg.s/m}{2.7,2373149.10^{-32}(2,3762992.10^{-16})^3}$ =

16,68059 J which is a small amount of energy .

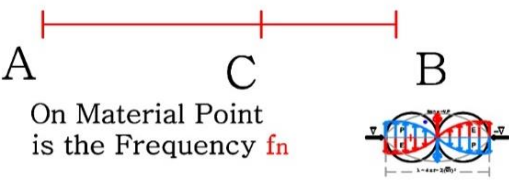***Rotating-Energy*** due to a ***Black Hole-Spin*** is E = $\frac{S^2}{2m\,r^3}$ = $\frac{(1,152.10^{66})^2}{2.1,6.10^{42}(2,4.10^{15})^2}$= 2,604.10^{43} J

equal to the ***Energy of an Electromagnetic gamma-ray-burst*** → i.e. energy-constant **k** , is

the Regulator of Energy as equation , **k** = $\frac{r.v^2}{4\pi^2}$ = $\frac{(2,4.10^{15}).9.10^{16}}{4,\pi^2}$ = 5,47.10^{30} N →

1c...   The Golden Ratio Pattern Φ Properties .

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 = $\frac{AB}{2}$ [√5+1]   …..(1)

Proof :

According to the definition of Mean ratio exists AB / AC = AC / CB , or AC² =AB.CB

= AB.[AB-AC] = AC² = - AC.(AB) + AB² → AC² +AC (AB) - AB² = 0   …...(2)

Solving the second degree equation (2)

then **AC = $\frac{AB}{2}$ [√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 σ1,σ2 , and Shear stresses **τ$_{12}$** are as equation   σ = $\sqrt{(σ1 - σ2)^2 + 4\,τ_{12}}$, and

σ1,2 = (σ1+σ2)/2 ± (½)$\sqrt{(σ1 - σ2)^2 + 4\,τ_{yz}{}^2}$, where → tanθ = 2. τ$_{12}$ / (σ1-σ2) .. (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**   σ2 = 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   σ2 = 0   and τ$_{12}$ = σ1 , then equation (3) becomes ,

→   **σ1,2 = σ1 /2 ± (½).$\sqrt{σ1^2 + 4.σ1^2}$ = $\frac{σ1}{2}$.[1± (√5)] = $\frac{σ}{2}$.[1± (√5)]**   …..... (4)

Equation (4) denotes the way that Stresses σ**1,2** are shaped on any Volume according to

the Principal Stress **σ** , and which ***is the Golden-ratio***   Φ = $\frac{σ}{2}$ **[1 ± (√5)]**   *of Stress* **σ** .

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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 $\Phi = 1 + \dfrac{1}{\Phi} = 1, 6180339887$:   Proof ,

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

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

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

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

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

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

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

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

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

Equation (7) is also a very Special property of the Golden ratio because , *according to Euclid* , A straight line AB is said to have been cut in Extreme and Mean ratio when as the whole line is to the greater segment AB / AC , so is the greater to the lesser AC / CB , **and according to Markos ,** Since **frequency in Material-point becomes** from Equilibrium of $\rightarrow$ **The Two-Opposite-Rotational-Energies** $[\pm]$ $\leftarrow$ as relation $\overline{B}\,\overline{w} = L = \dfrac{1}{2}J_1w_1^2 + \dfrac{1}{2}J_2w_2^2 + \dfrac{1}{2}J_3w_3^2$, or Angular-momentum $B \equiv \pm$ Spin S as ,

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

$\overline{\mathbf{B}} = \dfrac{4r.L}{(1+\sqrt{5}).\sigma} = \dfrac{2r.[\,L=hf\,]}{(1+\sqrt{5}).\sigma} = \dfrac{hf}{2\pi f} = [\dfrac{h}{2\pi}] \equiv \textbf{SPIN}$, where L = h f = Constant

and Frequency related to Φ is $\rightarrow$ $\mathbf{f_n} = [\dfrac{2}{\pi^2 r^4}].\overline{B} \equiv [\dfrac{1+\sqrt{5}}{2}]\dfrac{\sigma}{2\pi r} \equiv [\dfrac{\Phi\,\sigma}{2\pi\,r}]$ ...(7a) $\rightarrow$

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

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another Particle or particles then Produces another monad as $\rightarrow$ **1** $\equiv$ *New Quaternion* and the first continuous to be of the same Identity , *frequency* $\mathbf{f_n}$, as before and from Euler`s , *rigid body dynamics work* $W = 2L = \overline{B} \cdot \overline{w} = J \cdot w^2 \equiv h \cdot \mathbf{f_n} \leftarrow$ 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 energy on** *all of them and everything in this World .* The How is in [86]

2c... The STPL Pattern of Particles-Interactions and Forces-Exchanged :
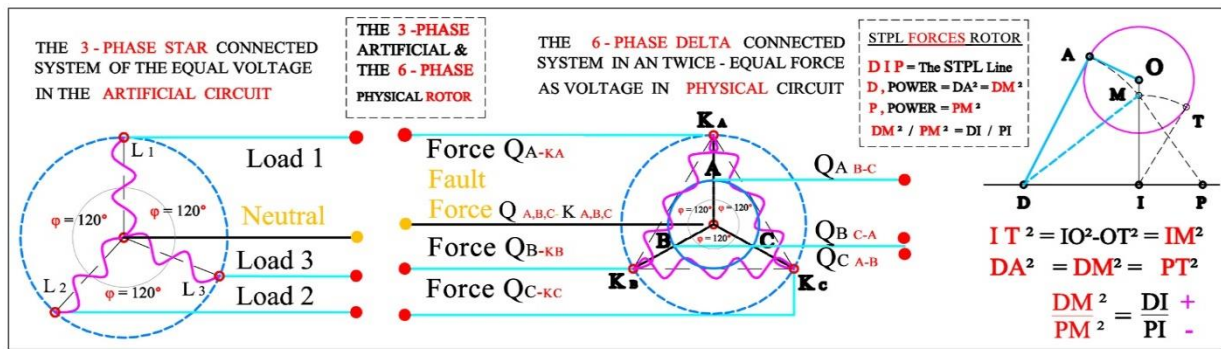
Figure – 3 - : The Physical explanation of **The Cosmic-Particles and Forces** in Universe :
   In figure -3- , [O , OA] is the Common-Circle , DP the STPL line , DA tangent to the circle , OI is Perpendicular to DP , IT = IM is the tangent to the circle and P , any other Point on line .To show 1) DM = DA , 2) PM = PM` where PM` is the tangent from P .

Proof :

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

From the right-angled-triangles IMD , IOD and Pythagoras theorem then $DM^2 = DI^2 + MI^2$
   and issues $DO^2 = DI^2 + OI^2$, or $\rightarrow$

$DO^2 = DM^2 - MI^2 + OI^2 = DM^2 + [OI^2 - MI^2] = DM^2 + [OI^2 - IT^2] = \mathbf{DM^2 + OT^2}$ **i.e.**

$\mathbf{DM^2} = DO^2 - OT^2 = DO^2 - OA^2 = \mathbf{DA^2}$, or **DM = DA** , **meaning that the**

Tangent DA of any Point **D or P** on STPL is always equal to the segment **DM or PM** .

For point P issues PM = PM ` where angle < PM`O = 90⁰

Remarks :

1.. The Tangent DA from Point P denotes the , Power of Point D to circle [O , OA = OT] ,

   or $P_O^D = DA^2 = MD^2$, and $P_O^P = MP^2 = PM`^2$ (1)

2.. On triangle DMP where MI is the height , issues Pythagoras relation $\dfrac{MD^2}{MP^2} = \dfrac{DI}{PI} = \dfrac{P_O^D}{P_O^P}$ …(2)

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

3.. Considering the Power of Any- Point be the Charge of the Point then the **Charge of Point D** is $\rightarrow$ Charge $_D$ $= + \overrightarrow{DI}$, and **Charge of Point P** is $\rightarrow$ Charge $_P$ $= - \overleftarrow{PI}$. i.e.
   The Physical Interpretation of Point-Charge is the Positive-Linear-Vector ,+ $\overrightarrow{DI}$, and the Negative-Linear-Vector , - $\overleftarrow{PI}$. which are the Interactions from the two Points in loop DP.

4.. In Material-Geometry the [⊕]Charge Attacks [⊖] Charge and are created the Interactions between Forces , and because Desargues **D** , Pascal **P** , Points occupy a different Voltage , therefore D , P Points Exchange Forces in the Range of Standing-Wave DP .
   It is proved that Charges [⊕]←a→[⊖] exist in Standing-Wave as the Four-Forces of SM.

Figure -4- : The Energy-Space , *Stress-Strain* in wavelength $\lambda = 2\pi r$, of a moving Photon :

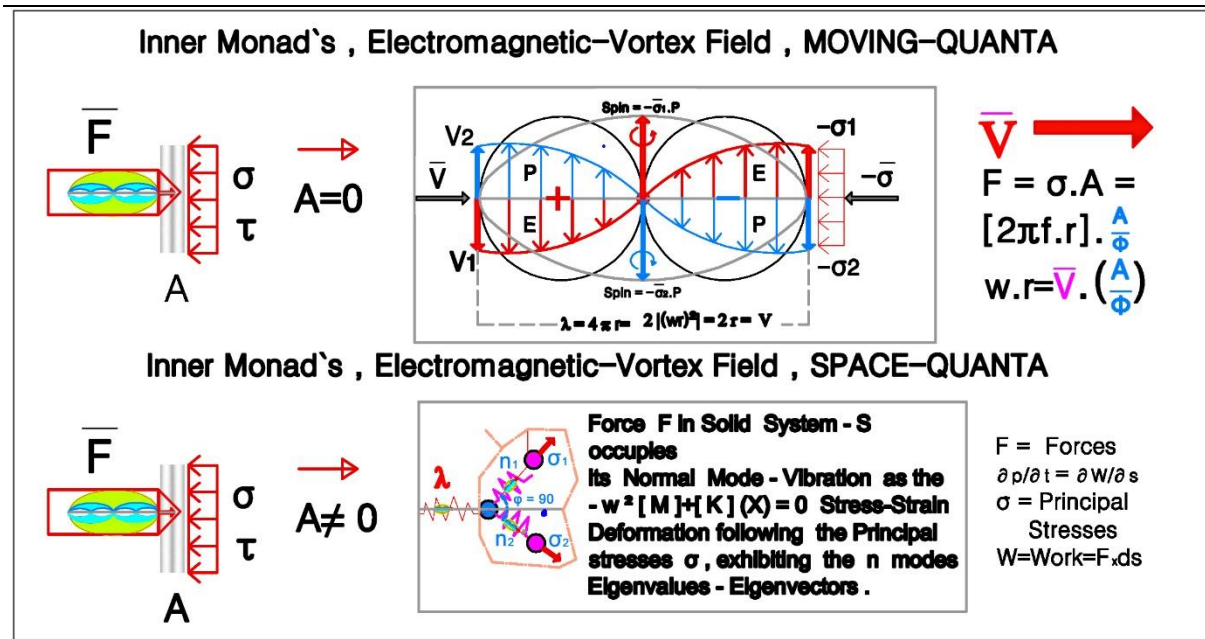**c... The Forces , Stresses , velocities and   Spin Relations   :**

1.. For area A = 0 , *the acting Force* **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 $\bar{v}$. The force $F = \sigma.A \rightarrow \bar{p}$ vector $= M.\bar{v} = (m\lambda).\bar{v} = [m\,c\,.T]\,.\,\bar{v} = [m\,c\,/\,f)\,.\,\bar{v} = [m\,/\,f]\,.c.\bar{v}$, *i.e. Force* **F → *becomes a Velocity-Vector*** $\bar{v}$ **or , a Force as Stress** **σ** **, enters in Space** Φ **as** [σΦ] **and becomes frequency** $\bar{f} = \frac{\sigma.\Phi.r}{2\pi.r_n}$ **and exists** Force $F = \boldsymbol{\sigma}\,.A = [\frac{2\pi rf}{\Phi}].A = w\,r.[\frac{A}{\Phi}] = \bar{v}\,[\frac{A}{\Phi}]$, 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 $\mu.\nabla^2 u + (\lambda+\mu).\nabla.[\nabla.u] = 0$

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* $\bar{v}$, this velocity-vector $\bar{v}$ is entering any trough , *Potential* , and transformed to an Energy-Rim , as these are the Orbits of Electrons . Because Photon is one of the moving-energy-stores , when it enters a cave $L_s < L_P$, then the cave becomes an Discrete Energy-Packet which is the Rim L_v .

4.. For area 0 = < A = < 0 , ***The Extreme case , where surface is interchanged as line or as line-segment , and*** *is the same as the infinite small ,* **ds** *,in Calculus ,where stresses* σ2 = 0 and τ_{12} are very small , ***it is the equation of stresses*** σ1,2 , and from Cauchy $\sigma 1\,/\,2 = \pm\,(\,½\,)\,.\sqrt{\sigma 1^2 + 4.\sigma 1^2} = \boldsymbol{\sigma_1}.[1\pm(\sqrt{5})]\,/\,2$ **,** 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 **g** as f_n , acting on Spin as $\mathbf{S_{PA}}.r^4$. The Proof **Centripetal Force** $F_c = mv^2/r = 1.(wr)^2/r = w^2.\,r = \pm\,\boldsymbol{\sigma} = (2\pi.f_1)^2.\,r = \sigma_1.[1\pm(\sqrt{5})]\,/\,2$ and $w^1 = f_n = \frac{[(1+\sqrt{5})\sigma]}{4\pi\,r}$. From Kinetic energy $= E = \frac{mv^2}{2} = \frac{1.w^2.r^2}{2} = h\,f$, then $w^2 = \frac{2\,E}{r^2}$ and $E = \frac{[(1+\sqrt{5})\sigma r]^2}{2}$, $f_n = \frac{[(1+\sqrt{5})\sigma]}{4\pi r}$ and $2.\bar{B} = \pi r^3\Phi\sigma$, then **force** f_n orients **Spin** $\bar{S}$ to $\bar{B}$ as , $\rightarrow \bar{g} = f_n\,x\,\bar{B} = |f_n|x|\bar{B}|.\sin\theta = \frac{[(1+\sqrt{5})\sigma]}{4\pi r}\,\pi r^3\Phi\sigma\,.1 = \frac{[\sigma^2 r^2(1+\sqrt{5})\Phi]}{8} = [\frac{\sigma.r.\Phi}{2}]^2$ …..(g)

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Equation (g) which is Gravity constant **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 $G = k_E\, g = g.\,[\,k_R\, g_R]$ 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 $\boldsymbol{\sigma} = \dfrac{\mathbf{F}}{\mathbf{A}} = \dfrac{2\pi r f}{\boldsymbol{\Phi}} = \dfrac{w\,r}{\boldsymbol{\Phi}} = \dfrac{\mathbf{v}}{\boldsymbol{\Phi}}$, velocity vector in a Unit-Space **Φ** . It was shown that the first Path is Gravity **g** and Original Field-lines of Force , G , are distorted by these *Charges , Local-coefficients , the Layers* following Newton`s laws **.** The Original Field-lines terminate at the surface on one side of the Medium ,and new field lines originate from the other side of it . It was shown that the Momentum vector ,$\overline{\mathbf{B}}$, is equal to spin **S** , b*ecause 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 { $v = n.\pi.c$ } 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 $v = w.r = (2\pi / T).r = 2\pi.f_1.\, r$, of fundamental
   frequency f_1 , of wavelength $\lambda = c.T = c / f_1$, and cave $r = n.[\lambda/2]$, then
   $r = n.(c /2f_1)$ and $v = 2\pi.f_1 . [n.c / 2f_1] = \mathbf{n.\pi.c}$ or $\mathbf{v = n.\pi.c}$ …….(π)

Equation (π) shows that velocities in lobes are , **n.π** 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 ,$v = n.\pi.\mathbf{c}$, 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 → Explain How the Planets move around the Sun But NOT the WHY.

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

Markos-Spaces → Explain the WHY by filling the Gap with a **Double-Ocean** of the **Pointy-Spinning- Material-Points** , *becoming from the* **Stationary- Material-Points** , *Photons or Electrons* , *and from the* **moving-Energy-Storages ,** *the Duality-Photons* , $\overline{v} . [\; \boxed{\overline{f_n}} + f_n\;] \equiv |\dfrac{v}{\pi^2.r^4{}_n}|.\boxed{\overline{B_n}} + |\dfrac{v}{\pi^2.r^4{}_n}|\; f_n$, of the two frequencies which Orientate and Re-orientate the Stationary-Spins and explain the HOW and the WHY all motions follow the **ubiquity** of the **Electromagnetism** , starting from the Primary-Material-Points , the *Photons* ,which through the **Golden-Ratio-frequency-Growth** effect and conserve the Whole of the Natural-World from microcosm to macrocosm . The Recent Annex relating the Greatest-Pressure-Level denotes the Pressure in the filling Gap of Space-Energy reality. It is done an effort of the Cosmic-Particles-Origination .

5.. The Four Forces : Material-Point is the **Attack** of the [$\oplus$] → to [$\ominus$] and from a different
   Voltage as **Forces** $\equiv \sum_{-}^{+} = + - \,, \sum_{+}^{+} = + + , \sum_{-}^{-} = - - , \sum_{+}^{+++} = + + , \sum_{-}^{---} = - - - -$
   and happening in *Standing-Wave-caves* and in *Travelling-Wave-caves ,* as **motion** .
   From above equation (4) is seen that , Since Particles are Waves therefore occupy the
   Energy-Storages either Moving or in Not-Moving .

D.. THE PHOTONS :

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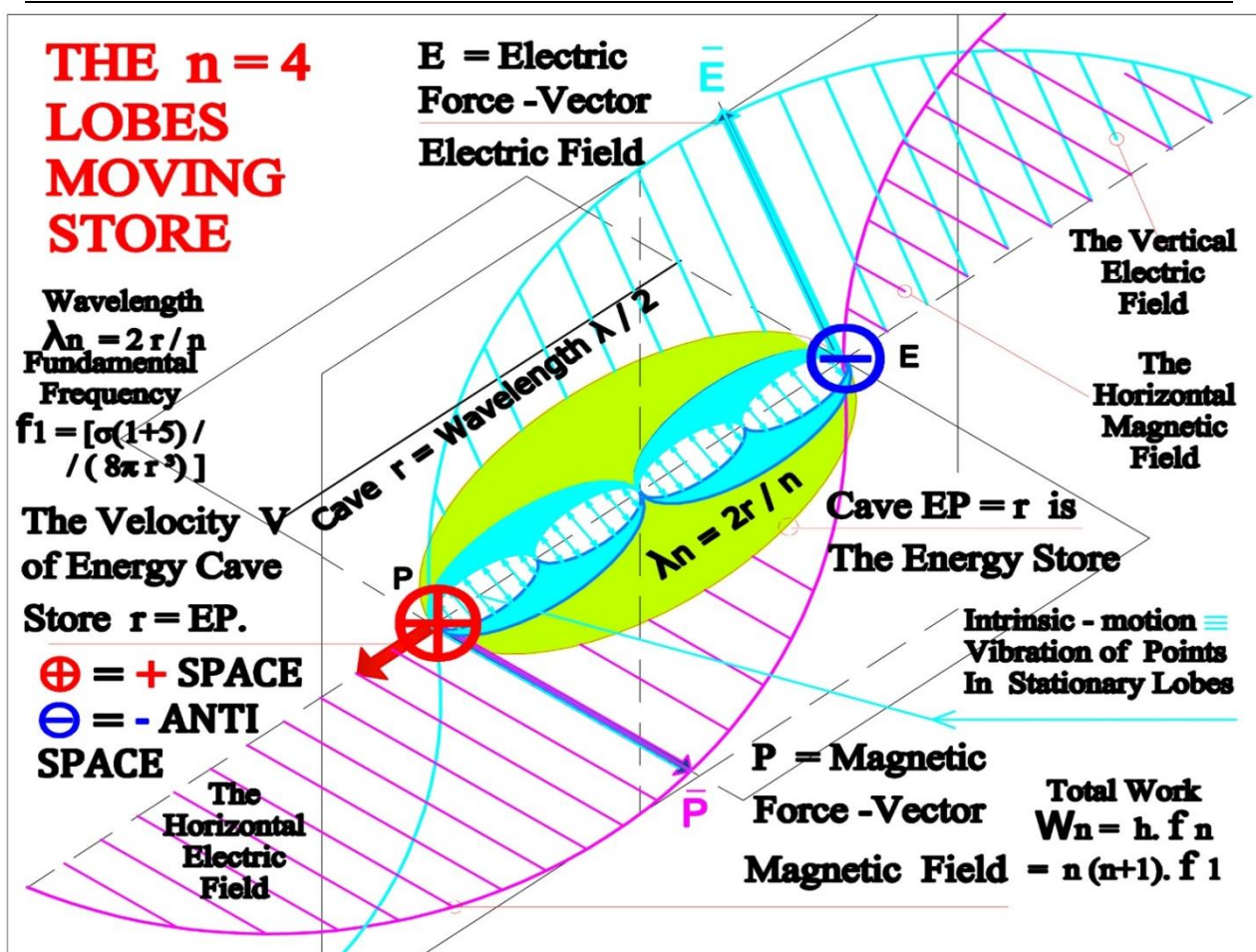
Figure - 5 - : The Propagation of Photon-Electromagnetic-Field-Storage EP :

In figure $r = \lambda/2 = EP$ is the **Energy-Storage-monad** $[S \equiv EM\text{-}R \equiv f_{1=N}, f_2, f_3, f_D, ,f_n = w^2]$
Propagating with $\bar{v} = \lambda_n.f_n = \bar{c}.[\frac{\sigma}{2\pi r} + \frac{\sigma\Phi}{2\pi r}] = \frac{\bar{c}.\sigma}{2\pi r} + \frac{\bar{c}.\sigma\Phi}{2\pi r} = \{\bar{c}.\boxed{\bar{f}_n} + \bar{c}.f_n\}$, where for

frequency $f_p = \frac{\bar{c}.\sigma}{2\pi r} = \frac{\sigma^2\Phi}{2\pi r} = f.\Phi = \frac{2n.\bar{B}}{\pi^2 r^4} = \frac{\sigma\Phi^2}{2\pi r}$, **as Particle**, where velocity $\bar{v} = w.r$, follows

the **Breakage-Principle** which is Quaternion $\bar{z} = [s + \bar{v} \nabla i$ or $\rightarrow s^2 - |\bar{s}|^2 + 2|s|^2.\nabla i \leftarrow \equiv$

$[\varepsilon E^2 + \mu B^2]$ **≡ The Energy-monad, EP, and as a Wave as**, $f_p = \frac{\bar{c}.\sigma\Phi}{2\pi r} = \frac{\sigma\Phi^3}{2\pi r} \equiv \frac{2.\bar{B}}{\pi^2 r^4}$

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

Energy (+ ↔ -) ≡ Motion in **n** lobes → 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 $[E^2 + H^2] = 2.(2r).c.\sin 2[\varphi \equiv \frac{\bar{B}}{\Phi}]$, the **Wave-Photon**.
Energy-Storage-monads are consisted of the above **Three-constituents** all-together,

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

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

for $\lambda_n = 2r$, then $v_n = v_1$, and then **n . λ_n = 2.r** or

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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 $\rightarrow \{ \bar{c} . \boxed{\bar{f}_n} + \bar{c} . f_n \}$

From Mechanics , the *Only - Possible motions* are , *the* **Periodic-Excitation** , and *the* **Revolving-Motion** therefore all *Moving-Energy- Stores travel* as *a Wave and* **Not** as a *Particle* . The **n** , **Energy-Tanks** , the N Antinodes in its moving Store $2\lambda = r = h / p$ $\equiv [f_1 , f_2 , f_n = w^2 \equiv n$ lobes$]$ follows the *Stationary-Wave-Nodes-Principle,*   i.e. **The Glue-Bond-Stress** *Rotation of opposites on* **Small - circles** *creates ,* n ,**Integer number of lobes ,** *which is the Wave-Nodes-Principle of the moving-energy-stores*, one of which is the Photon .   The {n} **Energy - Storages** of The Moving – Monads . Figure -4- In Electromagnetic field , EM-field , **Magnetic-field is the Storage in which Energy** $\equiv$ **motion is Stored , and Electric-field is the Force ,** *The Energy* , **which Pushes the [Energy-Store- Basket $\equiv$ 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 $= h.f_1$

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* $\rightarrow$ Loop-Total-Work , W $= [\frac{4\pi r^2 f1}{3}].n.(n+1)$

or W $= \frac{80.\pi r^2 f1}{3}$, and from Photon $\rightarrow \{ \bar{c} . \boxed{\bar{f}_n} + \bar{c} . f_n \} \leftarrow v_4 = \lambda_4.f_4 = 4.\lambda_4.f_0$,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 $\oplus$ constituent around the $\ominus$ 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 ,** $x = v_0 .\sin wt = A . \sin [\sqrt{(a/Am).t} + \pi/2]$ ……..(1)   where

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

b.. Angular velocity $\rightarrow |\bar{w}| = \frac{\sigma}{2r} [1+\sqrt{5}] = \frac{\sigma\Phi}{r}$, 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 $\rightarrow$ $\partial E/\partial t$, $\partial H/\partial t$ $\leftarrow$ *and when reduced to one line as ,* **E = H c** $E \rightarrow \partial E/\partial t \rightarrow H \rightarrow /\partial t \rightarrow H$.

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

$[E^2 + H^2] = 2.(2r).c.\sin 2\varphi , [\varphi \equiv \frac{\bar{B}}{\Phi}]$ …..(2) on-where exists the **Skin-effect . [68-70]** This happens because of the difference in density **on Stress-common-curve ,** $\rho = \sigma$ instead

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– 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**$[\boldsymbol{\varphi} \equiv \frac{\bar{B}}{\Phi}]$, of wavelength λ , ***Outward*** λ , as ***The***

Outer Electromagnetic-Wave $\rightarrow$ {**The-Wave** $\equiv [\varepsilon E^2 + \mu B^2] = 2.\lambda c.sin.2\varphi$} $\leftarrow$ 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 $\boldsymbol{\lambda_n}$, is
created from all $\pm$ 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] = $[MFMF] $\equiv$ ***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 $\bar{\mathbf{v}}$, 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$\bar{v}$. $\bar{r}$ = v².r ,** and becomes from relation
$n \lambda = 2r$, issuing $2r = n v / f$, and is $v = \lambda f$ or $\rightarrow \bar{\mathbf{v}} = \bar{\mathbf{c}} = \lambda f$.

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

For Unit-Stress-Gravity **g** , as $k = E = \frac{T^2}{a^3} = g = \frac{1}{f^2. a^3}$ and for $a = r$ then $g .r^3.\mathbf{f^2_p} = 1$,
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 <u>Energy</u> and
<u>Geometrical - Shapes</u> ,** *of the motion which are the* **Conic-Sections** . *The Interior motion
is kept in its Wavelength-Storage* **2r = n λ** , *and the Linear motion is continued by the
Propagating* **Electromagnetic - Wave** , *the* <u>**Energy-Store-Conveyer**</u> .

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.(c/λ) , 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 [$\oplus \cup \cup \ominus$] 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**

$\mathbf{f_p} = \frac{\sigma = [\sigma\Phi]}{2\pi r} = \frac{(1+\sqrt{5})\sigma}{4\pi r} = \frac{\sigma.\Phi}{2\pi r}$, from Intrinsic **Angular-Momentum-Vector** relation $\bar{B} = \frac{2L}{\bar{w}} =$

$\frac{L}{\pi f} = \pi^2 r^4$. $f = [\frac{h}{2\pi}] =$ **SPIN - S** , of Particles , From $\bar{v} = \frac{G\,\Phi}{A} = \sigma\,\Phi = \bar{c}$ the **Light-Velocity** and

From $a = \sqrt[3]{1/g\,f_R^{\,2}}$ **The-Hydrogen-cave** , and from $E_R = \frac{1}{a^3}[\frac{4\pi^2}{c^2} + \frac{S^2}{2m}]$ the **Atoms-Molecules** .

i.e. Photon is an **Energy-Spring-Store** , **r** ,in a Stationary-wave of wavelength **n λ = 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 [$\bar{v}$ $\boxed{\bar{f}_n}$]$\rightarrow \lambda$=2r/n** , and [+] Electric-field as Space-motion and [-] Magnetic-field as Anti-Space-Store [$\bar{v}$ f_n] .[70]

1d... The Duality   Of Isochronous Photons
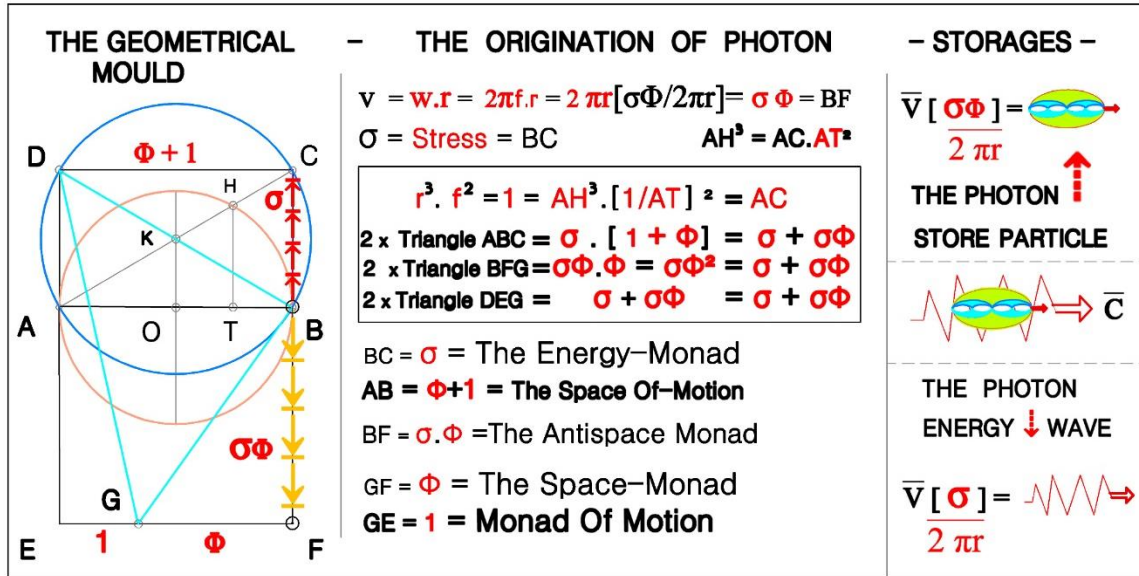
Figure – 6 - : The Material-Geometry **Mechanism-of-motion** in Photons-Cave   :

FROM MECHANICS **The Eternal-Rotation** of the Two Elements , [$\oplus\cup\cup\ominus$] , Up

or Down in the Material-Point circles ,Originates the Spins , $\pm\frac{1}{2}$, $\pm\,1$, $\mp\frac{1}{2}$, 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 σ1,2 , is $\sigma 1/2 = \pm(\frac{1}{2})\cdot\sqrt{\sigma 1^2 + 4.\sigma 1^2}$ = **$\sigma_1.[1\pm(\sqrt{5})]/2 = \sigma.\Phi$** which is the *Golden-ratio-Pattern* of the Material-Point as Type of a vanishing-shear due to layers laterally shifted . This minimum quantized energy 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 $S_{PA}.r^4$. The Centripetal Force is equal to Stress σ , so $F_c = mv^2/r = 1.(wr)^2/r = w^2.\,r = \pm\,\sigma = (2\pi.f_1)^2.\,r = \sigma_1.[1\pm(\sqrt{5})]/2 = \Phi.\sigma$, and since $m = \frac{\sigma}{w^2.r} = \frac{\sigma}{w.c} = \frac{\bar{B}}{r.c}$ then , $\pm\,\sigma = \frac{c.\bar{B}}{r^2}$ which is a relation between Stress Momentum and light-velocity c .

It was shown in [70-P32] that in a Cycloid , the area between the curve and the straight line is $A = 3\pi r^2$ and the arc length $l = 8r$. 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.sin φ and since $\sin\varphi = \frac{s}{4r}$ then $AT = g.\frac{s}{4r}$. Since acceleration $a = \frac{d^2s}{dt^2} = \frac{dv}{dt} = \frac{d}{dt}(\frac{ds}{dt}) = -g.\frac{s}{4r}$

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then $\dfrac{d^2s}{dt^2} = - g \cdot \dfrac{s}{4r}$ **or** $\{\ddot{s} = - w^2 \; \dot{s} \; \textit{where} \; w = \dfrac{2\pi}{T} = \dfrac{g}{4r}\}$ …(a) which is a Harmonic Oscillatory motion showing that Acceleration is proportional to displacement and is directed towards the

origin with a period $T = \dfrac{2\pi}{w} = 2\pi \cdot \sqrt{\dfrac{4r}{g}} = 4\pi \cdot \sqrt{\dfrac{r}{g}}$, or and $w^2 = [\dfrac{g}{4r}]^2$, where $w = 2\pi f$.

Origination of Frequency , *or Period* , happens from above Property where $[\dfrac{g}{4r}] = 2\pi\, f$ **.**
In Material-Point the Cycloidal-acceleration g_{cyc} is transformed as Centrifugal acceleration
$g_{cyc} = \dfrac{(v)^2}{R} = \dfrac{g}{4r}$, 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
$\bar{v} = \bar{w}.r = 2\pi. \bar{f}.r = \bar{\sigma} = \sigma\,\Phi$, Frequency $\bar{f} = \dfrac{\bar{\sigma} = [\sigma\Phi]}{2\pi r}$ and Total-Energy $2L = J.w^2 = 4\pi^2.f^2$
$w^2 = \dfrac{(\sigma\Phi)^2}{r^2} = [2\pi f]^2$, or **Frequency of Photon** $f_p = \dfrac{\sigma\Phi}{2\pi r} = \dfrac{[1+\sqrt{5}\,]\sigma}{4\pi r} = \dfrac{\sigma.\Phi}{2\pi r}$ …**(a)** 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 $L = B\,w = \dfrac{J.w}{2}\,w = \dfrac{J.w^2}{2}$ then $2L = J.w^2$,and $\overline{B} = r.mv = r\dfrac{\pi.r^4}{2}2\pi f\,r = \pi^2.r^4.f$
From momentum relation $\overline{B} = m\,r\,v = m\,r^2\,w = m\,r^2\,(2\pi f) = \dfrac{J.w}{2} = [\dfrac{\pi r^4}{2}].[2\pi f]$ then **Spin S** $\equiv$

Angular-momentum $\overline{B} \equiv \overline{S} = \dfrac{J.w}{2} = \dfrac{\pi r^4}{2}[2\pi f] = \pi^2.r^4.[\,f\,] \equiv \dfrac{[1+\sqrt{5}].\sigma.\pi.r^3}{4} = \dfrac{\pi r^3 \Phi.\sigma}{2}$ …..**(b)**

Frequency of Photon is $f_n = \dfrac{[\,(1+\sqrt{5})\sigma\,]}{4\pi\,r} = \dfrac{\sigma\Phi}{2\pi r}$, where $\Phi = \dfrac{(1+\sqrt{5})}{2} = 1{,}6180339887$ 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 $\rightarrow r\,d\varphi$, following equation $1 = k \cdot f^2_u\, r^3$, and expresses the area of triangles.

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

Or **Storage S** $\equiv$ $\boxed{[\oplus \leftarrow r \equiv \Phi \rightarrow \ominus]}$ + **Motion M** $\equiv \boxed{\bar{v} - \textbf{Vector}}$ and from Figure-4-

Triangle 2(BFG) = FB.FG = $\sigma.\Phi[\Phi] = \sigma.\Phi^2 = \sigma.[\Phi+1] \equiv \sigma.\Phi + \sigma \equiv$ **S**$_{storage}$ + **M**$_{motion}$
Triangle 2(DEG) = EG.ED = $\sigma + \sigma\,\Phi$ = $\sigma.[\,1+\Phi\,] \equiv \sigma.\Phi + \sigma \equiv$ **S**$_{storage}$ + **M**$_{motion}$ and
since Energy = motion / T $\equiv (\dfrac{v}{2\pi r}) \cdot [\sigma + \sigma\,\Phi] = \bar{v} \cdot [\dfrac{\sigma}{2\pi r} + \dfrac{\sigma\Phi}{2\pi r}] \equiv \bar{v} \cdot [.\boxed{\bar{f}_n} + f_n] \equiv$

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

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

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

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

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

<u>**Therefore → Photon is travelling Both   as Particle   and   as Wave**</u> ,   as

1.. **Energy-Storage** $S \equiv \boxed{[\oplus \leftarrow r \rightarrow \ominus]} \equiv \text{Particle } [\bar{v} . \boxed{\bar{f}_n}] \rightarrow [\bar{v} = \bar{c} = \lambda \frac{f}{\Phi}]$ → i.e.
a Stationary Standing - Wave → $[S \equiv [EM\text{-}R \equiv f_{1=N} , f_2 , f_3 , f_D ,, f_n = w^2]$.

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

The Physical-Interpretation of f_{Photon} :

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

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

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

and →→→ **Primary-Energy** $\equiv G.f_P \equiv h$ and OR $G^{-1} \text{x } \sigma \text{ x } \Phi^3 \equiv 1$ ←←← *where*

$G \equiv$ The Newton`s-Universal   Force $= 6,680561.10^{-11}$ m3/Ns²

$\sigma \equiv$ The Glue-Bond-Stress in Material-Points $\sigma = \frac{2\pi r f}{\Phi} = 1,85.10^{-11}$ Kg/m2   and , f ,
in Planck`s length $r = L_p = e^{- i.(5\pi/2).10}$ is Frequency $f_{Plank} = \frac{c}{2\pi r} = 2,95236210^{42}$ H ,
in Planck`s Length $L_p = e^{- i.(5\pi/2).10} = \{ \sqrt{3}.\pi. \mathbf{1,616199}.10^{-35}$ 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 $G \equiv \sigma.\Phi^3$, which is Acting on all
Quantized-Quantities $\rightarrow G \equiv \sigma.\Phi^3 \equiv \Phi^2.[\{\sigma \Phi\} \equiv 2\pi f_P r \equiv w r \equiv \bar{v} \equiv m a = \bar{c}] \leftarrow$ and
From $\sigma \text{ x } \Phi^3 \equiv G \rightarrow [1,846462.10^{-11}].[3,618033989] = 6,680561.10^{-11}$ o.ε.δ.(q.e.d)

i.e. Universe is a Monad , Becoming from **a HUGE-MAGNET** of Opposites $\oplus$, $\ominus$ which
Forms >→ The **3**-Dimentional **SPACES** Φ , **ANTI-SPACES** $|\Phi.\sigma|$, and >→ 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** $\rightarrow \{ \bar{c} . \boxed{\bar{f}_n} + \bar{c} . f_n \} \leftarrow \equiv \rightarrow$ Particle + Wave   ←

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

b.. **Photon** striking an Object of Microcosm or Macrocosm then , **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** .

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d..   **Photon** striking on **Hydrogen-Cave** can Produce a **Resonance-Energy–Frequency** f_R **,** such that can produce **Photos** and **Images** of Inter-Atom or any other Structures .

e..   **Photon** striking on **Cells** can Produce a **Resonance-Energy–Frequency** f_R **,** such

that can **Enter Cell** and **Break-It-Up.** Duality-Photon places $\boxed{\bar{f}_n}$ Store everywhere. The *Kinetic-Energy* E_K of a moving Material - Point , *as this is the Photon* , is stored as motion in its Storage , $r = [\, n\,\lambda/2]$ with the , **n** frequencies $f_n = n.f_1$, 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 [84-86-90] .

2d...   The Origination of Stresses σ :

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

$G = gk_E = g.[g_E\,k_E] = [\frac{T^2_P}{a^3}].[g_L\,k_L] = [\frac{c.r^3}{a^3}].[g_L\,k_L] = 9{,}8076925 * 6{,}8116.10^{-12} \equiv$

$6{,}68056.10^{-11}\frac{m^3}{Ns^2}$, and **Effects on gravity** $\rightarrow$ $g \equiv 9{,}8076925$ **Stress** $\frac{Kg}{cm^2}$ [73]

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

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

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

The Beyond-Planck-Length Force is $\rightarrow$ $F = \Phi^3.\boxed{\oplus\,\sigma\,\ominus} = \sigma\,x\,\Phi^3$ where ,

$\sigma \equiv \boxed{\oplus\,\sigma\,\ominus} \equiv$ **The Stress of Cave** as the **Quantized distance** $r \rightarrow \boxed{\oplus\leftarrow r \rightarrow\ominus}$

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

length Stress $\sigma = \frac{2\pi r f}{(n)\Phi} = \frac{2\pi r f}{1.\Phi} = \frac{2\pi.1,616199.10^{-35}.2,93949410^{42}}{1,6180339} = 1{,}84456315.10^8$ t/m2

$= 1{,}84456315.10^{11}$ Kg/m2 , and the Angular velocity , w, of Total-Planck Cave is ,

$|w| = \frac{\sigma}{2r}[\, 1+\sqrt{5}\,] = (\frac{1,852816510^{11}}{2.1,616199.10^{-35}}).1{,}6180339 = 9.274599.10^{46}$, rad/sec then

Stress Outside Planck`s-Length-cave $\rightarrow$ $\sigma_{Pl} = 1{,}84456315.10^{11}$ Kg/m2 , and

$G = \sigma\,x\,\Phi^3 \equiv [1{,}84456315.10^{11}] . [3{,}6180339887] = \mathbf{6\,,\,673692.10^{-11}}\frac{m^3}{Ns^2}$, *Nevertheless* , For Earth-System mass $M_E = 5{,}9723.10^{24}$ Kg , and for Area $\rightarrow$ Radius 6378,137 Km

$= 6{,}378.10^6$ m then Earth-constant $k_E = \frac{[6,378.10^6]^2}{5,9723.10^{24}} = 6{,}811551810^{-12}$ and Gravitational

Force $\mathbf{G} = g.k_E \equiv g.[g_L\,k_L] \equiv [\frac{T^2_P}{a^3}].[g_L\,k_L]\equiv 9{,}80769.\mathbf{6}{,}8115518.10^{-12}= \mathbf{6{,}68056.10^{-11}}\frac{m^3}{Ns^2}$

   Remarks :

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

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

Above relation means that Force G needs a Vector-surface π.s² to be spread as Stress σ

which is the case of Constant-light-velocity **c** as the *first Surface* .

b.. The case of a vector s ,is the *Linear-Stress* while of an Plane is the *Surface-Stress* and , consequently of a Volume is a *Space - Stress* , as this was referred before for G Force ,

i.e. $G \equiv \sigma.\Phi^3 \equiv \Phi^2.[\{\sigma\ \Phi\} \equiv [\frac{2B}{\pi r^3}] \equiv 2\pi f_P\ r \equiv w\ r \equiv \bar{v} \equiv m\ a \equiv m\ g = \bar{c} = \frac{2.B}{\pi r^3}]$

c.. Since Stresses follow equation $\sigma = \frac{F}{A} = \frac{2\pi r f}{\Phi}$, conclusively **Forces and Areas** are every-where 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   :
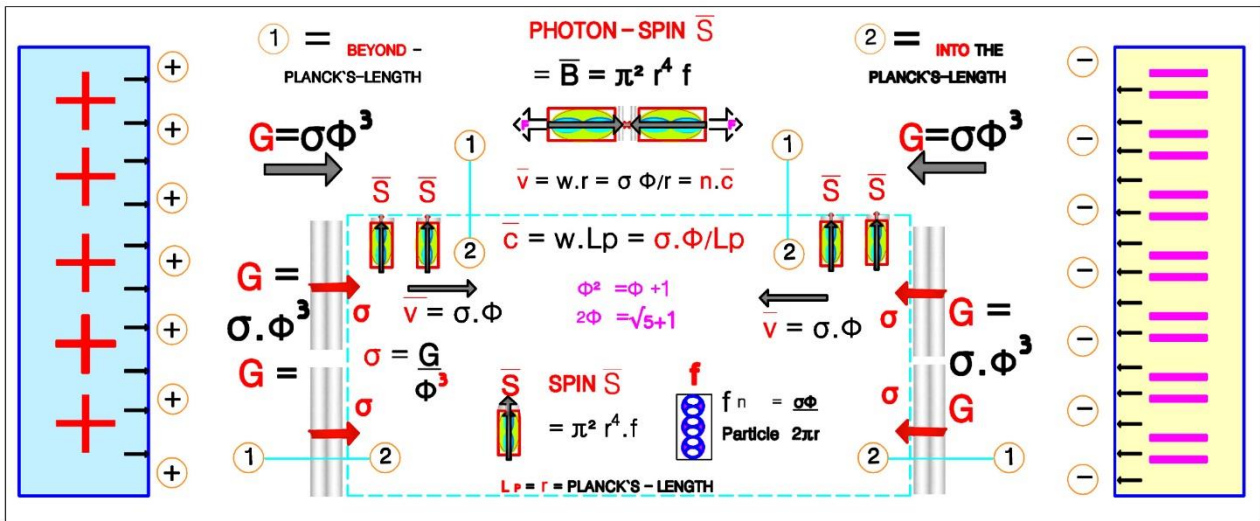
Figure – 7 - : **The light-velocity-Mechanism** in Material-Geometry **and The Photons**   :

In (1). Is The Beyond-Planck`s-length-Region where exists , The Gravitational-Constant **G** which is **the Force** G . The Photon is **Particle + Wave ≡ Energy** with light-velocity and

its Duality is in frequency where $\bar{v} = \bar{c}.[\ \boxed{\bar{f_n}} + f_n\ ]$. The Material-Points with velocities

$n.\bar{c}$, are as $\bar{v}_m = n.\bar{c}\{\ \boxed{\bar{f_n}} + f_n\ \}$, where $\boxed{\bar{f_n}}$ 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 $\bar{v} = \bar{c}\ .\ [\ \boxed{\bar{f_n}} + f_n\ ]$.

The Primary- Particles Fermions and Bosons , with their Spin $\bar{S}\ _F$ and according to their

frequency f_F is their velocity → The Constant-Light-velocity $\bar{c} = \frac{G}{\Phi^3\ L_P}$ → The Hydrogen

Cave He from g .r ^{3} . $f^2_p = 1$ → The Electron-Charge and Electron   from $4\pi^2 f^2_e\ .m_e = k$

$= \pi\ g$ and from Kepler`s relation $4\pi.f^2_e\ .m_e = g$.

   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 $\bar{v}\ .\ [\ \boxed{\bar{f_n}} + f_n\ ]$, which is   a Moving

Stationary-Wave ≡ Storage →> $[\ \bar{v}\ .\boxed{\bar{f_n}}\ ]$ ← Plus **a**   Propagating-Electromagnetic -Wave ≡

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Storage $\rightarrow>[\ \bar{v}\cdot f_n\ ]\leftarrow$ which is Material-Point i.e. From **Photon** $\rightarrow \{\ \bar{c}\cdot \boxed{\bar{f}_n} + \bar{c}\cdot f_n\ \}\leftarrow$

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

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

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

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

It was shown also that $\rightarrow$ **Energy** = motion / T $\equiv (\frac{v}{2\pi r})\cdot[\sigma+\sigma\Phi]$ = velocity =

$\equiv \bar{v}\cdot[\ \frac{\sigma}{2\pi r}+\frac{\sigma\Phi}{2\pi r}\ ]\equiv \bar{v}\cdot[\ \boxed{\bar{f}_n}+f_n\ ]$, 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 $\rightarrow\rightarrow$ $\boxed{[\oplus\leftarrow \textbf{Push}\rightarrow\oplus]}$ and $\boxed{[\ominus\leftarrow \textbf{Push = Force}\rightarrow\ominus]}$ $\equiv$ Force

Pull $\rightarrow\rightarrow$ $\boxed{[\oplus\leftarrow \textbf{Pull}\rightarrow\ominus]}$ and $\boxed{[\ominus\leftarrow \textbf{Pull = Force}\rightarrow\oplus]}$ $\equiv$ 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 $\equiv \sigma$ x A   and from (1) $\rightarrow F=\sigma\ .A=[\frac{2\pi rf}{\Phi}].A=w\ r.[\frac{A}{\Phi}]=\bar{v}\ [\frac{A}{\Phi}]$
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** $\bar{f}=\frac{\sigma.\Phi.r}{2\pi.r_n}$

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

Newton`s gravitational constant **G** is a Force directly proportional to the product of any two masses $\textbf{m}_1$ , $\textbf{m}_2$ in macrocosm and inversely proportional to the square of the distance between their centres , instead of the microcosms Coulomb`s law of , two charges $\textbf{q}_1, \textbf{q}_2$.

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 $\sigma2=0$ and τ_{12} are very small , ***it is the equation of stresses*** $\sigma1,2$, or is $\sigma1/2=\pm(½)\cdot\sqrt{\sigma1^2+4.\sigma1^2}=\sigma_1.[1\pm(\sqrt{5})]/2=\sigma\ \Phi$, 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 $\textbf{F}=\sigma\ \Phi^3$, and represents the **Equal Apportion** of the **External-Force** to the **Internal-Forces** .

According to Material-Geometry Distance $\equiv\boxed{[\oplus\leftarrow r \rightarrow\ominus]}$, and Stress $\equiv\Phi.\boxed{[\oplus\ \sigma\ \ominus]}$

and for the three-Dimension extreme-cases $\Phi^3.\boxed{[\oplus\ \sigma\ \ominus]}$ is Force $\textbf{F}=\Phi^3.\boxed{[\oplus\ \sigma\ \ominus]}$

i.e. **Forces Beyond-Planck-Length are** $\rightarrow \textbf{F}=\Phi^3.\boxed{[\oplus\ \sigma\ \ominus]}=\sigma\ \textbf{x}\ \Phi^3$ $\leftarrow$ ... (**d**)

Force G $\rightarrow$ on Spinning M-Points $\bar{S}$ through $\bar{g}\rightarrow$ on Planck`s - $\bar{B}\rightarrow$ on $\textbf{g}_G$, through $\textbf{f}_R.$

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$G = \sigma\ \Phi^3$, and $\sigma = \frac{G}{\Phi^3} = \frac{G.\sigma^3}{c^3}$,or $\rightarrow \sigma^2\ G = c^3$…(**e**) , where σ is a Stress between frequencies.

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

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

Equation (f) may be written as Force $\ \ \mathbf{G} = \bar{\mathbf{v}}\ \frac{A}{\Phi}$, which is a **Viscus-Damping-Force** where $\frac{A}{\Phi}$ is a constant of Proportionality and the equation of motion as $\mathbf{F_G} = [\ \frac{A}{\Phi}\ ]\ .\ \dot{x}$ Force **G** is applied in all **Quantized-Universe A** as Velocity $\bar{\mathbf{c}}$ 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** $\equiv\ i\ \equiv\ ^2\sqrt{-1}\ \equiv\ ^4\sqrt{-1} \equiv e^{-i.(\frac{\pi}{4}).b} = \mathbf{0{,}707106781} . \mathbf{b}$.

The Base **b** , which for Natural logarithms issues << The Natural logarithm ln(x) of a Magnitude x , is the Power to which , e , would have to be raised to equal x >> and Defining that $\rightarrow \ln(\mathbf{x})$ is the Period-needed to Grow **x** , as this is in Integration $\int x$. e^x is the **Amount of Growth** after **Period x** and the Possible-Repetitive-Permutations for moulds and elements which is $\ \ \mathbf{Mould^{\,Elements}\ =\ The\ \text{-}Growth\text{-}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 , $0{,}707106781.10^{-20} = 1, 0707106781.10^{-19}$.

In this Way The Non-Dimensional-number [$0{,}707106781*10^{-1} = 0, 0707106781$] , **Is Quantized in cave** , r , **as distance and Becomes The-Dimensional-Space in the Decimal - System** b =10 **as cave r** , and which cave is **r** = 1, 0707106781 or , **r** =1, 0707106781 m ,having **Unit-Area** $\pi.r^2$ =3.601588 m2 , and the **QUA-Universe** is $\mathbf{A = 3.601588\ .\ 10^{-19}}$ m2/s ,which are The Space + Anti-Space Positions in Universe ...(**i**)

From (h) , light-velocity $\bar{\mathbf{v}} = [\frac{G\ \Phi}{A}] = \frac{6{,}673692.10^{-11}\,1{,}6180339887}{3{,}601588\ .10^{-19}.} = \mathbf{2.99819938\ .10^8}$ **m/s**

i.e. Force **G** $\equiv$ motion , is Quantized $\rightarrow$ is Spread in { **Space** and **Anti-Space** } or $\equiv$ QUA $\equiv$ {is **The Quantized-Units-In-Area of Space and Anti-space** }, and as mould Φ exists in the *Impedance* **b** .
Impedance in Mechanics is the **Friction Coefficient ,** where for Force **G** be Proportional to the Light-velocity $\mathbf{c} = \bar{\mathbf{v}}$, 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

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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** ≡ Digits of Material-Geometryare →{ $\oplus$, [$\oplus \leftrightarrow \ominus$] , $\ominus$ } ≡ [+, 0 , -]←

The **Permutation** , *arrangement* ,of the Two-Elements $P_1^2 = 2$, i.e. are → [$\oplus, \ominus$] - [$\ominus, \oplus$]←

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 →

$P_1^3 . P_1^3 = 6 \times 6 = 36$ 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 ≡ Distances ≡ r , and since issues $10^{-x} = \frac{1}{10^x}$ then

$b = 36.10^{-20}$, and → $\bar{v} = \frac{F \Phi}{A} = [\frac{G \Phi}{A}] = [\frac{6,673692 . 10^{-11} . 1,6180339887}{36 . 10^{-20} .}] = 2.9995163. 10^8$ m/s

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

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

A… The Gravity-System , is an Infinite of ± Equilibrium-Rotating vectors $\bar{r}$, where for Stability $\uparrow\bar{r} \downarrow\bar{r} = 0$ **,** and which *Gravity-System* interacts with ***Hydrogen-Cave-Systems*** . The condition for ***Irrotational Energy*** is → $\nabla x\bar{B} = \nabla x\bar{S} = 0$, or $\nabla x\bar{B} = \nabla \bar{r} + 2\pi$ mf. $\bar{a} = 0$, and $\bar{r} = \pm 2\pi$ mf. $\bar{a}$. 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 $f_n = n.f_1 = \frac{E}{h} = \frac{n.v}{2\pi r} = \frac{n\sigma}{4\pi r}[1+\sqrt{5}] = |\frac{\sigma.\Phi}{2\pi.r_n}|$, and from $v = w r = 2\pi f r$ then ,

$f_n = v/2\pi r = \frac{(1+\sqrt{5})\sigma}{4\pi r} = \frac{\sigma.\Phi}{2\pi.r_n}$, and $\bar{v} = \sigma . \Phi$ ...**(a)** , and ± Spin $S_G = \bar{B} = J w = \pi^2. r^4. f_{n=g}$

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

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

→ **The Light velocity vector $\bar{v} = \bar{c}$ is Acting on cave , r = L_P , and finding Impedance**

, m_g , becomes the Centrifugal-Force F_g of Cave and is Equal to Gravity g ← as

$F_g = m_g [\frac{c^2}{r}] = J w^2 . \frac{c^2}{r} . g_Z = [\frac{\pi r^4}{2}].[\frac{c}{r}]^2. [\frac{c^2}{r}].\{ 2^3.\ln(3). \pi\sqrt{3} \} = 4\sqrt{3} \ln(3) .\pi^2 r c^4$, or

Gravity → $\bar{g} = 4 \sqrt{3} . \ln(3) . \pi^2 L_P c^4$ ← Is a Force between The Spinning $S_{pg} = \bar{B}$

and $F_g = \bar{g} = 4. \sqrt{3} .1,0986122886681.\pi^2.1,616199.10^{-35}. [2.99819938]^4 = 9 , 8076754$

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i.e. Gravity $\bar{g}$, is The effection of **G** force , on $\bar{c}$ **,** light-velocity in the 3-Dimensional Space and Anti-Space , **2³** , which is the Planck-length **L$_P$ = r** .

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

 are both **Constants because { G , Φ , A ≡ b . Impedance }** are all constants .

From Inner-velocity equation v = wr = (2π/T).r = 2π.f$_1$ r , wavelength λ = c T = c / f$_1$
cave   r = n.[λ/2] , then r = n.(c/2f$_1$) and **v** =2π.f$_1$[n.c/2f$_1$] = **n.π.c**   or **v = n.π.c**…(k)
Showing that velocities in lobes are , **n.π** ,times that of light and for n = 1 then **v = π.c**
more than three times faster of light velocity , and is the **Velocity-Quantization**.

From velocity v = n.π.**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 = σ x Φ = $\frac{G.r}{L_P \, \Phi^3}$ Φ = $\frac{G.r}{\Phi^2 L_P}$ and

from relation **G ≡ σ x Φ³ then →** [$\bar{c} = \frac{G.r}{\Phi^2 \, L_P}$] ← **which is Light-velocity in L$_P$** .

For the **Out-Planck`s-length** velocity equation $\bar{v}_m = n. \bar{c} .\{ \boxed{\bar{f}_n} + f_n \}$ and from equation

$\bar{v}_m$ = w r = **n.π.c** , f =[$\frac{n.c}{2r}$] , then → $\bar{v}_m = n. \bar{c} .[\boxed{\bar{f}_n} + f_n \}$ ← **which is velocity-Out L$_P$** .

Photon was proved to be a Material-point in cave , **r** , where its **Inner Storage** is *the Stationary-Standing-wave* the Electromagnetic-Wave   [E²+H²] = 2(2r).c.sin 2φ with **n** Lobes representing the ***Normal mode vibration*** with frequencies f$_n$ = n . f$_1$ = $\frac{E}{h}$ = $\frac{n.v}{4r}$ =
= $\frac{n\sigma}{2\pi r}$ [1+√5] , and **Outward the Storage** *is the Propagating Electromagnetic- Wave.* →

{[εE²+μB²] = 2.λc.sin.2φ} ← *where* **Particle** 2r = n λ , **Cave** r , **is the *Electromagnetic* -**

***Energy-Storage* ,** and Electromagnetic-Radiation E , B , **is** *the* **Wave Conveyer of Cave** ,

r , with frequency **f** = Energy E / Planck-constant h , or f = E / h . (Figure - 6) , i.e.
 Gravity $\bar{g}$, is The effection of **G** Force , on **c** light-velocity , in the 3-Dimensional Space and Anti-Space , **2³** , of Planck-length **L$_P$ = r** .   For more analysis in [90]
 from relation **σ x Φ³ ≡ G** → [1,845632.10^{11}].[3,6180339887] = **6,673692.10^{-11}** q.e.d.
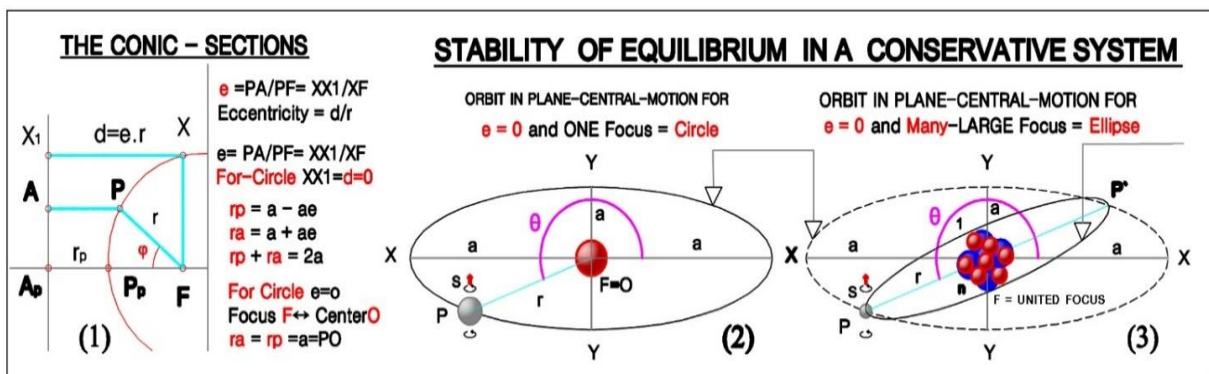
Figure – 8 -   : The Two Points Problem Stability of Equilibrium with One or Two Planets. Electron is created through the vibration , **f$_n$** , in the ***Energy-Space* , g - π** , *meters* . Electron cave is the minimum cave of light-velocity **c** to enter and possessing max Energy of **L$_p$** which is **h** .

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

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

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

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 $\ddot{x} + w^2 x = 0$ …. (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 $x = [\acute{x}(0) / w_n]. \sin w_n t + x(0). \cos.w_n t$ …….(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 ,

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

where **k** = Unit-Spring-Force $\equiv$ [*meter* of area].[*meter* of force $\equiv$ *stress*] $\equiv$ π **g** …(2a)

From Planck`s equation $f_e = E / h =$ [- 13,6 x 1,602.10^{-19} = 2,17872.10^{-18} Joule] / [6,626.10^{-34} J.s] = **3, 2881029.10^{15}**/s , where min-energy -13,6 eV is Hydrogen-atom

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

$m_e = \frac{g}{4\pi f^2_e} = \frac{9,8076754}{4.\pi.[3,2881.10^{15}]^2} = -7, 219016. 10^{-32}$ kg ……… (2b)

$f_e = 3, 2881029.10^{15}/$ s , and $L_e = 1, 6819781.10^{-17}$ m ….…..(2c)

Equations become from relation $\rightarrow$ $4\pi . f^2_e . m_e = g$ $\leftarrow$ 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 ($\oplus<<\rightarrow \ominus$) , 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 $G = k_e .g$, and Voltage $\bar{V} \equiv V_P \equiv \frac{c.\bar{q}}{h}$, Spin = B / π , where Electrons-equation of motion into $\oplus<\rightarrow\ominus$ is $\ddot{r} + w^2 r = 0$ and equation`s Solution $\rightarrow$ $4\pi.f^2_e .m_e = g$ $\leftarrow$ which is the *Electron* , and *Charges* , $\bar{q}$.

<u>**Electron Charge** $\bar{q}$</u> 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 $\rightarrow$ $\bar{q} \equiv \frac{K_E}{V_{P=1}} = \frac{m_e c^2}{2} = \frac{g c^2}{8\pi f^2.1}$ and $\bar{V} \equiv V_P \equiv \frac{c.Charge}{Total-Energy = h} = \frac{c.\bar{q}}{h}$ …..(3)

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

$a = \sqrt[3]{\frac{1}{k.f^2}}$, for **Unit**-Energy-Space-frequency k = g , a = π , then $\rightarrow$ **g** .**f²**.**π³ = 1** …..(4)

Frequency $f_n = \sqrt[2]{\frac{1}{g.\pi^3}} = \sqrt[2]{\frac{1}{9,808238.\pi^3}} = 1,8133418.10^{-3}$, i.e. **The Unit-Charge-Cave** $\bar{q}$ into Hydrogen cave [a =1,82043047.10^{-12}m].[1,813342.10^{-3}/s] = **3,3010625.10^{-15}** C

From equations Charge and Voltage is the **Self - Growing** Property of frequency f_n in

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Material-point , therefore and for Hydrogen-cave is equal to $\rightarrow \bar{q} \,.\Phi$,

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

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

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

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

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 which
is the mass m_g , becomes the Centrifugal-Force F_g of Cave and is Equal to Gravity **g** ,
while the **Light velocity vector $\bar{v} = \bar{c}$** Acting on **an-cave , $r \neq L_P$** , finds The-Impedance
Z_c , of the Vector $\bar{c}$, and becomes the Angular-Momentum-Vector B , of the minimum –
Energy Cave in L_P , which is equal to $B \equiv E \equiv r\ Z_c\ \bar{c}$ ......(1) where , **E** = The Planck`s
Total-Energy $E_p = h = 6{,}62606957{.}10^{-34}$ J .s , **r** = The min-Energy Cave of Hydrogen
Z_c = The Total Impedance in Universe , *of Space + Anti-Space* , from velocity motion and
$\bar{c}$ is 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 **g-Position** so $\text{Antilog}_{10}^{-g/10} = 0{,}10460975$
For the three dimensions Total-Impedance $Z_c = 0{,}10460975{.}(10^{-10})^3 = 1{,}046097{.}10^{-31}$ and

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

$L_H = \mathbf{r} = \frac{h}{c.Z_c} = 2{,}1127839{.}10^{-11}$ m is the min-cave in Planck`s-cave with max-Energy **h** .

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

Constant $\mathbf{k} = v^2.\,r = (\,w\ r\,)^2.r = [\,\frac{2\pi}{T}\,\mathbf{r}\,]^2.r = \frac{4\pi^2\,r^2}{T^2}.\,r = \frac{4\pi^2\,r^3}{T^2} = 4\pi^2.\frac{r^3}{T^2} = \mathbf{4\pi^2.r^3.f^2_p}$ ......(k)

Because (k) is constant , $r^3.\,f^2_p$, 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

of $f_N = n\,\frac{(1+\sqrt{5})\sigma}{4\pi r} = \frac{2\ \bar{B}}{\pi^2 r^4}$, and for the Damping-cave $\rightarrow r(t) = r(t +w) \leftarrow$ 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 $k = E = \frac{T^2}{a^3} = g = \frac{1}{f^2.\ a^3}$ and for $a = r$ then

$g\,.\,r^3.\ \mathbf{f^2_p} = 1$, 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*

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

g f ²   ≡   The **Energy-Part** embodied with stress , g , and

cave a³ ≡   The **Space-Part** , in the   3-DOF space , as **Period and Frequency ,**

$T^2 = g\,a^3 = 9,8076925.[\,2,1127839.10^{-11}\,]^3 = 9,2497939.10^{-32}$ s , and Period

T $= 3,013473.10^{-16}$ s , or frequency   **f** $= 3,3184302.10^{15}$ /s $= 3,3184302.10^{15}$ H

From equation **E= h f** $= 6.62607.10^{-34}.3,3184302.10^{15} = 2,175999.10^{-18}$ J/$(1,6.10^{-19})$

= **13 , 599999 eV** a **Quantized Energy corresponding to Hydrogen-Atom-cave.**

Above Quantity is the Quantum-Energy in the minimum cave a_H of L_P .

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

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

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

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

Total-energy $E = -\dfrac{GM\,m}{2\,a}$, Rotational-Momentum $L = \sqrt{(1 - e^2).GMm^2.a}$, the

eccentricity e = 0 , G M m   = - 2aE , and then → $L^2 = GMm^2.a = -2aE[a]m = -2a^2.Em$.

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

The lightest and the less-Energy $-Z_c$ = mass Particle of this universe , is the **Hydrogen** with the   maximum Quantized - Energy of   13,6 eV . In-Spaces or Volumes with the maximum energy is formulated the , Hydrogen - cave , by oscillating under the action of the Inherent forces in M-Points and which are the *Instruments* that ,**Golden –Ratio- frequency** uses to **Kick-Start** everything In this world .   Both motions , the **Periodic and Rotational** , exist as the Mean between the Two Primary - Opposite in   PNS ≡ Primary-Neutral-Space . This Mean is the Ocean of the , **Two kinds of Spins** created from the inner motion in Material-Points both Oriented by the acceleration **g** , created from the Rotational-motion and which **g** , continually effects on Spins through which force   **G** , Flows to all Energy Structures wherever these are .

The **Strong-force** in Nucleus is as , $F_{nucleus} = h\,.\,f_n \equiv h.n\,.\,\dfrac{(1+\sqrt5)\sigma}{4\pi r} \equiv h.[\,\dfrac{n.\overline{B}}{\pi^2 r^4}\,] \equiv h.\dfrac{n\Phi\sigma}{2\pi r} \equiv$

$h.\dfrac{n\sigma(1+\sqrt5)}{4\pi r} \approx 1\text{-}\,5.10^{10}$ Tesla , and for $F_{photon} = \dfrac{[\oplus>\rightarrow\leftarrow<\ominus]}{r^2} = \dfrac{\sigma.\sigma}{r^2} = \left|\dfrac{\sigma}{r}\right|^2 \equiv \left|\dfrac{2B.}{\pi.r^4\Phi}\right|^2$

From $r_{min} = 1,07.10^{-7}$ m and $f^2{}_p = \dfrac{1}{r^3}$ or $f_{min} = 2,839844.10^{10}$ H , then Bonding Energy

$L = h.f_N = 6.62607.10^{-34}.\,2,8398447.10^{10}$ J / $1,6.10^{-19}$ =   **1, 176063.10^{-6} eV**

$E = -L^2/2a^2m$ and for a = r → $a^2 = L^2/2Em = \dfrac{[1,17606.10^{-6}]^2}{2(13,6)1.10^{-12}} = 5,08501.10^{-4}$ and then ,

r = a $= 2,2549966.10^{-2}$ m , meaning The **Spin-Polhode** of the Hydrogen-cave .

From Orbit equation $\mathbf{a} = \sqrt[3]{\dfrac{1}{g\,.f^2}} = \sqrt[3]{\dfrac{1}{9,808[2,8398447.10^{10}]^2}} = \mathbf{5,018918.10^{-8}}$ m , → are

the Brackets ≡ [**Proton-Electron-Hook**] ≡{**Electric-Field–Loops**}→ **H-Atom-Radius** .

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

It is an Application to Material-Points [⊕↔⊖] , by considering the Positive-constituent with angular velocity $\overline{w} = \overline{v}/r = \dfrac{\sigma}{2r}[\,1+\sqrt5\,]$ ...(1) [70] and for an angle 45° from , **x** ,axis,

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

Angular-momentum $\equiv$ Spin $\equiv$ $\overline{B}$ $\equiv [\pi\sigma.r^3 (1+\sqrt{5}) /4]$ …..(3) In Figure -6- and for the center , K , of $\oplus$ sphere , issues $\overline{v}_K = [\ \overline{w}.\overline{r}_K] = [\frac{\sigma[1+\sqrt{5}]}{2r}2r] = \sigma[1+\sqrt{5}]$ and $\overline{B} = \overline{S} =$ $= [\overline{r}. m\overline{v}\ ] = [\ r.m. \sigma(1+\sqrt{5})]$ and for $m = 1$ then $\overline{B} = [\ r \sigma (1+\sqrt{5})\ ]$ .The Interchangable Ellipsoids of Angular velocity [70-P49] ,and Momentum for the same Moment of Inertia is $J_1 = J_2 = J_3 = J_0$,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 $\frac{3\pi r^4}{2}w^2 = C = (\frac{3\pi r^4}{2}) w^2$ $= (\frac{3\pi r^2}{2})(rw)^2 = (\frac{3\pi r^2}{2})[\sigma (1 + \sqrt{5})]^2 = 3\pi r^2\sigma.[3+\sqrt{5}] \rightarrow$ *The Ellipsoid of Angular-velocity*,$\overline{w}$, and $3B^2/J = \frac{3(rmv)^2}{J} = \frac{3(rv)^2}{J} = \frac{3r^2.\sigma^2[3+\sqrt{5}]}{4}[\frac{2}{\pi r^4}] = \frac{3.\sigma^2[3+\sqrt{5}]}{2\pi r^2} \rightarrow$ *The Momentum-Ellipsoid*,$\overline{B}$.

    The Angular-momentum In Planck`s-Length $\equiv$ Spin $\equiv| \overline{B} | \equiv \pi^2 r^4 f$ ……. (3) The value of $|B| = [\ 2 . 8{,}79455.10^{-35}.1. \ 1{,}6180339\ ] = 2{,}845976. 10^{-34}$ {Kg/m/s}. For Planck-Length $r_P = 1{,}61623.10^{-35}\sqrt{3\pi} = 8{,}79455.10^{-35}$ m , **velocity** $|\ \overline{v}\ | = \frac{\sigma}{r}[1+ \sqrt{5}\ ]$ and from (3) then $\rightarrow$ **Planck-cave-Stress $\sigma = \frac{2\overline{B}}{\pi r^3 \Phi} = 1$** , **Total-Energy** $2E = [J w]^2$, From $|\ \overline{v}\ | = \frac{\sigma}{r}[1+ \sqrt{5}\ ] = c = 3. 10^8$ m/s then , $\sigma = \frac{3.10^8}{3{,}679551.10^{34}} = 8{,}1477332.10^{-27}$Kg/m² $|w| = \frac{\sigma}{2r}[1+\sqrt{5}\ ] = (\frac{8{,}1477332.10^{-27}}{2.8.7945510^{-35}.}).3{,}2360675 = 1{,}499.10^8$, or $|w| = 1{,}5.10^8$ rad / sec , For $\sigma = 8{,}147733.10^{-27}$ Kg/m² and $\overline{B} = 5{,}691952 .10^{-34}$J then , Period $T = \frac{2\pi}{w} = \frac{2\pi r}{v} =$ $\frac{4\pi r}{\sigma (1+\sqrt{5})} = \frac{4\pi.8.79455.10^{-35}}{\sigma (1+\sqrt{5})} = \frac{3{,}4151}{\sigma} 10^{-34}$ s ,or **Period T= $[\frac{4{,}191584}{10^9}]$** s , and frequency $f = \frac{1}{T}$ i.e. **Planck-frequency f_1** $= 2{,}38573294.10^{34}$ Hz .   From above issues ,

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

b).. In Planck`s-length [for light velocity $c = 3.10^8$ m/s] , **velocity** is $|\ \overline{c}\ | = \frac{\sigma}{r}[1+ \sqrt{5}\ ]$ m/s and in cave $r_P = 8{,}794 10^{-35}$ m , the **Pressure $\sigma = \frac{r.c}{[1+\sqrt{5}\ ]} = 8{,}147733.10^{-27}$** Kg/m².

c).. In Planck`s-length the Period of Oscillation is $T = \frac{4\pi r}{\sigma (1+\sqrt{5})} = 4{,}192.10^{-8}$ s , and **Frequency $f_P = \frac{1}{T} \equiv \frac{\sigma.(1+\sqrt{5})}{4\pi r} = 2{,}3857265.10^7$ Hz ,** which is the minimum in Planck-cave . The extreme for stresses $\sigma 1{,}2 = \sigma 1 /2 \pm (\frac{1}{2}).\sqrt{\sigma 1^2 + 4. \sigma 1^2} = \sigma_1 .[1 \pm (\sqrt{5})] / 2 = \sigma \Phi$, velocity $v = (w = \frac{2\pi}{T})r = 2\pi r .f = [\frac{\sigma}{2}].(1+\sqrt{5})$,frequency $f = \frac{(1+\sqrt{5}]).\sigma}{4\pi r}$, Period $T = \frac{4\pi r}{\sigma(1+\sqrt{5})}$

d).. From Kepler-Orbit-Vibration the equation of inverse Period $\rightarrow f_n = \frac{(1+\sqrt{5})\sigma}{4\pi r} = [\frac{\sigma}{2\pi r}] \Phi$, $f^2{}_n = \frac{\sigma^2}{4\pi^2 r^2} \Phi^2 = \frac{1}{g.a^3}$, and $ga^3\Phi^2 = \frac{4\pi^2 a^2}{\sigma^2}$, or $a = \frac{1}{g} [\frac{2\pi}{\sigma \Phi}]^2$ and from Work in Orbits

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$W = 2E = B\,w = J.w^2$, or $2E = 2\pi\,f\,B$ i.e. → **Total - Spin*Frequency** ≡ $\overline{B}$ $f = \frac{E}{\pi}$, and

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

$$E = [\ \Phi\ \frac{\sigma}{4\pi r}\ ]\ .\ \overline{B}\ \equiv\ \frac{|B|^2}{2\,\pi^2 r^4}\ \equiv\ \frac{|B|}{2\,f} \qquad \dots\dots (4) \qquad \text{i.e.}$$

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

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

$E = [\Phi\ \frac{\sigma}{4\pi r}].\overline{B} = 1{,}6180339\ [(\frac{1}{4\pi.1{,}6819781.10^{-17}}].\ 2{,}845976.\ 10^{-34} = \frac{2{,}17872.10^{-18}}{1{,}602.10^{-19}.} = \mathbf{13{,}6\ eV}$

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

1e..   The Dynamic Structure of Atom :

The two elements In Nature are **motion ≡ Energy**   and   **Space ≡ Displacement** only .
In Mechanics Work ≡ Energy ≡ motion is , Force (x)Displacement and is conserved .
In order that *Motion* is *Conserved as Displacement* in all directions , then this Displacement
must be kept , **Quantized** , in a **Finite Space** differently is annihilated .
In Mechanics the only-possible motion in a Finite Space , is the Periodic excitation [↔] or ,
Reciprocating-motion , and the Revolving motion [⊕↻↻⊖] which defines the **Quality** of
Particles. The Rotational motion defines different Period or frequency or Energy .

Atom is a Finite-Energy-Space in where exists   motion ≡ Energy ≡ Force **x** Orbit-ray .
Motion occurs from Electrons with Impedance Z_c ≡ 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 , $\frac{d}{dt}\ [\frac{\partial L_a}{\partial q_i}] - \frac{\partial L_a}{q_i} = 0$ *where* , Lagrangian $L_a = (T_K - L)$ ….(1) and

   L   =   The Potential Energy ≡ Pointy motion ≡ Spin
   T_K =   Kinetic-Energy ≡ 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,
   $\dot{q}_1$ =   The generalized velocities . i =1,2….N
   θ   =   The   r → v ↑ angle on Orbit-Nucleus
   The Lagrangian of motion is   (1) ↓   as

$L_a = \frac{1}{2} m\,\dot{r}^2 - V(r) = \frac{1}{2} m[\dot{r}^2 + \dot{\theta}^2] - V(r)$ ….(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 → $\frac{d}{dt}\ [\frac{\partial L_a}{\partial \dot{r}}] - \frac{\partial L_a}{\partial r} = 0$ and $\frac{d}{dt}\ [\frac{\partial L_a}{\partial \dot{\vartheta}}] - \frac{\partial L_a}{\partial \vartheta} = 0$ …….(2)
Angular momentum vector $\overline{L} = r\,m\,v = m.r.r\,\dot{\theta} = (mr^2.\dot{\theta})$ and $r^2.\dot{\theta} = \frac{L}{m}$ ….. (2a)
and from Kepler`s law of areas $dA = \frac{1}{2}.r.r.d\theta = \frac{1}{2}.r^2.\theta$, or $dA/dt = \frac{1}{2}.(\frac{L}{m}) = \frac{L}{2\,m}$
i.e. the area swept by the central radius   **r** , is → $\frac{dA}{dt} = \frac{L}{2\,m} = $ **constant**   ……(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 $\frac{1}{2}\mathbf{m}\dot{r}^2 + \frac{1}{2}[\frac{L^2}{m\,r^2}] + \mathbf{V(r)} = \mathbf{E}$ .....(4)

where **E** is the Energy = the motion in cave Atom , **r** . Solving (4) to velocity then

Velocity $\dot{r} = \sqrt{\frac{2}{m}[E - V(r) - \frac{L^2}{2m\,r^2}]} \equiv \sqrt{\frac{2}{m}[E - \{\frac{k}{r} + \frac{L^2}{2m\,r^2}\}]}$ ....(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 momentum $\equiv L \equiv B =$ 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 $r \to 0$,   then $U = -\frac{k}{r} + \frac{L^2}{m\,r^2} = \frac{1}{r^2}[\frac{L^2}{2\,m} - k\,r] \equiv \quad \infty \to$ Strong-Forces

b... As $r == \infty$, then $U = -\frac{k}{r} + \frac{L^2}{m\,r^2} = \frac{1}{\infty^2}[\frac{L^2}{2\,m} - k\,r] \equiv \quad 0 \to$ PNS-Field

c... As $r \to \infty$, then $U = -\frac{k}{r} + \frac{L^2}{m\,r^2} = -\frac{1}{\infty}[-\frac{L^2}{2\,mr^2} + k] \equiv \quad <0 \to$ Black Hole

d... As $r \to \frac{L^2}{2\,k\,m}$, then $U = \frac{4k^2m^2}{L^4}[\frac{L^2}{2\,m} - \frac{L^2}{2\,m}] = \quad 0 \to$ Turning-Points

e... As $r \to \frac{L^2}{2\,k\,m}$, then $U = \frac{4k^2m^2}{L^4}[\frac{L^2}{2\,m} - \frac{L^2}{2\,m}] = \quad 0 \to$ Black-Hole   i.e.

For a , The Potential-Energy becomes infinite (∞) , as $r \to 0$, 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 $r =\to \infty$, as this happens in PNS - Energy-field where time T , is not existing and Energy , E , is Infinite .
For c , The Potential-Energy becomes Negative (< 0) as $r = \infty$, for any L and r .
Integrating (3) then , $A = T\,L/2m = 2\,a\,b$,   where **T** the Period of Orbital rotation and

$b^2 = a^2-(ae)^2$ and from Kepler laws $\frac{T^2}{a^2} = \frac{4\pi^2m}{2E} = \frac{4\pi^2}{2E/m} = \frac{4\pi^2\,a}{GM}$ or $T^2 = \frac{4\pi^2\,a^3}{GM} =$ constant ..(6)

Energy $E = \frac{1}{2}m\dot{r}^2 + \frac{L^2}{2\,m\,r^2} - \frac{GmM}{r}$,   **L = m.r². $\dot{\theta}$** ....(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 $U' = \frac{\partial U}{\partial r} = -\frac{k}{r} = f + \frac{L^2}{2\,m\,r^3} = 0$,

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

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

2e..   The Boundedness of Orbits   :

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

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

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

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

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

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

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

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

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

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

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

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

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

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

$$J_1.[\overline{k}\,\frac{d^2\,\overline{k}}{dt^2}] + J_3\,w_3.\frac{d\overline{k}}{dt} + \overline{s}_0.Q\,[\overline{k}\,\overline{k}`] = 0 \quad ……….(15) \quad \text{where} ,$$

J_1 , J_2 , $J_3 \rightarrow$ Are the Moments of Inertia of Ellipsoid related to Principal axis .
$\overline{w}\,[w_1,w_2,w_3] \rightarrow$ Is the constant Angular-Velocity-Vector with respect to changes in
$\overline{i}$, $\overline{j}$, $\overline{k} \rightarrow$ The Unit constant-vector of the moving Body-System . { the Origin}.
$\overline{i}`, \overline{j}`, \overline{k}` \rightarrow$ The Unit constant-vectors of Body-System .
$\overline{s}_0$, $\overline{s} \rightarrow$ The Unit motion vector on the common section of Planes i - j , i - k .
φ , θ , $\psi \rightarrow$ The Three axial angles of vectors $\overline{i}`$, $\overline{s}_0 - \overline{i}$ ,$\overline{s}_0 - \overline{k}\,\overline{k}`$
$Q \rightarrow$ The weight of the Rigid-Body = m g .
$\frac{d\varphi}{dt}$, $\frac{d\vartheta}{dt}$, $\frac{d\psi}{dt} \rightarrow$ The Angular-velocities of angles , φ , θ , ψ ,
$\overline{B}\,[B_1 , B_2 , B_3] \equiv \overline{S}\,[S_1 ,S_2 ,S_3] \rightarrow$ The Angular-Momentum-Vector $\equiv$ Spin.

Energy Relations :
$\overline{B} = J_1 w_1 \overline{i} + J_2 w_2 \overline{j} + J_3 w_3 \overline{k}$ …...…….. (16)
$B^2 = J_1{}^2 w_1{}^2 + J_2{}^2 w_2{}^2 + J_3{}^2 w_3{}^2$ ………….. (16a)
$\overline{B}_w = Jw^2 (= 2L) = J_1{}^2 w_1{}^2 + J_2{}^2 w_2{}^2 + J_3{}^2 w_3{}^2 \rightarrow$ Ellipsoid of Angular-velocity
$L = \frac{B_1{}^2}{2\,J_1} + \frac{B_2{}^2}{2\,J_2} + \frac{B_3{}^2}{2\,J_3} = $ The Constant-Angular-velocity-momentum-Ellipsoid ...(17)

i.e. $\rightarrow$ For any radius OP of $\overline{\mathbf{w}}$**-vector** exists another radius of $\overline{\mathbf{B}}$ **−vector** Perpendicular to , The $\overline{\mathbf{w}}$**-edge** Tangential-Plane of the Angular-Vector-Ellipsoid , and The $\overline{\mathbf{w}}$**-**vector is Perpendicular to the $\overline{\mathbf{B}}$**-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-$\overline{\mathbf{w}}$- Vector-Ellipsoid

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$\qquad$ **[OP] in E-Tangential to Ellipsoid [$\overline{B} = OT \perp E$] Vector .** [70]

4e.. : The Precession and Nutation of Electron :

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

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

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

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

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

For Material-Point, the chains of Spins due to Periodic excitation [<↔] 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 $\overline{v} = \overline{c}$** , 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 $\overline{B}$ of The-Stationary-Photon-cave , where $\overline{B} \equiv \overline{S} \equiv$ Spin .

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

$\overline{v} = \sqrt{\frac{2}{m}[E - \{\frac{k}{r} + \frac{L^2}{2m \, r^2}\}]}$, **Creates IN Orbit** , **r** , the Varying and Perpendicular

Magnetic-Field , $\overline{B}$, which in time-turn **Creates** an Electric-field $\overline{E} \perp \overline{B}$, with resultant force **F** acting on Electron **.**Velocity $\overline{v}$ is composed of V_p , Perpendicular to the Magnetic-circles $O \perp B$, and V_v , Parallel to the Magnetic-field-Vector $|\overline{B}|$, tending such that $L \equiv S \equiv$ 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 $f_N = f_R = 2, 8398447.10^{10} \, s^{-1}\{C-5\}$ 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** $_N = 6.62607.10^{-34} . 2,8398447.10^{10} = 18,817009. 10^{-24}$ J / $(1,6. 10^{-19}) = 1,174463 .10^{-4}$ eV , is conserved as **Thermal-Energy E_T** in kilo Cal and is $E_T = 18,817009. 10^{-24}$ J / $[(4,19. 10^3) = kcal] = 4,49093. 10^{-27}$ 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 **$E_P = 20$** kcal = 20. $(4,19. 10^3) = 8,3777.10^4$ 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** $=10^6.365.24.3600 = 3,1538.10^{13}$ sec , is accumulated Thermal-Energy of $E_T = 3,1538.10^{13}.4,49093.10^{-27} = \mathbf{1,41625.10^{-13}kcal}$, i.e.

<div align="center">35</div>

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The Stationary Hydrogen-wave–cave Thermal-Energy needs 1-Quadrillion years to be 1-kcal.

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

The Produced-Work in Orbit as Frequency $f_N = \dfrac{sQ}{2\pi.J_3w} = 2,8398447. 10^{10}$ s^{-1} is

Constant and is **Conserved** .   Because of the **Magnetic - field created On-Orbit** , and
Applied At - Nucleus with the same Effect then , exists   LARMOR - Equation   as
$w_0 = \gamma. \beta_0 / 2\pi$ **,** and for Hydrogen at 1,5 T Magnet , $\gamma = 2,675. 10^8$ / sT , $\beta_0 = 1,5$ T
then $w = 63,864$ MHz $= 63,864.10^8$ Hz and frequency $f_N = 2\pi.w = 4,012575. 10^{10}$ s^{-1}.

Remarks :

1.. Since the frequency created from Electron-Nutation is the Basic , *first* , Orbit of Atoms ,
therefore allows a **Resonance-frequency** between all **Atoms** , **Molecules** and others .

2.. Since Electron is continually-oscillating with the Nutation-frequency f_N **, so** Produces an
oscillating magnetic field which in turn is the source of an oscillating field , which implies
the **Regeneration each other** , i.e. a **Propagating Electromagnetic-Wave** where **E = B c**
This is a **Way of Information** and **Storage in Nature .**

3.. Since Resonance-frequency is IN the first Orbit of Atoms ,therefore allows Electromagnetic
Wave , **to get out the Atoms-cave** , with a quantum-Energy $E = h f_N$ or $E = 2\mu.B$.

4.. Since Electron is rotating in Orbits so Electromagnetic Wave is also rotating , therefore is
needed a **Proper-Stationary-Magnet** on which Rotation becomes Oscillation in order to
succeed a clear 3-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 Bonded .

5e.. 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 ,

Magnetic – moment . $\bar{\mu} = I . A$ …...…..(a)

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

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

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

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

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

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

$\qquad$ or $\qquad\qquad F_{loop} = F_{dipole} + \overline{\mu} . [\nabla \times \overline{P}]$.

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

moment , $\overline{\mu} = \frac{g_s.q}{2m}. S$, where g_s = a dimension-less quantity q = the charge , m = the mass ,

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

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

equivalent to Angular-velocity-Vector , $\overline{w}$, then $g_s = 2 . (\frac{m.\overline{\mu}}{\overline{w}.S}) = 2 . [\frac{m.(\overline{\mu}=2L`)}{\overline{w}.(S=2L)}]$ …(d)

i.e. Dimensionless quantity g_s , is related to $\rightarrow$ mass **m** , charge **q** , Spin **S** , and Intrinsic magnetic moment $\overline{\mu}$, or $\rightarrow$ is analogous to mass **m** , Angular velocity **w** , and Glue-bond **σ**. This Intrinsic Angular-Velocity $\overline{w}$, of the Material-point allows Spin **S** , to be quantized as to Straightly in Great-circles , [S = ± 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 $\mathbf{v} = w\ r = |w|\ r = \frac{\sigma}{2r} [1+\sqrt{5}].r = \frac{\sigma}{2} [1+\sqrt{5}] = \sigma\ \Phi$, is related

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 $\overline{B}$ 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 ± 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 , $\overline{B}$, is originated **From the Glue-bond** , ± **σ** , of any two Opposite-Constituents in Energy-caves . Since current , I , is the net outward current through a closed surface and , $\overline{q}$, is the Electric-Charge contained within the volume defined by the surface , then Electric charge is equivalent to Magnetic moment , or $\overline{q} \equiv \overline{\mu}$, and current equivalent to angular velocity , or $I \equiv w$. **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** , $a_a = \frac{\overline{B}x\overline{w}}{J}$, where

$J = \frac{\pi r4}{2}$ = The Polar moment of inertia and from Newton equation $2E = m.a_a$ then , $\mathbf{m} = \frac{2E}{a_a} =$ $[\frac{\overline{B}.\overline{w}}{\overline{B}x\overline{w}}]$. $\mathbf{J}$ 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 , $\mathbf{m} = \frac{2E}{a_a} = [\frac{\overline{B}.\overline{w}}{\overline{B}x\overline{w}}]$. $\mathbf{J}$ ≡ *a number measuring Energy-quantities in caves* .

For an inclination of 45° then the Dot Product of $\overline{B}.\overline{w}$ is $\rightarrow |\overline{B}|.|\overline{w}| = |\overline{B}|.|\overline{w}|.\cos 45°$ and the Cross Product of $\overline{B}x\overline{w}$ is $\rightarrow |\overline{B}|x|\overline{w}| = |\overline{B}|x|\overline{w}|.\sin 45°$ equal to Dot Product , and In Planck`s – length - cave $r = 4,453. 10^{-35}$ then mass becomes $\rightarrow$
$$m = \frac{1}{1} . J = \frac{\pi r4}{2} = 617,63.10^{-140} = 6,1763. 10^{-138} \text{ Kg} , \text{and}$$
$$\text{The Ellipsoid of Angular-velocity remaining} \frac{w_1^2}{2} + \frac{w_2^2}{2} + \frac{w_3^2}{1} = \frac{2L}{J_3}$$

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 $\overline{B} = r m v = m r wr = m.w.r²$, *mass* $\mathbf{m} = \frac{\overline{B}}{wr^2} = \frac{2.B}{\sigma.r(1+\sqrt{5})} = [\frac{1}{2\pi f}] \frac{\overline{B}}{r} = \frac{1}{w} \frac{\overline{B}}{r}$ $= \frac{2\overline{E}}{r}$ or $\rightarrow m = \frac{2 E}{r}$, and E = $\frac{B}{2c.}$ ...[m] *denoting the Unification of Energy Mass and Cave* .
[m] is **The mass of Material-Point related to Any cave** , **r** , and $\pm \boldsymbol{\sigma}$ its Principal Stresses.
All Energy-levels follow the Space-Grainy-relation $f_n^2 a^3 = k = $ **Quantum-of motion**.

Applying above to Under Planck`s length (that what prior called Virtual Particle or Fields of Antiparticle pairs) ,{ The Spin ≡ the Angular-Momentum-Vector $\overline{B}$ **,** in the Self rotating Material point [+s² ↔ - s²] } → explains the **Why Galaxies** , and the clusters of Galaxies **remain stable** . In Caves of (⊕≡ +s²) , (⊖≡ - s²) ,Emerge-Spin as the Automobile - Force is **Vacuum-Energy** which was Prior analyzed . The Gravity-length-cave **r** =$3,969.10^{-62}$

and mass becomes → $m = \frac{1}{1} . J = \frac{\pi r4}{2} = 389,80218.10^{-248} = 3,898.10^{-246}$ Kg .

6e..   The Atoms Precession   :

Figure – 9 - : The Electron`s Nutation in Precession :

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

  {Electron 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** $\overline{B}$ **, and the Angular-Velocity-Vectors** $\overline{w}$ **,** of
  Electron at Point P and Proton at Point O , are Perpendicular each other and   forming
  the Herpolhode , OPT $\perp$ OB , where Polhode is   PS $\perp$ OP , perpendicular to Ellipsoid .

In (**3**) **The Change of Angular Momentum vector** $\overline{B}$ **, 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 = constant
then $\frac{d\varphi}{dt} = \frac{d\psi}{dt}$ = constant and angular velocity $w = \overline{k}\frac{d\varphi}{dt} + \overline{k}\frac{d\psi}{dt}$ in the $\overline{k}$ $\overline{k}$` Plane.
After some operations results the equation of motion under above restrictions as ,

$$J_1.\mathbf{u}^2.\cos\theta - J_3. w_3.\mathbf{u} + s\,Q = 0 \qquad ..... (1) \qquad \text{where } \mathbf{u} = \frac{d\varphi}{dt} = \frac{dB}{dt}$$

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

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

The under root terms are > 0 when $\frac{sQ}{J_1.\cos\theta}$ 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 $d\overline{B} = M.dt = [\ \overline{s}_o.Q\ ]dt = s\,Q.[\overline{k}\ \overline{k}`]dt$ ………(3)

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

The Angular-momentum-vector $\overline{B}$ rotates according to equation $\frac{dB}{dt} = [\overline{u}\overline{B}] = uB.[\overline{k}\overline{k}`]$
in Gravitational Potential $U_g = [\ mg].s.\cos\theta = -sQ.[\overline{k}\overline{k}`]$, so the change of $\overline{B}$ is $\rightarrow$
$\frac{dB}{dt} = \mathbf{u} = \frac{sQ}{B} = \frac{sQ}{J_3.w_3.}$ and from 1- degree equation of motion , $\ddot{u} + w^2\,\mathbf{u} = \mathbf{0}$, then
Period of Nutation $T = \frac{2\pi}{u} = \frac{2\pi.J_3 w}{sQ}$,   and ***Frequency*** $f_N = \frac{sQ}{2\pi.J_3 w}$ …….. (4)
With Total Energy of Nutation $E_N = \frac{J_1}{2}[w_1{}^2 + w_2{}^2] + \frac{J_3}{2} w_3{}^2$ or in Euler angles

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

An Example :

For Electron radius $\mathbf{s} = r_e = 5, 82.10^{-16}$ m ,

Weight of Electron $Q = m_e\,g = 9,11.10^{-31}. 9,808 = 8,93.10^{-30}$ Kg ,

Moment of Inertia-Disk $J_e = J_3 = [\pi\,a^4/2] = \pi/2[5,8.10^{-16}]^4 = 1,777591.10^{-61}$ m^4,

Angular velocity $w_e = \frac{v}{r_N} = \frac{c}{1836} = \frac{3.10^8.}{1836} = 1,633.10^5$ m/s because of masses analogy

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The-Electron-Nutation-frequency $\quad f_N = \dfrac{s\,Q}{2\pi.J_3 w} = \dfrac{5,82.10^{-16}.\,8,93.10^{-30}}{2\pi.1,777591.10^{-61}.1,633.10^{5}} =$

$$f_N = f_R = 2,8398447.10^{10}\ s^{-1}\ \ .....(6)$$

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 = $ 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 $\quad \bar{v}_e = \bar{v}_{e\uparrow} + \bar{v}_{e\rightarrow}\quad$, which is composed of Two-velocity components ,the one is the Perpendicular $\uparrow$ and the other is the Parallel $\rightarrow$ **to Motion Box** where the **First CARRIES Motion Into the** [**Motion-Box**] , and the **Second PUSHES** the **Motion-Box** , Figure -9-   as

1.. The [Motion Box] which carries ,**This Motion v** $\equiv \dot{r}$, are **The Magnetic-field-lines** which are circles in field , filled with motion $\equiv$ transportation $\equiv$ Spinning $\equiv$ tension .
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 $\bar{v}_{e\rightarrow}$. The Resulting Helical motion is Energy Propagated .
The difference between the Potential-Energy of the Orbit and that of   Electron Nutation in Precession with the *Lowest-Potential-Energy*, is the Resonance-Frequency The analogous is in Electrical Circuits where when *A circuit is Driven to Oscillate at its natural frequency ,* f_N ,either by storing in it Electrical-Energy or by Charging its Capacitor as , F-10. The Cyclotron frequency $f_N = \dfrac{sQ}{2\pi.J_3 w} = \dfrac{qB}{2\pi.m}$ is free of velocity.
In Fig-9- is shown the **Propagating Electromagnetic-Wave**.

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

Strength-field $\bar{B}_F = [\dfrac{2\pi.m_T}{q_T}].f \equiv \bar{B} = \dfrac{\pi r^3 \Phi.\sigma}{4} \rightarrow$ **Wave** $\equiv \{[\varepsilon E^2 + \mu B^2] = 2.\lambda c.\ \textbf{sin}\left[\dfrac{2\pi c}{\lambda}\right]\}$,

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

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Figure -10- : The How moving-Electrons create Electromagnetic-Wave and Propagate.

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

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

Perpendicular Magnetic-Field $\overline{B}$,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 $\overline{B}$, **Property** answers the **Zeeman effect** .

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

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

ORBIT , r , the Perpendicular Magnetic-Field $\overline{B}$, 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** $\overline{v}$, related to
$L \equiv S \equiv$ 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 ≡ motion** Propagates , *travels* , as **Magnetic-
Field** $\overline{B}$ which is the Box , and as **Electric-Field** $\overline{E}$ which is **The Thrust** of the Box .

Since this frequency $f_N = f_R = 2,8398447.10^{10} \, s^{-1}$ **exists in all Atoms** , it is
The **Resonance - frequency** between All **Atoms and Molecules** in this Cosmos .
For Half-frequency $f_R / 2 = 1,4199223.10^{10} \, s^{-1}$, then Kinetic Energy is zero and
Potential-Energy is , $U = E = h\,f = 6,62606957.10^{-34}.1,4199223.10^{10} = 9,4.10^{-24} J$
$= 5,8722.10^{10} \, eV$, which 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 ,** $w_0 = \gamma. \beta_0 / 2\pi$, and for the
Hydrogen at 1,5 T Magnet , $\gamma = 2,675. 10^8 /sT$, $\beta_0 = 1,5 T$, then
$w_0 = 63,864$ MHz $= 63,864.10^9$ Hz , frequency $f_N = w/2\pi = 1,016457. 10^{10} \, s^{-1}$ or

is , **The Communication-Tool** , *The Identity-Card* between all Atoms relations.

From Orbit-equation , $\overline{v} = \sqrt{\frac{2}{m}[E - \{\frac{k}{r} + \frac{S^2}{2m\,r^2}\}]}$ and for v = 0 then E = $\{\frac{k}{r} + \frac{S^2}{2m\,r^2}\}$ and

for $r_p = L^2 / [GM\,m^2] = S^2/m^2 GM$ then $E = \{\frac{k.GM.m^2}{L^2} + \frac{S^2}{2m\,r^2}\} = [\frac{k.GM.m^2}{S^2} + \frac{m.[GMm]^2}{2.S^2}]$, and

Energy $E = [\frac{GM.m^2}{2\,S^2}].[2k+GMm] \equiv \frac{k_0}{2\,S^2} \equiv$ **Constant** and **Halve-Spin-Inverse-Squared** ,

The Total-Energy for moving-caves is $E_K = \frac{1}{a_R^2}[\frac{4\pi^2}{c^2} + \frac{a_H.c.S_T}{2}]$ in Joules (1J = 1N.1m)

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i.e. **Energy ≡ motion** , And is transported in Caves as their **Spin-Position** , **S** , which thus , defines The Identity of Orbits in all Atoms and Molecules .
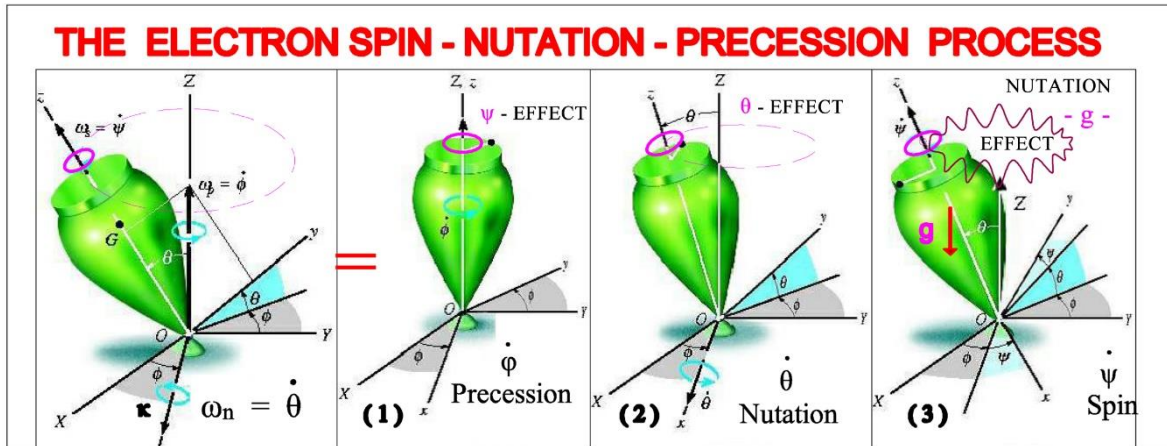
Figure - 11 - The Effect of Gravity ,**g**, on Electron-mass **Originates Electron-Nutation** θ , in **Electron-Precession** , φ , and changes **Electron-Spin-Direction** , ψ . The **Produced-Energy** is stored in Magnetic field $\overline{B}_p = 2\pi.m_p.f_r / \overline{q}_p$

The Data In A - Cave -Site　:

a).. **Spin** is a **Couple of Forces** [+ F , - F] following the Vectors Rules .　Figure-10-

b).. **Electron** [of – Charge] moving in Orbit around the Nucleus creates a **Magnetic Field** **tilted** to Electron`s - Spin [ $M_O = S_O$] , 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 $M_O = S_O$] 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 , dψ . 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*] ≡ The **Energy-Proton-Cantilever-Vector** or the **Hydrogen-Bracket N-O .**

d).. Gravitation-Force through Gravity is continually acting on the Orbit-Electron-Spin. The tilted axis of **Electron-Spin precesses** by changing the Direction of N-O lever arm , *from the Nutation of Precession in the Magnetic-field due to* the *Negative ,–, Charge ,* **and** from **the tilted** axis of **Nucleus-Spin** which **continually precesses in** the Magnetic field . *The produced Energy as Resonance frequency* f_R *is added in* N-O *loop or in* → [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**

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Resultant M_T , Resonates with the Quantum frequency f_R of the cave to form with $\pm$ q
Charges the Magnetic Field $\overline{B}_R$. 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 variated**
$\overline{R}$ **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 variated vector $\overline{R}$ 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 $\acute{x}$ of the **Orbiting-Electron Creates** ,
The Nutation of Electron , which Work is Conserved as **The-Electron-Magnetic-**
Field and **magnetic moment ,** $\overline{\mu}$ **, in** a time **T ,** and as a **Resonance-frequency** f_R .
When velocity $\acute{x} = 0$ 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 $\rightarrow$ $E_{loop} = E_{dipole} + \overline{\mu} . [\nabla x\overline{P}] \equiv E_{dipole} + \overline{B} .[\nabla x\overline{P}]$ …(e) in which

case , **Of An-External-Magnetic-Field** , P , the **Electron - Spin is swigging around**
the Magnetic-Vector and this Motion , *the Nutation* **, is transferred to the Nucleus**.

<u>The Produced-Work is The-Frequency</u> $f_N = \frac{sQ}{2\pi.J_3w} \equiv f_R = 2{,}8398447.10^{10}$ s^{-1}.

IN MRI , this is the Transverse-Presession , 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 , $w_0 = \gamma . \beta_0 / 2\pi$ **,** and
for Hydrogen at 1,5 T Magnet , $\gamma = 2{,}675. 10^8$ /sT, $\beta_0 = 1{,}5$ T , then an-frequency
$w = 63{,}864$ MHz $= 63{,}864.10^8$ Hz , frequency $f_N = 2\pi.w = 4{,}012575. 10^{10}$ s^{-1}**.**

Remark – 2 .

The Accumulation of Energy as (e) creates the [**The-Proton–Electron-Vector-Bracket**]
which is the BONDING - FREQUENCY , $f_N = [\frac{sQ}{2\pi.J_3w}]$,and Happens in the **Maximum**

Potential cave $E = - U(x)$, and which is needed for any **Two Atoms to Joint** and create

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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** $\bar{S}$ 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** $\acute{\psi}$,is under **NUTATION** ϑ **,** and the **Response** is the **PRECESSION** $\acute{\varphi}$, or   **THE** → **ELECTRON-NUTATION** ← due to **Gravity** is applied for a short time in the **Plane Perpendicular ,** $\perp$ **, to the variated Moment-Vector ,** $|\bar{R}| \equiv |M_T| = |M_N|+|M_O|$ and the Work produced is **Conserved** in → Nucleus-Orbit **[p ↔ e]** ≡ the [Energy-Box] . **The Angular-velocity-cone ,** $\bar{w}$ **, is Rolling with Spin-Vector** $\bar{B}$ **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 12, is shown the **Magnetic –Dipole-moment** of nucleus which is associated with the Orbital Angular Momentum $|\bar{B}|$, *the Spin* , resulting to the $\bar{R}| \equiv |M_T| = |M_N|+|M_O|$

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 , $\bar{v} \left[\frac{\sigma}{2\pi r} + \frac{\sigma\Phi}{2\pi r} \right] \equiv \bar{v}.\left[\boxed{\bar{f}_n} + f_n \right]$,

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

As was calculated for the **Strength** of an **Magnetic-field** of 1 Tesla the Static-Moment $= 1,174462.10^{-4} = 11,74462.10^{-5}$ eV. In the Absence of Electron , $|M_T| \equiv |M_N| \equiv$ The Spin exists only as Nucleus-Magnetic-Field $\bar{B}_L$ **.** The Kinetic Rotational-Energy in a monad , is the Scalar Quantity , L = E , while the Vectors of , *Angular-Momentum* $\bar{B} \equiv \bar{S}$, and that of *Angular-Velocity* $\bar{w}$, are related in monads as $\bar{B} .\bar{w} = 2L = J .w^2$ Analysis in [90] .

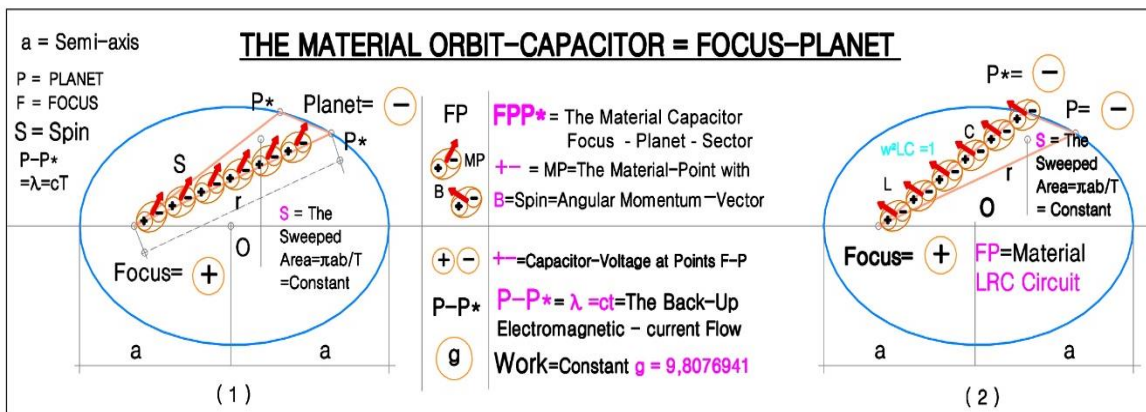### 7e.. The Focus and the Signals in Orbits :

Figure -12- : The Material , **LRC Circuit** on **Orbit** , on Focus-Planet-Sector |F↔P| :

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

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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 $\ddot{x} + w^2 x = 0$ with solution $4\pi f^2_e . m_e = g$, where The Reaction to the Change of motion , *Electron mass* $m_e = \frac{g}{4\pi f^2_e}$ and the Primary equation of Electron → $w^2_e . m_e = \pi g = constant$ ← .... (m)

Hydrogen-cave is **a Vacuum** in where exist also the **Lattice-Stationary-Spinning-Material Point ,** where Energy in **Cave** **a** ,is equation $E = \frac{k}{a} + \frac{L^2}{2m\,a^2}$ and Unit-energy **k** becomes from equation $a^3.f^2_n.k = 1$ and is $k\,a = \frac{1}{a^2 f^2}$, and from velocity $c = w\,a = 2\pi f a$ is , $f^2 a^2 = \frac{c^2}{4\pi^2}$ or $k\,a = \frac{4\pi^2}{c^2}$ and **Resonance - Energy** → $E = \frac{ka}{aa} + \frac{L^2}{2m\,a^2} = \frac{1}{a^3}[\frac{4\pi^2}{c^2} + \frac{S^2}{2m}]$ .....(re)

A… The Gravity-System , It is Another Infinite ± 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 → $\nabla x\bar{B} = \nabla x\bar{S} = 0$, or $\nabla x\bar{B} = \nabla\bar{r} + 2\pi\,mf.\bar{a} = 0$, and $\bar{r} = \pm 2\pi mf.\bar{a}$. Vector $\bar{r}$, occupies Both directions for Rotational - equilibrium , **i.e. The vector $\bar{r} = \pm \bar{B} \equiv \bar{S}_n = 2\pi mf_n$,** 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 → $f_n = n.f_1 = \frac{E}{h} = \frac{n.v}{2\pi r} = \frac{n\sigma}{4\pi r}[1+\sqrt{5}]$, and from $v = w\,r = 2\pi f\,r$ then , $f_n = v/2\pi r = \frac{(1+\sqrt{5})\sigma}{4\pi r} = \frac{\sigma.\Phi}{2\pi.r_n}$, where $v = \sigma . \Phi$, and Spin $S_n = \bar{B} = J\,w = \pi^2. r^4. f_{n=e}$

B… The Hydrogen-Cave-System . From the **Nucleus -Planet** velocity equations $K_E = \frac{mv^2}{2} = E - \{\frac{k}{r} + \frac{L^2}{2m\,r^2}\} = 0$, $4\pi f^2_e .m_e = g$, and for $E = \frac{\pi g}{r} + \frac{L^2}{2(g/4\pi f^2)\,r^2} = \frac{\pi}{g\,r^2}.[g^2\,r + 2. S^2.f^2] = 0$, then issues $g^2\,r + 2. S^2.f^2] = 0$ or $f^2 = \frac{r.g^2}{2L^2} = \frac{r.g^2}{2B^2 w^2} = \frac{r.g^2}{2B^2(2\pi f)^2} = \frac{r.g^2}{8B^2\pi^2.f^2}$, since $2L = B\,w$, then the **Cave-Resonance-frequency** of Nucleus-Planet is → $f_c^4 = \frac{r_c.g^2}{8\pi^2 S_c^2}$ …f.(c) where r_c = Nucleus –Planet-Segment , and S_c = the Spin of cave , consisting the Cave-System . Communication between the two Systems happens with their *Resonance-frequency* , and when $f_n^4 = |\frac{\sigma.\Phi}{2\pi.r_n}|^4 = \frac{r_c.g^2}{8\pi^2 S_c^2}$ or as $\sigma^4.\Phi^4.[8\pi^2.S^2_c] = r_c.g^2.[16.\pi^4.r^4_n]$. Rearranging , $\sigma^4.\Phi^4.S^2_c = r_c.g^2.2.\pi^2.r^4_n$, or $|\frac{\sigma.}{r_n}|^4 = \frac{2.\pi^2.r_c.g^2}{\Phi^4.S_c^2} = \frac{2.\pi^2 g^2}{\Phi^4}[\frac{r_c}{B^2}] = \frac{16.\pi^4.f^4_n}{\Phi^4}$, and Resonanse frequency $f^6_{Resonance} = \frac{g^2}{8\pi^2 r_c^2\,B^2}$,and $f^3_{Res} = \frac{g}{2.\sqrt{2}.\pi r|B|}$, or $f^2_{Resonance} = \frac{g}{\sqrt{2}.\sigma\Phi|B|}$ …(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 → $E = \frac{1}{2}.m_1. v_1^2 + \frac{1}{2}.m_2. v_2^2$, and because $v_1 = v_2 = v$, then $E = \frac{v^2}{2}[m_1 + m_2]$ **,** and since $m_1 = \frac{F}{g1}$, $m_2 = \frac{F}{g2}$, $\bar{v} = \bar{r}$, and for Unit Work $E = 1$, becomes ,

$E = \frac{v^2}{2}[m_1 + m_2] = \frac{r^2}{2}[\frac{F}{g1} + \frac{F}{g2}] = \frac{F.r^2}{2}[\frac{1}{g1} + \frac{1}{g2}] = \frac{F.r^2}{2}[\frac{g1+g2}{g1*g2}] = \frac{F.r^2}{2}[\frac{2.g}{g^2}] = \frac{F.r_c^2}{g} = 1$, 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

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inverse square to the distance as $F = \frac{g}{r_c^2}$ ...(**r**) ,i.e. → **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 Reaction and **called** Impedance $\equiv$ mass . The Surface-force *,* g_G *, becoming from the inner acceleration* f_n *of*

Material-Points as Vector , $\bar{r} = \pm\ \overline{B} \equiv\ \overline{S}_n$, is acting on Spins $\overline{B}$ *, and all the masses of the universe ,* or is Action of G → on $\bar{g}$ → on $\overline{B} \equiv \overline{S}$ → on g_G , through $f_{Resonanace}$ Since $f_{Resonanace} = \sigma\ \Phi^3 = G$, 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** $\sigma = \sqrt[2]{\frac{c^3}{G}} = \frac{(2,9982.10^8)^3}{(6,673692.10^{-11})} = 6,3548867.10^{17}$ Kg/m2
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 → the Period $T = 2\pi^2\sqrt{\frac{m}{k}}$, frequency $f_H = \frac{1}{2\pi}\sqrt[2]{\frac{k}{m}}$, and Energy $= h\ f_H$ .....(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 , $E = \frac{mc^2}{2} + \frac{k}{a} + \frac{L^2}{2m\ a^2} = hf_R$

Hydrogen Diameter $a_H = \sqrt[3]{\frac{1}{g\ f^2}} = \sqrt[3]{\frac{h^2}{g\ E^2}} = \sqrt[3]{\frac{[6,62606957.10^{-34}]^2}{9,808.(\mathbf{13,6}.1,60218.10^{-19})^3\ J}} = 2,1127839.10^{-11}$ m

The constant Energy **k** , in Orbit is $k = \frac{L^2}{2m\ a}$ 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 $(w_o)^2 = LC$

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

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

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

Remarks :

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

In Planck`s length L_P , The light velocity **vector** $\bar{c} = \frac{G\ L_P}{r.\Phi^2}$ 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 $r = \frac{h}{c.Z_c} = 2,1127839.10^{-11}$ m . From Kepler-second law of Areas , $g\ r^3 f^2{}_p = 1$, the frequency $f = 3,2839982.10^{15}$ H and Energy $E = h\ f = \mathbf{13,6\ eV}$, which is that of Hydrogen cave .

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

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

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

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

F.. : THE NEW ATOMS –STRUCTURE .

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

NUTATION FROM GRAVITY f_N AT ELECTRON -PRECESSION IS TRANSFERED AT HYDROGEN - NUCLEUS AS m_N
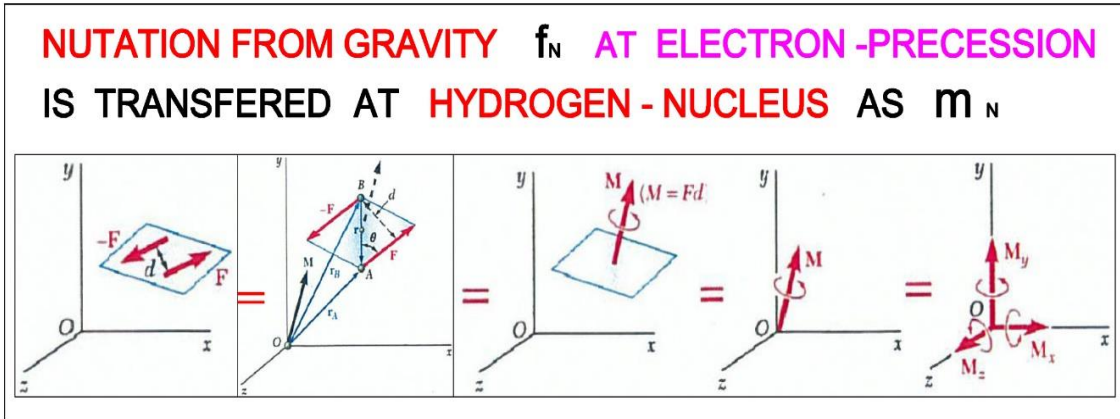
Figure - 13 - : The Orbit-Electron-Spin is applied on the Nucleus-Proton-Spin :

Spin is a Free-Vector of Electron and can be applied at **Any-Point** with the same effect. Couple $\equiv$ Moment **M** =Fxd $\rightarrow$ Vector , and may be resolved into **Component-vectors** Electron-Nutation-Vector M_O is the Resolved **Component-vector** M_N+M_O 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 = $\sqrt[3]{1/g\ f^2}$ = $2,1127839.10^{-11}$ m , in the Planck cave $L_P \equiv e^{-\,i.\left(\frac{5\pi}{2}\right).10} \equiv \sqrt{3}.\pi.\ \mathbf{1,616199}.10^{-35}$ m . The why such , was prior referred in 6d . Nucleus is held together by the Spin-paring of the Spins in Nucleus .

1... The Light velocity vector $\overline{v} = \overline{c}$ 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 $\overline{v} = \overline{c}$** Acting on **an-cave** , $r \neq L_P$, finds The-Impedance $\mathbf{Z_c}$ of the Velocity $\overline{c}$, and Becomes the minimum-Energy-cave in L_P , and Equal to $\mathbf{E \equiv r\ Z_c\ \overline{c}}$, where **E** = The Planck`s-Total-Energy $\mathbf{E_p} = h$ = $6,62606957.10^{-34}$ J.s , **r** = The min-Energy cave of Hydrogen , $\mathbf{Z_c}$ = The Total Impedance in Universe $\equiv$ Space + Anti-Space from velocity motion $\overline{c}$ = The light-velocity in m/s . Equation becomes $\rightarrow$ r Z_c c = E = h $\leftarrow$. 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* $\mathbf{10^{-10}}$ of their **g-Position** so Antilog $_{10}^{-g/10}$ = 0 , 10460975 For the three dimensions Total-Impedance Z_c =0,10460975.$(10^{-10})^3$ = $1,046097.10^{-31}$ and

$$\mathbf{r_H} = \frac{h}{c.Z_c} = \frac{[6,62606957.10^{-34}]}{2,99798.10^8\,.1,0460975.10^{-31}} = \mathbf{2,1127839.10^{-11}}\ \text{m , and is the Hydrogen cave i.e.}$$

The Quantization of **Energy $\equiv$ Angular-Momentum** $\equiv$ r m v , which is produced from the three Elements **r** = The Planet-Focus line , **m** = The masses , **v** = The velocity of mass and

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follow Kepler-second-law where for radius **r** , sweeps out Equal-Areas in equal times and consequently **Energy-Quantization** becomes from equation $a^3.f^2{}_n.k = 1$ where $k = [\frac{4\pi^2}{GM}]$.
The Unit-Work occurs in Hydrogen cave following Kepler-first law in Orbits , $4\pi^2.r^3f^2{}_p = k$, which k = The **Quantized Work** $W = v^2[\frac{h}{2\pi}]$ or Work $= k = 4\pi^2.r^3f^2{}_p$ and being equal to the Unit-prior and so , $\mathbf{k} = 4\pi^2.r^3f^2{}_p = \frac{1}{f^2 r^3}$ which results to the Resonance frequency f_R

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

Atom-Cave is a , **Heap of Masses** M_T , *Protons Electrons and Neutrons* , and Charges Q_T , *Protons and Electrons* , follow the Lorentz force equation $F = q.[E + v \times B]$ where $E = 0$ and Force is $\bar{F} = q . \bar{v} \times \bar{B}$. The Created Magnetic-Field $\bar{B}_F = |\frac{2\pi.M_T}{Q_T}| f$, where in it *Energy $\equiv$*

motion is **Quantized** , i.e. Magnetic-Field $\bar{B}_F$ is the Store of Energy in motion , $\ddot{x} + w^2 x = 0$
The Resonance Energy $\mathbf{E_R}$, becomes from **The Moving Electron in Orbit** of charge $\bar{q} \equiv \ominus$
with the **Orbit-Velocity-Vector** $\bar{v} = \sqrt{\frac{2}{m}[E - \{\frac{k}{r} + \frac{L^2}{2m r^2}\}]} = 0$, and this because charge $\bar{q}$
Creates IN Orbit , **r** , the Varying and Perpendicular Magnetic-Field , $\bar{B}$, which in time-turn **Creates** the Electric-field $\bar{E} \perp \bar{B}$, with resultant force **F** acting on Electron **. For c = 0 then** In Orbit exists **Only-Potential-Energy** of Orbit , and $\mathbf{E} = \frac{k}{a} + \frac{L^2}{2m a^2}$, and using Kepler`s law for equal-areas $\mathbf{k} = \frac{L}{2 m}$ , 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 $\mathbf{a} = \sqrt[3]{\frac{1}{k.f^2}}$ then $\mathbf{k} = 1/a^3.f^2$, and **Energy** $\mathbf{E} = \frac{1}{a^3.f^2}[\frac{1}{a}] + \frac{L^2}{2m a^2} = \frac{1}{a^4.f^2} + \frac{L^2}{2m a^2} =$

$\frac{1}{a^2}[\frac{4\pi^2}{c^2} + \frac{L^2}{2m}]$ **, or** $\mathbf{E} = \frac{1}{a^2}[\frac{4\pi^2}{c^2} + \frac{L^2}{2m}]$, $a^2 = [\frac{1}{E}].[\frac{4\pi^2}{c^2} + \frac{L^2}{2m}]$, and **Stored in the Magnetic field**
i.e. Exists only **Potential-energy L** and the *Orbit is that of Circle* .

2.. Electro-Mechanical Equation , $\mathbf{q}\,\bar{\mathbf{B}}_\mathbf{L} = 2\boldsymbol{\pi}\,\mathbf{m}\,\mathbf{f}$, exploited in Hydrogen-Atom creates the *Uniform Magnetic-field* $\bar{\mathbf{B}}_\mathbf{L}$ **,** which IGNORES , the velocities in (1) and Capacitance in Energy-levels (1-2) . The Heap of masses and Charges FOLLOWS Permutation - Rules as the Neutral-quantities and Newton-Laws as well as the Vibrating equation , $m\,\ddot{x} + w^2 x = 0$.
3.. Hydrogen - Cave is a *Uniform-Magnetic- field ,* Because $\bar{B}_L$, **is Independent** of the **Electron-velocity** v_e and of the **Cave-radius** , r , therefore electron is not accelerated in the Magnetic-Field , but its Strength is **Dependent on frequency , f** , only .
This demand formulates the Hydrogen-Energy-caves and the **Quantization** of Energy $\equiv$ motion , beginning from the Nucleus and extended to Orbits-Planets occupying ,

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

2f..   The Elements in the Atom cave $\rightarrow$ { Masses – Charges – Caves }

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

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

c-**Neutron**[$\oplus \leftrightarrow \ominus$]$\rightarrow$ mass $\mathbf{m_n}$ = 1,672.10^{-27} Kg $\rightarrow$ Charge $\mathbf{C_n}$ = 0 ,0 C $\rightarrow$ **d** = 1,7.10^{-15} m

d... **Newton `s law** for masses is the Force $\rightarrow$ $\mathbf{F_N = G} \dfrac{m_1.m_2}{r^2}$, where d = r .

e... **Coulomb law** for Charges is the Force $\rightarrow$ $\mathbf{F_c = C} \dfrac{q_1.q_2}{r^2}$,

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

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

h – The United Newton-Coulomb **Electro-Mechanical** Equation , $\mathbf{q\ \overline{B}_L = 2\pi\ m\ f}$, and the

Resonance frequency $f^4 = \dfrac{1}{4\pi^2 m a^3}$, or $\mathbf{f_R = \sqrt[4]{\dfrac{1}{4\pi^2 m.a^3}}}$ between Charges and masses .

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

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

or , Above configuration of , masses $\mathbf{m_L}$, Charges $\mathbf{q_L}$ in a Hydrogen cave $\mathbf{a}$, **Forms**
a Harmonic Oscillator with a Natural Frequency f_R with the less Damping-factor (1/m).

> **The Quantum of a Magnetic-Field $\overline{B}_L$ 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** $\rightarrow$ q . $\overline{B}_L$ =[2π.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**. $\overline{B}_F$, in **Fields**.

5... The Parallel RLC-Electric-Circuits Create a ***Resonant Frequency*** stored in Magnetic
Field $\overline{B}_F$, 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 $\overline{B}_F$ and the same for , ***Masses , Charges , Caves*** , as below ,

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

The Nucleus Total-Harmonic mass $\equiv M_T$ is $\rightarrow$ $\dfrac{1}{M_T} = \dfrac{1}{m_P} + \dfrac{1}{m_n} + \dfrac{1}{m_e} = \dfrac{10^{27}}{1,672} + \dfrac{10^{27}}{1,672} + \dfrac{10^{31}}{9,11}$

$= \dfrac{10^{31}}{8360} + \dfrac{10^{31}}{9,11} = \dfrac{10^{31}}{9,100084}$, and the **One -Total-mass** M_T = 9,100084.10^{-31} Kg ...(1)

The System Total- Harmonic-Charge $\equiv Q_T \equiv q_p + q_e$ = 2.1,6022.10^{-19} = 3,2044. 10^{-19} C
and the **System-Resonance-Charge** Q_T = 3,2044. 10^{-19} C ……...(2)

The frequency of the Closed-Nucleus-Orbit-System becomes from Kepler second Planetary
law equation , $4\ \pi^2\ m\ f^2_o = k$, and constant law of Areas $1 = k\ .f^2_o\ a^3$. Their common k ,

is Constant-Energy $\rightarrow k = 4\ \pi^2\ m\ f^2_o = \dfrac{1}{f^2_o\ a^3}$ or , $f^4 = \dfrac{1}{4\pi^2 m a^3}$ and $f = \sqrt[4]{\dfrac{1}{4\pi^2 m.a^3}}$ ...(f)

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

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by the frequencies of Inductive and Capacitive Reactance and the Total-Resistance becomes as the above $\mathbf{m} = M_T = 9,100084.10^{-31}$ Kg . The Resonance-Cave-frequency is as (f) ,

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

Coulomb-law issues between Nucleus and orbit diameter *Charges* $d = 10^{-10}$ m , while Newton`s-law issues for all *masses* between Nucleus and Nucleus-Orbit $d = 10^{-14}$ m .

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

The Magnetic-field-Strength $\overline{B}_F = |\frac{2\pi.M_T}{Q_T}|f = \frac{2\pi.9,100084.10^{-31}.[1,3099329.10^{15}]}{[3,2044.10^{-19}]}$ (Kg/Cs) =

$2,3373706.10^4$ Tesla ...(4) i.e. $\overline{\mathbf{B}}_{\mathbf{F}} = \mathbf{23,373706}$ **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 $\mathbf{a} = \sqrt[3]{T^2/g} = \sqrt[3]{1/g\,f^2} = \sqrt[3]{1/g\,[\,1,3099329.\,10^{15}\,]^2} = \sqrt[3]{7,78342.\,10^{-33}}$

$= 1,9817863.10^{-11}$ m , and the **Resonance - Energy** $\mathbf{E} = \frac{1}{a^3}[\frac{4\pi^2}{c^2}+\frac{L^2}{2m}]$, where

$\mathbf{L}$ = the Spin S = $5,691952.\,10^{-34}$ {Kg/m/s} , mass $\mathbf{M}_T = 9,100084.10^{-31}$ Kg of System , $\mathbf{c} \equiv 2,998.10^8$ m/s **.** and $\mathbf{E}$ = [$2,5461638.10^{21}$] x [$4,392086.10^{-16} + 1,780111.10^{-37}$] =

$= 1,118297.10^6$ J + $4,5324541.10^{-16}$ J   ......(E)

    i.e. **Energy in Electron-Orbit is $1,118297.10^7$ J , or 11,2 Million Joules ,**

2..... Case –B. → **1-Proton** [⊕] , 1-**Electron** [⊖] :

The Nucleus Total-Harmonic mass $\equiv M_T$ is → $\frac{1}{M_T} = \frac{1}{m_P} + \frac{1}{m_e} = \frac{10^{27}}{1,672} + \frac{10^{31}}{9,11} = \frac{16729,1.10^{27}}{15,23192} =$

$\frac{10^{27}}{0,0009105} = \frac{10^{31}}{9,105}$ and $M_T = 9,105044.10^{-31}$ Kg   ....(1)

The Nucleus-Orbit Total-Harmonic-Charge → $Q_T \equiv q_p + q_e = 2.1,6022.10^{-19} =$

$3,2044.\,10^{-19}$ C and the **System-Resonance-Charge** $Q_T = 3,2044.\,10^{-19}$ C ....(2)

The frequency $f = \sqrt[4]{\frac{1}{4\pi^2 m.a_H{}^3}} = \sqrt[4]{\frac{1}{4\pi^2 9,105.10^{-31}(2,1145016.10^{-11})^3}} = \sqrt[4]{2,942807.10^{64}} =$ $1,3097561.10^{16}$ H .

The Magnetic-field-Strength $\overline{B}_F = |\frac{2\pi.M_T}{Q_T}|f = |\frac{2\pi.m_T}{q_+}|f = \frac{2\pi.9,105.10^{-31}[\,1,3097561.10^{16}]}{3,2044.10^{-19}}[Kg/C.s]$ $= 2,5424947.10^5$ Tesla $\equiv$ **0,25424947 Mega-Tesla** → *the Strength of a Neutron-star*

Energy in an Electron-cave where radius $r_e = 5,82.10^{-16}$ m , follows Energy-equation

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

mass $M_T = 9,105044.10^{-31}$ Kg of System , Energy is E = [$2,9522561.10^{30}$] x $[4,392086.10^{-16} + 1,7791411.10^{-37}] = 1,2966562.10^{15}$ J + $5,2524801.10^{-7}$ J ......(E)

    i.e. Energy in Electron-Orbit is $1,29.10^{15}$ J , or 12,9 quadrillion Joules , and equal about 60 Megatons of TNT .

When an **Electron** of mass $\mathbf{m_e} = 7,2373149.10^{-32}$ kg is found in above Magnetic-field then

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$$f = \sqrt[4]{\frac{1}{4\pi^2 m.a_H{}^3}} = \sqrt[4]{\frac{1}{4\pi^2 7,237.10^{-32}(2,1145016.10^{-11})^{\ 3}}} = \sqrt[4]{37,022376 \cdot 10^{60}} = \mathbf{2,4663545.10^{15}}\ H$$

and Energy $E = h\,f = 6.62607.10^{-34} \cdot 2,4663545.10^{10} = 1,6342237.10^{-18}\ J\ /\ (1,6.10^{-19}) =$

$$= \mathbf{10\,,\,201146}\ \ eV\ , \ \text{which is the \textbf{Energy in}}\ \ n = 1\ \ \textit{Energy-Level}\ ,\ \ or$$

From equation $m_e = \frac{g}{4\pi f^2{}_e}$, $f_e = E\,/\,h = [\,-13,6\ eV/h\,]$ then $f = \sqrt[4]{\frac{E^2}{4\pi^2 a_H{}^3 [g.h^2]}} = \sqrt[4]{\frac{E^2}{\pi g h^2 a_H{}^3}}$

3….. Case –C. → **1-Proton** $[\oplus] \equiv$ An **Ion-nucleus** :

The Nucleus Total-Harmonic mass $\equiv M_T$ 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 / $\mathbf{1,66053886.10^{-27}}$ amu $= \mathbf{1\ amu}$ ……...(1)

The Nucleus-Orbit Total-Harmonic-Charge → $Q_T \equiv q_p = 1,6022.10^{-19}$ ……...(2)

The Resonance-Cave-frequency is $f = \sqrt[4]{\frac{1}{4\pi^2 m.a_H{}^3}} = \sqrt[4]{\frac{1}{4\pi^2.1,672.10^{-27}8.(2,1127839.10^{-11})^3}} =$

$\sqrt[4]{2,0051704.10^{60}} = 1,189975.10^{15}$ H ..(1). **The System** M_T = **masses ,** Q_T = **Charges**

creates a constant Magnetic-field $\overline{B}_F = |\frac{2\pi.M_T}{Q_T}|f$, of **Strength** $\overline{B}_F = |\frac{2\pi.M_T}{Q_T}|f$ as ,

$\overline{B}_F = \frac{2\pi.1,672.10^{-27}.[6,32705.10^{14}]}{1,6022.10^{-19}.}$ (Kg/Cs) $= 4,1464883.10^{\ 7}$ Tesla ...(3)   i.e.

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

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

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

mass $M_T = 1,67.10^{-27}$ Kg of System , Energy is $E = [\,1,4105087.10^{30}\,]\ x[-]$
$[4,392086.10^{-16} + 9,7000946.10^{-41}] = 6,1950755.10^{14}\ J + 1,3682067.10^{-10}\ J$

For the **Ion-Proton** $E = \frac{k}{a} + \frac{L^2}{2m\,a^2} = [\frac{L}{2\,m}].\frac{1}{a} + \frac{L^2}{2m\,a^2} = \frac{L}{2a.m}[1 + \frac{L}{a}]$ where $\mathbf{a}_p$ is Proton-cave

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

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

   i.e. Energy of Charge-Proton is $0,\,203.10^9$ J , or $0,203$ Giga-Joules

      and , it is equal about to the reduced Planck energy .

Remark : Cave is composed of One mass in its Proton-cave with an *Magnetic-field* **Strength** $\overline{B}_F = 4,1464883.10^{\ 7}$ Tesla = **41,464883 Mega-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 exists on Magnetic-moment axis and Spin Precesses** , the highly magnetized vacuum must behave like a Prism that **Polarizes the light** ,and this is happening because of the Two-Magnetic-fields in Atom . The Birefringence also split X - ray Photons into two.

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

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1.. Charge $\overline{q}$ → Is the *Quantum* of the Efficient-Energy .

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

3.. $\overline{q}$ Photon → $\frac{G}{\sqrt{2}.f} = \frac{G.h}{\sqrt{2}.E} = 3,13 \ 10^{-44}$ C , Is the *Quantum* of Material-points .

4.. $\overline{q}$ Electron → $\frac{G}{c\sqrt{2}} = 1,58.10^{-19}$ C , Is the *Quantum* of the Plane-Magnetic-field .
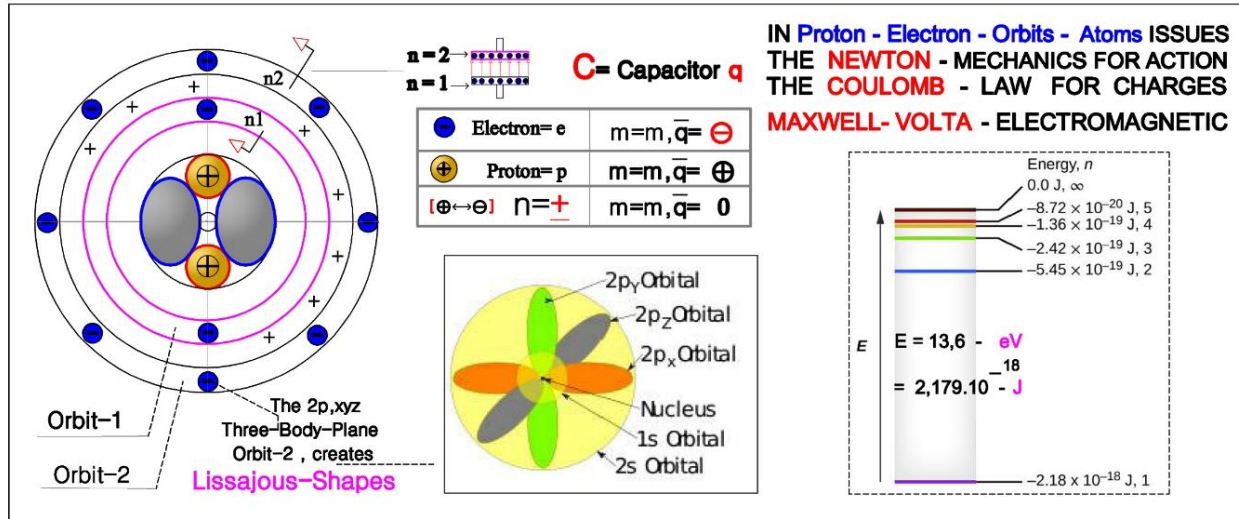
Figure-14- : The Analogous **RLC-Electric-Circuit** of **Atom`s Structure** and Mechanics

Remarks :

The Case –A- is composed of the three masses ,m_p ,m_n ,m_e ,which consist a Plane on which vibration of Charges Q_T is executed in two perpendicular directions x , y **The Phase-Plane**, which is the velocity-Vector-Cartesian System , $x \perp \acute{x}$. The Total-energy for Unit-mass is $E_T = K_E + P_E = (½) . \acute{x}^2 + U(x)$ = constant and solving for $y = \acute{x}$ this Ordinate of the Phase Plane is given by Planar equation , $y = \acute{x} = \pm \sqrt{2[E - U(x)]}$, therefore Orbits can be , that of Circle and those of , ∞ , eight shapes in x , y , Plane , as the linear-equation $\ddot{y} + w^2 y = 0$, of the **x ⊥ y** Plane and which follows the *Lissajous Shapes* .

The Case –B- is composed of the two masses ,m_p , m_e ,which consist a Vector on which the Vibration of Charge Q_p is executed in the direction of Vector $\overline{PE}$. The *Resonance Frequency* f = $1,3097561.10^{16}$ H , and The *Magnetic-field-Strength* $\overline{B}_F = 9,3530401.10^5$ Tesla and are the *Quantum of Energy-Space* in Hydrogen cave **a** .

The Case –C- is composed of One mass in its Proton-cave with an *Magnetic-field* Strength $\overline{B}_F$= $4,1464883.10^7$ Tesla = **41,464883 Mega-Tesla** ,with a *Frequency* $f_R = 6,32705.10^{14}$ H. The fact that Atom`s-nucleus occupies such Energy as that of Neutron stars , consists the Atom as the strongest massive element in nature . This quantity consists the minimum **Quantum of Energy** in this cave and can be said is the **Quantum of Magnetic-Energy** in Atom .
This case is very interesting because it is the Quanta of Electron in microcosm and macrocosm i.e. the Spin of Electron is squeezing in the direction of the field - *Space* . **Since Energy is on Magnetic-moment axis and Spin Precesses** , the highly magnetized vacuum must behave like a Prism that **Polarizes the light** . This happens because of the Two-Magnetic-fields in Atom. Birefringence also split X- ray Photons into two or when the opposite , to merge them together.

4….. Case –D- → **2-Proton** [⊕] , 2-**Electron** [⊖] ,**2-Newtron** [⊕↺↺⊖] – [⊕↔ ⊖] :

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The Nucleus Total-Harmonic mass $\equiv M_T$ is $\rightarrow$ $\frac{1}{M_T} = \frac{2}{m_P} + \frac{2}{m_n} + \frac{2}{m_e} = \frac{2.10^{27}}{1,672} + \frac{2.10^{27}}{1,672} + \frac{2.10^{31}}{9,11} = \frac{10^{31}}{400,55} + \frac{10^{31}}{4,555} = \frac{405,105.10^{31}}{1824,5052} = \frac{10^{31}}{4,5037834}$, and $M_T = 4,5037834.10^{-31}$ Kg .....(1)

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

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

$f = \sqrt[4]{\frac{1}{4\pi^2 m.a_H{}^3}} = \sqrt[4]{\frac{1}{4\pi^2.4,5037834.10^{-31}.(2,1145016.10^{-11})^3}} = \sqrt[4]{5,949276.10^{60}} = 1,5617663.10^{15}$ H

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

M-field $\overline{B}_F = |\frac{2\pi.M_T}{Q_T}|f = \frac{2\pi.4,5037834.10^{-31}[\ 1,561766.10^{15}]}{6,4088.10^{-19}\ .}$ (Kg/Cs) $= 6,8959836.10^3$ Tesla ....(4)

$\overline{B}_F = 6,8959836.10^3$ T $= 6,89598.10^3$ **Kilo-Tesla** $\rightarrow$ *the Strength of a Non-Magnetar-Star*

1Tesla = [N.s / C .m] = [N / Ampere .m] = [Kg /C.s] = 10^4 Gauss $= 10^{-6}$ Mega-Tesla.

Energy in cave $\mathbf{a} = \sqrt[3]{\mathbf{T^2/g}} = \sqrt[3]{1/g\ f^2} = \sqrt[3]{1/g\ [1,5617663.10^{15}]^2} = 6,5283506.10^{-9}$ m and

follows equation $E = \frac{1}{a^3}[\frac{4\pi^2}{c^2} + \frac{L^2}{2m}]$ where L = the Spin S $= 5,691952.10^{-34}$ {Kg/m/s} , mass

$M_T = 4,5037834.10^{-31}$ Kg of System , $c \equiv 2,998.10^8$ m/s **.** E = [$2,3463513.10^{16}$] x [-] = [$4,392086.10^{-16} + 3,5967888.10^{-37}$] = $10,305376.10^0$ J$+8,43933.10^{-21}$ J .....(E) i.e. Electron-Orbit-Energy is 10,30538 J $= 6,432096,10^{19}$ eV become from filled Helium-orbit.

5.... Case –E - $\rightarrow$ **20-Proton** [$\oplus$] , 20-**Electron** [$\ominus$] ,**20-Newtron** [$\oplus \cup \cup \ominus$] – [$\oplus \leftrightarrow \ominus$] :

The Nucleus Total-Harmonic mass $\equiv M_T$ is $\rightarrow$ $\frac{1}{M_T} = \frac{20}{m_P} + \frac{20}{m_n} + \frac{20}{m_e} = \frac{20.10^{27}}{1,672} + \frac{20.10^{27}}{1,672} + \frac{20.10^{31}}{9,11}$ $= \frac{10^{29}}{4,182} + \frac{10^{32}}{4,5553} = \frac{10^{32}}{4,5500438}$, and $M_T = 4,5500438.10^{-32}$ Kg .....(1)

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

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

$f = \sqrt[4]{\frac{1}{4\pi^2 m.a_H{}^3}} = \sqrt[4]{\frac{1}{4\pi^2 4,5500438.10^{-32}(2,1127839.10^{-11})^3}} = \sqrt[4]{58,887921 0^{60}} = 2,770171.10^{15}$ H..(3)

According to Planck E = h f = $6,62606957.10^{-34}.2,770171.10^{15} = 1,8355345.10^{-20}$ Joules

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

M-field $\overline{B}_F = |\frac{2\pi.M_T}{Q_T}|f = \frac{2\pi.4,55.10^{-32}[\ 2,770171.10^{15}]}{6,4044.10^{-18}\ .}$ (Kg/Cs) $= 1,2365715.10^2$ Tesla ....(4)

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

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1Tesla = [N.s / C .m] = [N / Ampere .m] = [Kg /C.s] = 10^4 Gauss = 10^{-6} Mega-Tesla.

In cave $\mathbf{a} = \sqrt[3]{\mathbf{T^2/g}} = \sqrt[3]{\mathbf{1/g\, f^2}} = \sqrt[3]{1/g\,[2,770171.10^{15}]^2} = 2,3684748\,.10^{-9}$ m Energy

equation $E = \frac{1}{a^3}[\frac{4\pi^2}{c^2}+\frac{L^2}{2m}]$ where L = the Spin S = $5,691952.10^{-34}$ {Kg/m/s} , and mass

$M_T = 4,5500438.10^{-32}$ Kg of System , $c \equiv 2,998.10^8$ m/s . E = $[1,7826351.10^{17}]$ x [-] = $[4,392086.10^{-16} +3,5602202.10^{-36}] = 7,8294866.10^1$ J + $6,3465734.10^{-19}$ J .... (E)

   i.e.   Energy in Electron-Orbit is 78,294866 J , Comparing to the Prior Helium
   is seen that Energy in Outer Orbits of **Calcium** is less than Inner Helium .
   This is the why Bonds on Atoms with multiple number of electrons follow
   the Ionic Bonding .

6….. Case –D- → **-2- Proton** [⊕↔⊕] , **-2- Neutron** [– [⊕↔ ⊖] ≡ { The-Nucleus } :

The Nucleus Total-Harmonic mass ≡ M_T is → $\frac{1}{M_T} = \frac{2}{m_P} + \frac{2}{m_n} = \frac{2.10^{27}}{1,672} + \frac{2.10^{27}}{1,672} = \frac{10^{28}}{4,18}$

and $M_T = 4,180.10^{-28}$ Kg ....(1)

The Nucleus-Orbit Total-Harmonic-Charge → $Q_T \equiv 2.q_p+ 2.q_e = 3,2044.10^{-19} +$

$3,2044.10^{-19}$ C and the **System-Resonance-Charge** $Q_T = 6,4088.10^{-19}$ C …...(2)

The frequency of the Closed-Nucleus-Orbit-System becomes from Kepler second Planetary law equation , $4\pi^2 m\, f^2_o = k$, and constant law of Areas $1 = k\,.f^2_o\,a^3$. Their common k ,

is Constant-Energy → $k = 4\pi^2 m\, f^2_o = \frac{1}{f^2_o\,a^3}$ or , $f^4 = \frac{1}{4\pi^2 m a^3}$ and $f = \sqrt[4]{\frac{1}{4\pi^2 m.a^3}}$ ….(f)

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 $\mathbf{m} = M_T = 4,180.10^{-28}$ Kg . The Resonance-Cave-frequency is as (f) ,

$f = \sqrt[4]{\frac{1}{4\pi^2 m.a_H{}^3}} = \sqrt[4]{\frac{1}{4\pi^2 4,180.10^{-28}(2,1127839.10^{-11})^3}} = \sqrt[4]{0,267927.10^{60}} = 7,19456.10^{14}$ H ..(3)

According to Planck E = h f = $6,62606957.10^{-34}.7,19456.10^{14} = 4,7678039.10^{-19}$ Joules

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

M-field $\overline{B}_F = |\frac{2\pi.M_T}{Q_T}|f = \frac{2\pi.4,180.10^{-28}[\,7,19456.10^{14}]}{6,4\,088.10^{-19}}$(Kg/Cs) = $2,9483812.10^6$ Tesla …..(4)

$\overline{B}_F = \mathbf{2,9483812}$ **Mega-Tesla** → *the Strength of a Non-Magnetar-Neutron-Star*

1Tesla = [N.s / C .m] = [N / Ampere .m] = [Kg /C.s] = 10^4 Gauss = 10^{-6} Mega-Tesla.

In cave $\mathbf{a} = \sqrt[3]{\mathbf{T^2/g}} = \sqrt[3]{\mathbf{1/g\, f^2}} = \sqrt[3]{1/g\,[7,19456.10^{14}]^2} = 5,81840133.10^{-10}$ m Energy

equation $E = \frac{1}{a^2}[\frac{4\pi^2}{c^2}+\frac{L^2}{2m}]$ where L = the Spin S = $5,691952.10^{-34}$ {Kg/m/s} , and mass

$M_T = 4,180.10^{-28}$ Kg of System , $c \equiv 2,998.10^8$ m/s in cave a = $5,81840133.10^{-10}$ m

E = $[2,9538785.10^{18}]$ x$[4,392086.10^{-16} +3,8753966.10^{-40}] = 1,2973688.10^3$ J
$+ 1,144745.10^{-19}$ J ….(E)

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

n... Case –N. → **n-Proton** [⊕] , **n-Electron** [⊖] , **n-Neutron** [⊕ᴗᴗ⊖] – [⊕↔ ⊖] :

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

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is found , the Mendeleyev Periodic table in Planck`s level $\mathbf{10^{-35}}$ m (*this Property issues in all Geometrical caves and in a cave of* , $\mathbf{10^{-62}}$ *m* , *which is the Gravity level in which Gravity - Field exists*) , and also all models of the atom as follows ,

a... In Set ↓ ≡{**Mould**≡ Space ≡Cave} → The minimum Number of Points in each Energy-Level is

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

b... Elements → The maximum number of **Elements** ≡ **Digits** in Material - Point is **, 2** , [1 Positive ⊕ and 1 Negative ⊖] consisting the → Unit-M-P ≡ { [⊕↔⊖] , ⊕ ,⊖} The possible Repetitive-Permutations for moulds and Elements are $\mathbf{Mould^{Elements} = m^2}$, 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	2	Sphere ≡ S
Line-sector →	m =2	4	**8**	→ 2+8	10	S+ Lissajous-Figures
Plane	→ m =3.	6	**18**	→ 10+18.	28	Two-Spheres
Volume	→ m =4.	8	**32**	→ 28+32.	60	Three - Spheres
m –Space	→ m = m	2xm	**2xm²**	→ $2m^2+2(m-1)^2+2$, m-Spaces-Volume		

Photon was proved to be a Material-point in cave **r** , where its **Inner Storage** is *the Stationary-Standing-wave* the Electromagnetic-Wave [E²+H²] =2(2r).c.sin 2φ with **n** Lobes representing the *Normal mode vibration* with frequencies $f_n = n.f_1 = \dfrac{E}{h} = \dfrac{n.v}{4r} = = \dfrac{n\sigma}{8r}$ [1+√5] , and **Outward the Storage** *is the Propagating Electromagnetic- Wave* →{[εE²+μB²] =2.λc.sin.2φ}← *where* **Particle** 2r = n λ , **Cave** r , is the *Electromagnetic Energy-Storage* **,** and Electromagnetic-Radiation E , B ,**is** *the* **Wave Conveyer of Cave** , **, r , with** frequency **f** = Energy E / Planck-constant h , or f = E / h .   (Figure – 3 - 4)

From relation Force   G = σ A = (2πf r)$\dfrac{A}{\Phi}$ = w r = **c̄** . $\dfrac{A}{\Phi}$, *The Action* of G → on **c̄** and Following relation **σ x Φ³ ≡ G** , and from Energy-force F_g in r = L_P Planck`s scale of mass m $_g$ = J.w² , where angular-velocity w = $\dfrac{c}{r}$ and , the 3-Dimensional Space of the two + , - , are [2³ = (⊕↔ ⊖)³] *then* , Impedance g $_Z$, of Space ln(3) and Anti-Space π√3 , originates the Gravity as   Centrifugal-Force $\mathbf{F_g} = \mathbf{\bar{g}} = m_g [\dfrac{c^2}{r}] = m_g [\dfrac{c^2}{r}] = J w^2.\dfrac{c^2}{r}.g_Z = [\dfrac{\pi r^4}{2}].[\dfrac{c}{r}]^2. [\dfrac{c^2}{r}]. 2^3.\ln(3).\pi\sqrt{3} = \mathbf{4\sqrt{3}. \ln 3.\pi^2 rc^4} = \mathbf{9,8076754}$, existing In-Out Atom .

i.e.   **Gravity** **ḡ** , is The effection of **G** force , on **c** light-velocity , in the 3-Dimensional Space and Anti-Space , **2³** , In and Out the Planck- length **L $_P$ = r** . Gravity existing in Hydrogen-Cave which is a *Uniform-Magnetic- field* **,** Because $\bar{B}_L$, **is Independent** of the **Electron-velocity** v_e and of the **Cave-radius** , r , therefore electron is not accelerated in the Uniform-Magnetic-Field , but its Strength is **Dependent on frequency , f** , only .

   The Process for , **n** , equal Opposite-Elements **for measuring Hydrogen-cave**   :

The Nucleus Total-Harmonic mass ≡ M_T → $\dfrac{1}{M_T} = \dfrac{n}{m_P} + \dfrac{n}{m_n} + \dfrac{n}{m_e} = \dfrac{2.n}{m_P} + \dfrac{n}{m_e}$, because $m_n = m_P$

The Nucleus-Orbit Total-Charge ≡ Q_T → $n.q_p + n.q_e$, where m_p= masses , q_T= charges

The frequency of , Nucleus-Orbit-System is $f_H = \sqrt[4]{\dfrac{1}{4\pi^2 M_T .(a_H)^3}}$, where a_H = Electron cave.

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The constant **Hydrogen-Uniform-Magnetic-field** is $\overline{B}_{H-UMF} = |\frac{2\pi.M_T}{Q_T}|.f_H$ in Tesla ,

The Resonance - Cave , is $a_R = \sqrt[3]{T^2/g} = \sqrt[3]{\frac{1}{g}.f^2_H}$ m , in Hydrogen-cave a_H in m ,

The Energy in Hydrogen-cave is $\rightarrow E = \frac{1}{a_R{}^2}[\frac{4\pi^2}{c^2}+\frac{S^2_T}{2m}] = \frac{1}{a_R{}^2}[\frac{4\pi^2}{c^2} + \frac{c.a_H.S_T}{2}]$ in Tesla ,

The Electric Force between u-Quarks and d-Quarks in Protons is $\rightarrow F_c = C\,\frac{q_1.q_2}{r^2}$ Newton .

3f... The Elements in the Proton-Neutral-caves → { Masses-Charges-Forces }
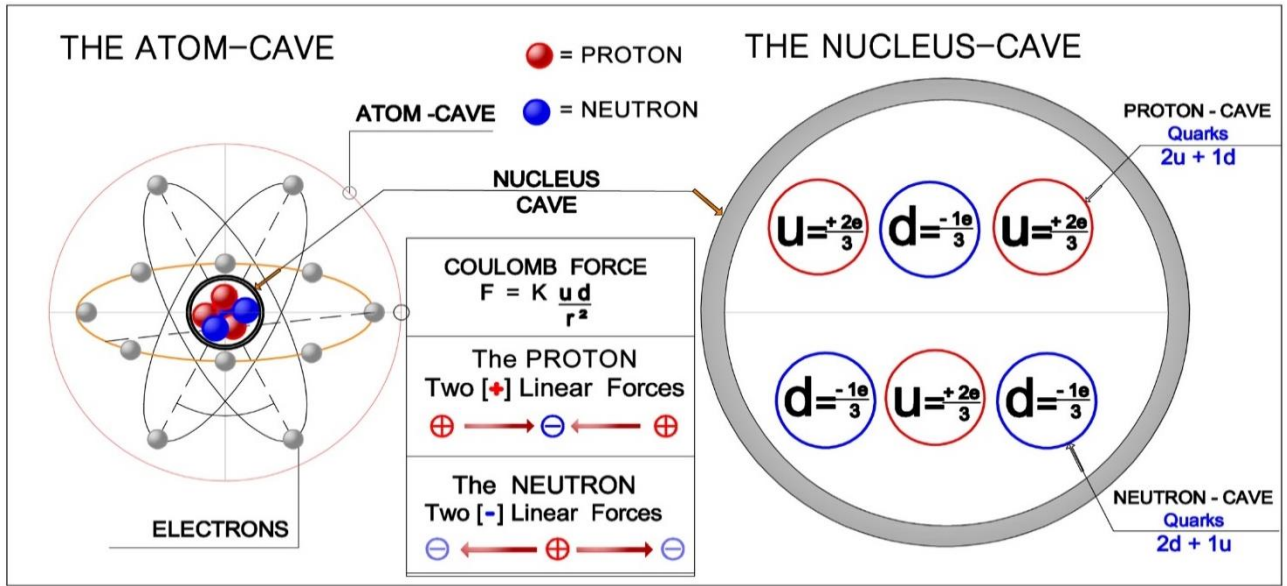
Figure – 15. The Structure within the Hydrogen-Nucleus of , ⊕ **Proton** , [⊕↔⊖] **Neutron**
Proton is consisted of Three-Primary-Opposite-Spaces ⊕ , ⊖ , [⊕↔⊖] , having
masses m_p , Charges $\overline{q}_p$, and caves $a_p = r$.

The elements in Proton are the Two u-Quarks and One d-Quark .

The total mass M_T in Proton follows , ***The Parallel Connections Resistors*** inverse law and

The Proton Total-Harmonic mass $\equiv M_T$ is $\rightarrow \frac{1}{M_T} = \frac{1}{m_u} + \frac{1}{m_u} + \frac{1}{m_d}$,

The System Total- Harmonic-Charge $\equiv Q_T \equiv 2.q_u + q_d = 2.(2/3).e - (1/3)\,e = +\frac{3}{3}e = $
$+ 1,6022.10^{-19}$ C , and the **System-Resonance-Charge** $Q_T = +1, 6022.10^{-19}$ C ….(2)

The Proton Total- Harmonic- Charge $\rightarrow Q_T \equiv 2.q_u + q_d$,and for the Resonance **Frequency**
of the Unit-Cave is the Stationary-System becoming from Kepler second Planetary-law as
equation , $4\pi^2 m\, f^2{}_o = k$, and constant law of Areas $1 = k\,.f^2{}_o\,a^3$. Their common k , is the

Constant-Energy $\rightarrow k = 4\pi^2 m\, f^2{}_p = \frac{1}{f^2{}_p\,a^3}$ or , $f^4{}_p = \frac{1}{4\pi^2 m a^3}$ and $f_p = \sqrt[4]{\frac{1}{4\pi^2 m.a^3}}$

The measured magnitudes are as follows ,

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

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

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

d-**u-***Quark*** →from equal masses $m_p = 2.m_u + m_d = 3.m_u = 1,672.10^{-27}$ Kg ,and Quark masses

$m_u = m_d = m_p / 3 = 5,573.10^{-28}$ Kg , and $\frac{1}{M_T} = \frac{1}{m_u} + \frac{1}{m_u} + \frac{1}{m_d} = \frac{3}{m_p} + \frac{2.3}{m_p} = \frac{9}{m_p}$ and Proton

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Resonance mass $M_T = \frac{m_p}{9} = 1,857777.10^{-28}$ Kg $\approx 16,7267$ mEv/c² …….(m)

For Proton issues $q_p = 2.q_u + q_d = 2.\frac{2}{3} e - \frac{1}{3} e = e$, and the Stability of forces is axial .

Electron-Charge $C_e = 1,602.10^{-19}$ C , while $C_{qu} = \frac{2}{3} e = + \frac{2}{3} 1,602.10^{-19}$ C

$\qquad\qquad\qquad\qquad C_{qd} = - \frac{1}{3} e = - \frac{1}{3} 1,602.10^{-19}$ C , and from

$Q_T \equiv 2.q_u + q_d$, then Proton **Resonance charge** $Q_T = \frac{3.q_p}{3} = 1,602.10^{-19}$ C ….(c)

Proton-**Resonance frequency** $f_p = \sqrt[4]{\frac{1}{4\pi^2 m.a^3}} = \sqrt[4]{\frac{1}{4\pi^2 5,573.10^{-28}(8,4.10^{-16})^3}} = 5,26241.10^{17}$ H

Using the United Newton-Coulomb **Electro-Mechanical** Equation , $q\overline{B}_L = 2\pi.m\ f$, the Proton

Magnetic-field $\overline{B}_F = \frac{|2\pi.m_T|}{Q_T} f = \frac{2\pi.1,85777.10^{-28} 5,262409.10^{17}}{1,6022.10^{-19}}$ (Kg/Cs) = $3,83389.10^9$ Tesla

which is the **Strength of a Magnetar**, i.e. A type of Neutron-Star having an extremely
Powerful **Magnetic-field** , and **Electric-Forces** to be over **Ten-Thousands-Newton** .
The **Electric Force** between the **u**-Quarks and **d**-Quarks in Proton is from Coulomb law

$F_{ud-p} = C\frac{q_1.q_2}{r^2} = 8,9875.10^9 (Nm2/c²).\frac{2}{9}[1,602.10^{-19} C]^2\frac{1}{(10^{-16})^2} = 1,997222.10^{6}$ N …(F p)

and The **Electric Force** between the **u**-Quarks and **d**-Quarks in Neutron is

$F_{ud-n} = C\frac{q_1.q_2}{r^2} = 8,9875.10^9 (Nm2/c²).\frac{2}{9}[1,602.10^{-19} C]^2\frac{1}{(10^{-16})^2} = - 1,997222.10^{6}$ N ..(F n)

i.e. **Forces between** the **Opposites Equilibrium-Linearly** ←[d-u-d]→ **or** →[u-d-u]←

For the **Neutral-cave** issues $q_n = 2.q_d + q_u = - 2.\frac{1}{3} e + \frac{2}{3} e = 0.e$, and the Stability of forces
is axial as in Proton and this because the Dynamic-Strip-Polygon doesn`t close .

Remarks :

1.. Gravitational force $G \equiv \boldsymbol{\sigma} A \equiv [\frac{2\pi r f}{\Phi}] A \equiv \overline{v} [\frac{A}{\Phi}] \equiv \sigma.\Phi^3 \equiv \Phi^2 . [\{\sigma\ \Phi\}] \equiv$

$\qquad\qquad G \equiv \Phi^2. [\{\sigma\ \Phi\} \equiv 2\pi f_P\ r \equiv w\ r \equiv \overline{v} \equiv m\ g = \overline{c} = \frac{2.B}{\pi r^3}] \rightarrow$ i.e. **G**

is Related to → motion≡ work W , Spaces r , Anti-Spaces 1/r , Stresses σ , Areas A , Caves a ,
$\qquad$ → Periods T , Frequencies f , Angular-waves w , Angular-Momentum B ,
$\qquad$ → Spin B ≡ S , velocities v , Light-velocity c , Impedances Z_n, Masses m ,
$\qquad$ → Gravity $\overline{g}$, Charges , $\overline{q}$, Electromagnetic - Fields $\overline{E}$, $\overline{M}$, Hydrogen H ,
$\qquad$ → Atoms , Molecules , Golden-Ratio Φ , All-Universe . Markos 9/4/2020.

4f.. The Energy of The-Primary-Particles-caves :

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

From rotational Energy B = r m v = S = Spin then , $m = \frac{B}{r.v} = \frac{B}{r.wr} = \frac{B}{r^2.w} = \frac{S}{r^2.w}$ …..(1)

Centripetal-Energy $E_K = \frac{m}{r} v^2 = \frac{v^2}{r} [\frac{S}{r^2.w}] = \frac{w^2 r^2.S}{r.r^2.w} = \frac{w.S}{r} = \frac{2\pi f.S}{r} \equiv \frac{c.S}{r^2}$ …..(**2**)

From Unit-Area-Energy $f^2.a^3 = \pi$, then $f = \sqrt[2]{\frac{\pi}{a^3}}$ ...(3) and $E_K = \sqrt[2]{\frac{\pi}{a^3}}.\frac{2\pi S}{r} \equiv \sqrt[2]{\frac{\pi^3}{a^3}} . \frac{2S}{r}$ ...(**4**)

and or Energy from caves → $E_K = \frac{k}{r} + \frac{L^2}{2m\ r^2} = \frac{k}{r} + \frac{L^2}{2(\frac{S}{r^2.w})r^2} = \frac{\pi}{r} + \{\frac{Sw}{2} = \frac{cS}{2r}\} = \frac{\pi}{r} + \frac{cS}{2r}$ ...(**5**)

1.. **Neutrinos ,v, m** =$(3,11.10^{-6})$MeV/c² x $1,8.10^{-28}$ = **5 ,598 .10^{-34}** Kg

The Spin is , $S_v = 5,691952.10^{-34}${Kg/m/s}, $a_v = 7,0.10^{-21}$ m , $f_v = [E_{vK} = mc²] / h =$

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$5,6.10^{-34}$ $[10^{17}].1,6022.10^{-19} = 8,96912.10^{-36}$ J / $[6,626.10^{-34}$ Js = **13,536244. 10^1/ s**

From cave r = 7.10^{-21} m and f = $\sqrt[2]{\frac{1}{g.a^3}} = \sqrt[2]{\frac{9,8078}{(7.10^{-21})^3}} = 5,347345.10^{30}$ H then ,

E_{vK} = h. $f_v = 6,62607.10^{-34}$ J s.[$5,347.10^{30}$] / $(1,6022.10^{-19}$ eV) = **2,2114518.10^{14}**eV

Using $E_{vK} = \frac{k}{r} + \frac{cS^2}{2m.r^2} = \frac{36.10^{-20}}{7,10^{-21}} + \frac{3.10^8(5,691952.10^{-34})^2}{2.3,922.10^{-36}[7,0.10^{-21}]^2} = 51,428$ eV+ $2,528774.10^{17}$eV

= 252,8774 , $[10^{15}]$ TeV → The Total Energy of the Sun striking Earth-face per second.

2… **Electron , e ,** $m_e = 0$, 511MeV = 0, 511.10^{-6} eV . $[1,80. 10^{-27}] = 9,198.10^{-34}$ Kg

$a_e = 5,0.10^{-18}$ m , Charge $C_e = 1,602.10^{-19}$ C , Spin $S_e = \frac{S}{2} = 2,845976.10^{-34}$ {Kg/m/s},

From cave r = 5.10^{-18} m and f = $\sqrt[2]{\frac{g}{a^3}} = \sqrt[2]{\frac{9,8078}{(5.10^{-18})^3}} = 2,801114.10^{26}$ H then ,

Using $E_{eK} = \frac{k}{r} + \frac{cS^2}{2m.r^2} = \frac{36.10^{-20}}{7,10^{-18}} + \frac{3.10^8(5,691952.10^{-34})^2}{2.9,198.10^{-34}[5.10^{-18}]^2} = 51,428$ eV + $2,111843.10^{10}$ J

= 51,43 eV+ $1,32 .10^{29}$ eV → The Energy of 133 gr to fall 1 meter against gravity.

3.. **Gamma-ray** , γ, is the **Photon-Energy** E = $\bar{c}$ [$\frac{\sigma}{2\pi r} + \frac{\sigma\Phi}{2\pi r}$] ≡ $\bar{v}$.[$\boxed{\bar{f_n}}$ + f_n] ,with Spin =1

and is an **Energy-Storage S** ≡ $\boxed{[\oplus \leftarrow r \rightarrow \ominus]}$ ≡ **Particle [$\bar{v}$. $\boxed{\bar{f_n}}$]** → [$\bar{v}$ = $\bar{c}$ = λ $\frac{f}{\Phi}$] → and is

an Stationary-Standing-Wave → [S≡ [EM-R ≡ $f_{1=N}$,f_2 ,f_D ,f_n= w^2] =2.(2r).c.sin 2[φ ≡ $\frac{\bar{B}}{\Phi}$]

2.. Energy-Motion M ≡ $\boxed{\bar{v} - \textbf{Vector}}$ ≡ **Wave** [$\bar{v}$ .f_n] ≡ [f_1= (E²+H²) = n $\frac{\Phi.\sigma}{2\pi r}$ = $\frac{n\bar{B}}{\pi^2 r^4}$]

i.e. **a Propagating Wave** {W≡ EM-R ≡ [εE² + μB²] = 2.λc. sin 2[φ ≡ $\frac{\bar{B}}{\Phi}$]}

Energy under Planck-scale **E = [$\Phi \frac{\sigma}{4\pi r}$]** . $\bar{B}$ ≡ $\frac{|B|^2}{2 \pi^2 r^4}$ where $B_p = 5,691952.10^{-34}$ {Kg/m/s},

$\bar{q}$ Photon = $\frac{G}{\sqrt{2}.f} = \frac{G.h}{\sqrt{2}.E} = \frac{[6,6736923 .10^{-11}].[6,62606957.10^{-34}]}{\sqrt{2}.E=1} = 3,127 \ 10^{-44}$ C .   i.e.

The Energy in Photon is **Dependent** on Gravitational **G** and frequency f_p **of Storages** .

Issues → 1eV=$1,6022.10^{-19}$J ← 10^3eV = $1,6022.10^{-16}$ J ,10^6eV =$1,6022.10^{-13}$ J , 10^7eV =$1,6022.10^{-12}$ J ,10^9eV =$1,6022.10^{-10}$ J , 10^{12}eV =$1,6022.10^{-7}$ J and from **f = E / h** then ,

f_{1eV} = $1,6022.10^{-19}$ J / $[6,62606957. 10^{-34}]$ = $2,418024.10^{14}$ H

f_3 = $2,418024.10^{17}$ H , f_6 = $2,418024.10^{20}$ H , f_7 = $2,418024.10^{21}$ H ,f_9 = $2,418024.10^{23}$ H ,

The Total-Energy of an Electron-Charge ,q, in a Voltage V , is **E = h f = q V** , where $f_e = \sqrt[2]{\frac{1}{a^3}}$

Voltage V= $\frac{h.f}{q} = \frac{h.c}{q.\lambda} = \frac{6,62606957.10^{-34}.2,9979.10^8}{1,602..10^{-19}.\lambda}$ = **12,3983.10^{-7}[$\frac{1}{\lambda}$] eV** =12,398 eV for λ=10^{-7}m

or **V** = $\frac{h.f}{q} = \frac{6,62606957.10^{-34}}{1,602..10^{-19}C} \sqrt[2]{\frac{1}{a^3}}$ =$4,1361232.10^{-15}.\sqrt[2]{\frac{1}{a^3}}$ eV =$4,1361232.10^{-15}\sqrt[2]{\frac{1}{10^{-21}}}$ = **12,398eV**

i.e. The Voltage of a cave , **a** , is dependent on inverse **a** , since λ = 2a .

In cave10^{-13} m exists min-energy ,and from g = $f^2_n a^3$, or $f_\gamma = \sqrt[2]{\frac{g}{a^3}} = \sqrt[2]{\frac{9,807}{10^{-39}}}$ = $9,903.10^{19}$ H

Max-Energy is **E = h f_γ** =$6,62606957. 10^{-34}.9,903.10^{19}$ /$1,6.10^{-19}$ = **4,095543 .10^5 eV**

Since **G** Effects on $\bar{c}$ velocity through eq. → E = h f_γ = $\bar{c}$.[$\boxed{\bar{f_n}}$ + f_n] then [$\boxed{\bar{f_n}}$ + f_n] = $\frac{E}{\bar{c}}$ = f_γ

or Energy $\bar{E}$ Photon = 1,eV = **12,4 eV+1,6.10^{-16} eV** and for E 10^n eV , then Photon-Energy

is $\bar{E}$ Photon = n,eV = **12,4 eV + 1,6. $10^{[n-16]}$ eV**   …………(n eV)

Gamma-ray ,γ, is the minimum Energy = $2,77344.10^{-14}$ eV and in the Smallest acceleration

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Space , or in cave $a_\gamma = 1.10^{-13}$ m where issues $f_\gamma = 5, 6.10^{19}$ H.

X-ray , X , is of $\bar{E}_{Photon=2,eV} = 5,203.10^{[-14]}$ eV , $f_x = 5,605.10^{19}$ H and $a_x = 1.10^{-14}$ m

From above is seen the How **Duality-Photon-Energy** is working , $E = \bar{c} .[\boxed{\bar{f_n}} + f_n]$ and from

Stress $\rightarrow \sigma = [\frac{2\pi r}{\Phi^2}] .f_n = [\frac{2\pi r}{\Phi^2}] .[\boxed{\bar{f_n}} + f_n] = [\frac{2\pi r}{\Phi^2}] . \boxed{\bar{f_n}} + [\frac{2\pi r}{\Phi^2}] . f_n \equiv$ **Storage** + **Information**

and it is **The Way of Energy-Storage and Stress-Information** in Nature . In **Quaternion** with Real and Imaginary Part , **Energy Acts only** on the **Resultant-Direction End-Points** Carrying Energy from One-Edge to another Edge, and shows Cosmic-Particles-Origination.

THE PHOTON`S ELECTROMAGNETIC - SPECTRUM :

Photon-ray , $f_{ph} \rightarrow [> a_{ph} = 1.10^{-13}$ m $> 1.10^{-[14+n]}$ m , $f_{ph} = [\boxed{\bar{f_n}} + f_n] = \frac{E}{\bar{c}} = f_\gamma$

$\bar{E}_{Ph=n,eV} = $ **12,4 eV+1,17444. 10** $^{[-n-16]}$ **eV** , where n = 1 , 2 , 3 , … n

Gamma-ray , $\gamma \rightarrow [1.10^{-10}$ m$>a_\gamma = 1.10^{-12}$ m$>1.10^{-[14+n]}$ m , $f_\gamma = 1,774.10^{19}$ H$>10^{19+n\infty}$

$\bar{E}_{\gamma,eV} = $ **1,17444. 10** $^{[-14-16]}$ **eV** , in $2r = 10^{-12}$ m , $f_{\gamma R} \rightarrow 10^{20}$ H

X-ray , X , $\rightarrow [1.10^{-8}$ m $> a_x = 1.10^{-9}$ m $> 1.10^{-10}$ m , $f_X = 1,774.10^{18}$ H $\cong 10^{18}$ H

$\bar{E}_{X,eV} = $ **1,17444.10** $^{[-12-14]}$ **eV** , in $2r = 10^{-10}$ m , $f_{xR} \rightarrow 10^{18}$ H

Ultraviolet , $\rightarrow [1.10^{-6}$ m $> a_x = 1.10^{-8}$ m $> 1.10^{-10}$ m , $f_X = 1,774.10^{17}$ H. $\cong 10^{17}$ H

$\bar{E}_{X,eV} = $ **1,17444. 10** $^{[-10-12]}$ **eV** , in $2r = 10^{-8}$ m , $f_{\gamma R} \rightarrow 10^{16}$ H

    i.e.   Electromagnetic-Spectrum $\equiv$ Photon in all its frequencies.

Remark : For **Neutral-caves** issues $q_n = 0.e$, and the Stability of Forces is **Axial** as in Proton and this because the **Dynamic-Strip-Polygon** closes **Linearly** .This Property issues on Markos [STPL] **Six-Triple-Points-Line** where **Spaces and Anti-Spaces Equilibrium** [91] .

SUMMARY :

1… Force **G** , **Gravitational-Constant-Force G , becomes as Stress** $\equiv$ Force/Area $\equiv$ **g** , as equation $G = gk_E = g .[g_E k_E] = [\frac{T^2_P}{a^3}].[g_L k_L] = [\frac{c.r^3}{a^3}].[g_L k_L] = 9,8076925* 6,8116.10^{-12} \equiv 6,68056.10^{-11} \frac{m^3}{Ns^2}$, and **Effects on Gravity - Stress** $\rightarrow$ **g** $\equiv 9,8076925 \frac{Kg}{cm^2}$ [73] . From the Beyond-Planck-length force $F = \sigma . A$ =The Glue-Bond $\equiv$ Stress x Area $\equiv [\frac{2\pi f.r}{\Phi}].A = w r.[\frac{A}{\Phi}] = \bar{v} [\frac{A}{\Phi}]$,then $F = G = \sigma A = [\frac{2\pi rf}{\Phi}].A = \bar{v} [\frac{A}{\Phi}] \equiv \sigma.\Phi^3 \equiv \Phi^2.[\{\sigma \Phi\} \equiv 2\pi f_P r \equiv \frac{2B}{\pi r^3} \equiv w r \equiv \bar{v} \equiv m g = \bar{c}]$

i.e. Force **G** is **converted** From an axial force $\bar{F} \equiv$ motion , on a Surface A $\equiv$ Space , to Stress σ , in a cave - **r** as frequency f_P and as Angular-velocity $\bar{w}$ and Angular-momentum $\bar{B}$, everywhere as velocity $\bar{v}$ and in Planck-scale-Length P_L , as light-velocity $\bar{c}$ and Gravity $\bar{g}$. Because velocity $\bar{c}$ carries the motion in Photon-Boxes and every where , and Photons , are related to **G** through stresses σ , $G = \sigma.\Phi^3 = [\sigma.\Phi]\Phi^2 = [2\pi r. f] \Phi^2 = [2\pi\Phi^2] r f$, carries also the **Golden-ratio-Pattern** in all microcosm and macrocosm as $\rightarrow \sigma = [\frac{2\pi r}{\Phi^2}] . f_n$

2…Dual-Photon $\bar{v} = \bar{c}.[\boxed{\bar{f_n}} + f_n]$, is **Particle + Wave** $\equiv$ **Energy** moving with light-velocity and its Duality exists in frequency . The Material-Points travel with velocities **n. $\bar{c}$** , and are as $\bar{v}_m = n.\bar{c}.\{\boxed{\bar{f_n}} + f_n\} \equiv [\frac{G}{\Phi^3 L_P}]\{\boxed{\bar{f_n}} + f_n\}$, where $\boxed{\bar{f_n}}$ is the Stationary Storage and [f_n] Travels as an Propagating Electromagnetic-Radiation where motion $\equiv$ Energy $\equiv$ Wave as Electric-Force and is altered to the , Space $\equiv$ Magnetic force as $\bar{E} = \bar{B}$ c .

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Since $G \equiv \sigma.\Phi^3 \equiv \Phi^2 [\bar{c}]$ then → The only **Force** creating velocities is Force - **G** .

3...<u>Light Velocity</u> $\bar{v} = \bar{c} = \frac{F \Phi}{A} = [\frac{G \Phi}{A=b}] = [\frac{6,673692 .10^{-11}.1,6180339887}{36 .10^{-20} .}] = 2.9995163. 10^8$ m/s

And is a Constant-Light-velocity $\bar{c} = \frac{G}{\Phi^3 L_P}$, because all constituents are constant.

Since $G \equiv \sigma.\Phi^3 \equiv \Phi^2 [\bar{c}]$ then → The only **Force** creating velocities in loops is **G .**

4...<u>Gravity</u> **$\bar{g}$** . The **Light velocity vector** $\bar{v} = \bar{c}$ is **Acting on cave** , $r = L_P$, and finding

Impedance m_g , becomes the **Centrifugal-Force F_g** of the **Cave** and it is Equal to the

Gravity g , as **Gravity** → $\bar{g} = 4 \sqrt{3} \ln(3) . \pi^2 L_P c^4 = 9 , 8076754$ m/s

Since $G \equiv \sigma.\Phi^3 \equiv \Phi^2 [m \bar{g}]$ then→ The only **Force** creating Gravity and masses is **G** .

5...<u>Hydrogen cave **H**</u> . The **Light velocity vector** $\bar{v} = \bar{c}$ acting on **an-cave** , $r \neq L_P$, finds

The-Impedance Z_c from Velocity $\bar{c}$, and becomes the minimum-Energy - cave in L_P ,

equal to $E \equiv r Z_c \bar{c} \equiv h$, and is the Hydrogen cave $L_H = r = \frac{h}{c.Z_c} = 2,1127839.10^{-11}$ m

which is the min-cave in Planck`s - length with the max-Energy **h .** From the Unit-Stress-

Gravity **g** as $k = E = \frac{T^2}{r^3} = g = \frac{1}{f^2. r^3}$, then $g r^3.f^2_p = 1$, which is the Kepler second

and constant Unit-law for areas , and in this min - L_H frequency $f = 3,2839982.10^{15}$ H ,

which is the Hydrogen cave occupying Energy → **E= h f** = 13 , 6 eV . =

Since $G \equiv \sigma.\Phi^3 \equiv \Phi^2$ [w r] then→ The only **Force** creating Caves and Periods is **G** .

6...<u>Electron cave **e**</u> . The Natural-frequency **f** in Planck`s length for the **Primary-Particle**

occupying the less **Negative-charge-frequency**, is the **Electron** ,and is from equation

solution $\frac{w_n}{2\pi} = f_e = \frac{1}{2\pi} \sqrt{\frac{k}{m}}$, or $4 \pi^2 f^2_e .m_e = k = \pi g$ and $m_e = \frac{g}{4 \pi f^2_e}$, where

$f_e = 3, 283998.10^{15}$/s , Light velocity **c** , is acting on **Electron-Unit-Charge** $\bar{q}$ ← or ,

$G = c \sqrt{2} \bar{q}$, and then **Electron-Charge** is $\bar{q}_{Electron} = \frac{G}{c \sqrt{2}} = 1,574.10^{-19}$ C .

Since $G \equiv \sigma.\Phi^3 \equiv \Phi^2 [\sigma \Phi]$ then→ The only **Force** creating velocities and Charges is **G** .

7... <u>Electromagnetism $\bar{E} , \bar{B}$</u> Using the United Newton-Coulomb **Electro-Mechanical**

Equation , $q \bar{B}_L = 2\pi.m f$ **, then** The Proton-Uniform-Magnetic-field $\bar{B}_F = \frac{|2\pi.m_T|}{Q_T} f =$

$1,502766.10^{11}$ Tesla . The Proton-Resonance frequency $f_p = \sqrt[4]{\frac{1}{4\pi^2 m.a^3}} = 5,26241.10^{17}$ H ,

and Energy equation $E = \frac{1}{a^3} [\frac{4\pi^2}{c^2} + \frac{L^2}{2m}]$ where L = the Spin S = 5,691952. 10^{-34} {Kg/m/s}.

Since $G \equiv \sigma.\Phi^3 \equiv \Phi^2 [\frac{2S=B}{\pi r^3}]$ then → The only Force creating Spins and EM-Fields is G .

8... <u>Weak Forces in Proton and Neutron caves</u> . The Electric Force between the **u**-Quarks and

d-Quarks in Protons and Neutrons becomes from Coulomb law for charges as in **Uniform**

Magnetic-field $\bar{B}_F = \frac{|2\pi.m_T|}{Q_T} f = \frac{2\pi.1,85777.10^{-28} 5,262409.10^{17}}{1,6022.10^{-19}}$ (Kg/Cs) = 3,83389. 10^9 Tesla

in where Uniform MF , the cyclotron frequency is independent of the particle speed and radius

Force $F_c = C \frac{q_1.q_2}{r^2} = 8,9875.10^9 (Nm2/c²).\frac{2}{9}[1,602.10^{-19} C]^2 \frac{1}{(10^{-15})^2} = $ **51,25679 N**

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x[1Nm = 6,2415. 10^{18} eV] = **3,1991925.10^{20} eV**

Since $G \equiv \sigma.\Phi^3 \equiv \Phi^2 [\frac{2\overline{B}_F}{\pi r^3}]$ then $\rightarrow$ The only Force creating Caves and EM-Fields is G .

9… <u>Strong Forces in Hydrogen-cave</u> .From cave $r_H = \frac{h}{c.Z_c} = \frac{G\Phi h}{A.Z_c} = 2,1127839.10^{-11}$ m and from Unit-Energy , g .$r^3.f^2_p = 1$, the frequency **f** = $3,2881322.10^{15}$ H , then the Hydrogen cave-Energy **L** = h.f_N = $6.62607.10^{-34} .3,2881322.10^{15}$ J /$1,6.10^{-19}$ = 13,6 eV . In case of **1-Proton** $[\oplus] \equiv$ An **Ion-nucleus** , then Total-Harmonic-mass $M_T = 1,67.10^{-27}$Kg . Total-Harmonic-Charge $Q_T = 1,6022. 10^{-19}$ C , The Resonance-Cave-frequency f , is

$f = \sqrt[4]{\frac{1}{4\pi^2 m.a_H^3}} = 1,189975.10^{15}$ H . The System M_T = masses , Q_T = Charges creates a constant Uniform-Magnetic-field of Strength $\overline{B}_F = |\frac{2\pi.M_T}{Q_T}|f = 7,7929983.10^7$ Tesla which is $\rightarrow$ **The Strength of a Non-magneton Neutron-Star** .

Proton is consisted of Two Up-Quark q_u , and One Down-Quark q_d , with masses $m_u = m_d = m_p / 3 = 5,573.10^{-28}$ Kg , and the Resonance **mass** $M_T = \frac{m_p}{9} = $ $1,857777.10^{-28}$ Kg , and charges $\mathbf{C_{qu}} = \frac{2}{3} e = + \frac{2}{3} 1,602.10^{-19}$ C , $\mathbf{C_{qd}} = - \frac{1}{3} e = \frac{1}{3} 1,602.10^{-19}$ C , with Resonance **charge** $Q_T = \frac{q_p}{3} = 1,6022.10^{-19}$ C , and for Proton-Ion $q_p = 2.q_u + q_d = 2. \frac{2}{3} e - \frac{1}{3} e = e$. The Proton-Resonance frequency for **Uniform MF** is

$f_p = \sqrt[4]{\frac{1}{4\pi^2 m.a^3}} = 5,26241.10^{17}$H , and a Magnetic-field-Strength $\overline{B}_p = \frac{|2\pi.m_T|}{Q_T} f = $(Kg/Cs) = 65,7 .$10^9$ Tesla , i.e. **A Strong-Nuclear-Force** with the **Strength of a Magnetar**, The Electric Force between the **u**-Quarks and **d**-Quarks in Proton is from Coulomb law $\mathbf{F_{u-d}} = C \frac{q_1.q_2}{r^2} = 1,9972.10^{-7}$ N , which is the Energy per **Proton** in CERN-LHC, 2015.

Since $G \equiv \sigma.\Phi^3 \equiv \Phi^2 [\frac{2\overline{B}_F}{\pi r^3}]$ then $\rightarrow$The only Force creating Sub-Caves and EM-Fields is G.

i.e. In Universe exists **ONLY ONE FORCE** , that of Newton-Gravitational-constant-Force **G** which , is following the Material-Geometry-Pattern and Cauchy – Euler – Lagrange - Kepler –Newton – Coulomb , Laws of Mechanics such in microcosm as in macrocosm. The Gravitational force $G \equiv \sigma.\Phi^3 \equiv \Phi^2. [\{\sigma \Phi\} \equiv [\frac{2B}{\pi r^3}] \equiv 2\pi f_P r \equiv w r \equiv \overline{v} \equiv m a = \overline{c}]$

10...The Stationary Photon $\overline{v}$.$[\boxed{\overline{f}_n} + f_n] \equiv |\frac{v}{\pi^2.r^4_n}|.\boxed{\overline{B}_n} + |\frac{v}{\pi^2.r^4_n}| f_n$ can use any of the two Storages , *frequencies* , by Placing the Storage $\boxed{\overline{f}_n} = \boxed{\overline{B}_n} = $ Energy = motion , anywhere needed to it and any time can travel with light-velocity . This Property of Photons will be the interest of Future-Technologies because Storage can be **Properly-Prepared**, issuing

$F_{photon} = \frac{[\oplus < \rightarrow \leftarrow \ominus]}{r^2} = \frac{[\sigma.\sigma]}{r^2} = |\frac{\sigma}{r}|^2 = |\frac{2\pi f.}{\Phi}|^2 = |\frac{w}{\Phi}|^2 = |\frac{2L}{\Phi\overline{B}}|^2 = |\frac{\overline{c}}{r.\Phi}|^2$, in the same Box $\overline{B}_n$. When a Photon travels through an Static-Magnetic-field then $\rightarrow$ The Spectral-lines $\leftarrow$ *Split into* **Multiple-closely-Spaced-lines** , because of the Released-Energy , $\boxed{\overline{f}_n}$, into Magnetic-Field , a Phenomenon happening such in Inorganic as in Organic Chemistry .

Because Photon is related to stress **σ** as , $\overline{v} [\frac{\sigma}{2\pi r} + \frac{\sigma\Phi}{2\pi r}] \equiv \overline{v}.[\boxed{\overline{f}_n} + f_n] = \overline{v}.[\frac{\sigma \Phi^2}{2\pi r}]$ and $\mathbf{\sigma} \equiv [\frac{2\pi r}{\Phi^2}] .f_n \equiv \frac{f_{ph}.2\pi.r}{\Phi^2} \equiv \frac{w.r}{\Phi^2} \equiv \frac{v}{\Phi^2} \equiv \overline{c}\frac{1}{\Phi^2}$, dependent on Position and velocity ,

It is a Way , of Information from , f_n , **and from Storage** , $\boxed{\overline{f}_n}$, **in Nature .**

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11.. In order that a Material-Point A , moves to another Material-Point B , a Force F must Push Point A to Point B .This happens to Coulomb-law of Charges and Forces , and also to the Magnets where The $\oplus$ Charge moves to the $\ominus$ Charge . These Charges are Breakages from the Collision of any Two-Opposite -Velocity-Vectors into an Equilibrium **Physical Velocity-Whirl** , where **The Thrust** on Charges is the Circular-Position of these Charges **,** + , 0 , - **,** on the [STPL mechanism] and where exists ± Charge ≡ |s| ≡ |$\bar{v}$|² . [91]
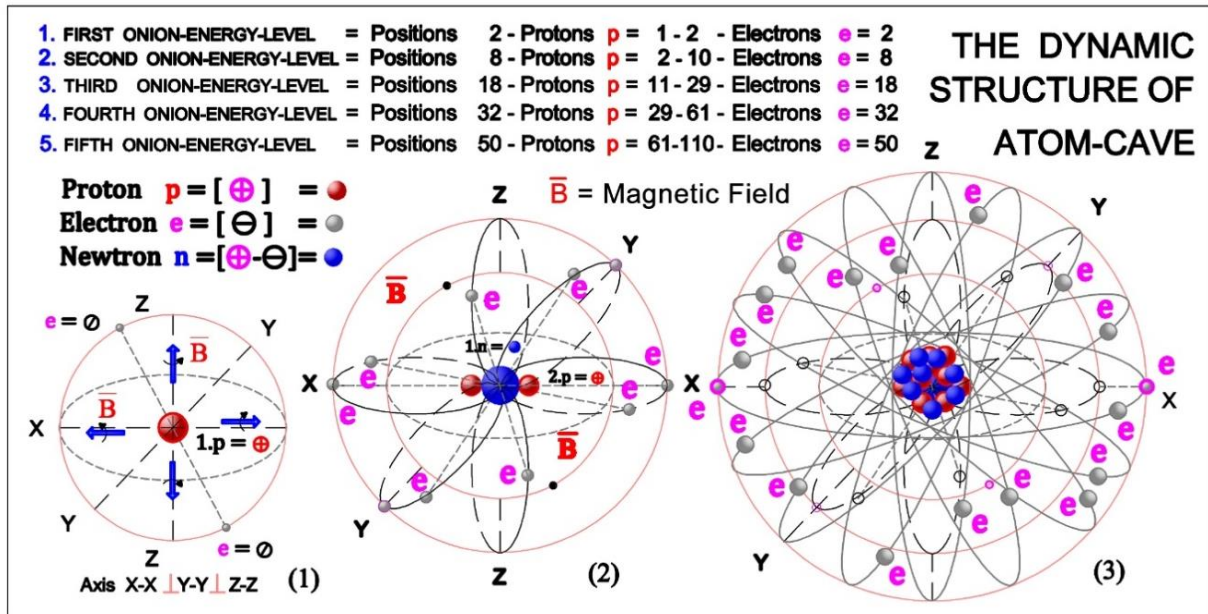
Figure-16- : The New **Energy-Atom-Cave Pattern** , In minimum Energy-Space , **p ↔ e** :

5f...   The New Electromagnetic-Structure of Atom .

From the **Set of infinite Rest , [+] , [- +} or moving Units ≡ Charges** , the electrons [-] , and choosing **Two of them** in each Orbit **for Stability ,** is found Mendeleyev - System and the following New-Proposition of Atom-Structure as follows ,

1.. Hydrogen-Cave becomes from Gravity , **g** , entering the minimum cave **a** of $g.a^3.\mathbf{f}^2{}_{\mathbf{p}} = 1$ 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 UMF ≡**Uniform-Magnetic-Field** $\overline{B}_p$,[***The-Material-Space***] as equation $\bar{q}_p.\overline{B}_p = 2\pi.m_p.f_r$ which is the **Storage of Energy** in Hydrogen-Cave .
In this UMF , Charges **$\bar{q}$** , Orbiting in a Plane Normal to $\overline{B}_p$, their cyclotron-frequency **f_n** is independent of the Particles-speed and radius allowing the acceleration of Charged Particles as are the , Electrons $\rightarrow \bar{v}_e = 2\pi r. f_e$ and , Dual-Photons $\rightarrow \{\ \overline{c}\ .\ \boxed{\overline{f_n}}\ +\ \overline{c}\ .\ f_n\ \}$.

2.. The Presence of a **Negative-Electron-Charge** $\bar{q}_e \equiv \ominus$ in the Uniform-Magnetic-field $-\overline{B}_p$ experiences a Force , *The-Lorentz-Force* , when entering the Magnetic-field and since it occupies the constant-energy , $\bar{q}_e \equiv \dfrac{G}{c\sqrt{2}} = 1,59.10^{-19}$ C , then follows a **Complete-circle** ***The-Material-Space*** **is** $\overline{B}_p$,and thus defines the Number of the Material-Points in Spaces as well as the Material-number **Zero** which is now included .
The presence of Photons with this Dual frequency $\{\ \overline{c}\ .\ \boxed{\overline{f_n}}\ +\ \overline{c}\ .\ f_n\ \}$, Storage + Energy allows The **Work** ≡ Energy produced by **Electrons** , be Stored in **Photons – Storages .**

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

a.. The **Three Elements** $\equiv$ Digits of Material-Geometry are $\{ \oplus, [\oplus \leftrightarrow \ominus], \ominus \} \equiv [+, 0, -]$ The Positive , The Zero , The Negative with their Global meaning .

b.. The **Permutation** , *arrangement* , Per-two of the only Two-Elements is , $P_1^2 = \mathbf{2}$, and these are the two as $\rightarrow [\oplus, \ominus]$ and $[\ominus, \oplus]$. The number of **Permutation** with **Repetition** of the **Two** Elements in $\mathbf{n = 2}$ which is the Sub-Spaces as $\mathbf{P}_{\text{Elements}}^{\text{Moulds}} \equiv \mathbf{RP}_1^2 \equiv 2$, and this because Material Geometry numbers do Not begin with zero $[\oplus \leftrightarrow \ominus]$, as in E-Geometry .

c.. The Material-Spaces for 1- **Point** $\equiv$ 2 Elements , A **Vector** $\equiv$ 4 Elements , A **Plane** $\equiv$ 6 Elements , A **Volume** $\equiv$ 8 Elements , A **Space1volume** $\equiv$ 10 Elements , A **Space2volume** $\equiv$ 12 Elements , A **Space-n-volume** $\equiv$ 2 n Elements in Regular Solids , Analysis in [63]

d.. The number of **Permutation** with Repetition of the **Two**-Elements in the **n**-**Spaces** and in the Two **Sub-Spaces** is $\mathbf{P}_1^2 . \mathbf{RP}_2^n \equiv \mathbf{2} \ \mathbf{n}^2 \equiv \textbf{The Number of Electrons in Each-Space}$, A relation defining the number of Electrons in Orbits and The-Mendeleyev-Atoms-Table. Nature follows the Quantum-Space-Positions logic for each element agreeing with M-G, which is the Objective reality such in Space as in motion which is equal $\equiv$ Energy .

e.. The number of **Permutation** of the **n**-**Spaces** and of Repetition in the **2-Sub-Spaces** of the **Two**-Elements $[\oplus, \ominus]$ is equal to $\rightarrow P_1^2.RP_2^n + P_1^2.RP_2^{n-1} + P_1^2.RP_2^{n-2} + ... \equiv$ $2 [n^2+(n-1)^2+(n-2)^2+..]$, *Onion Summation* , $\sum_1^n [\frac{n(n+1)(2n+1)}{6}] = 2, 10, 28, 60, 110$, denoting thus the Total-number of Positions in Hydrogen-Caves as an Additional-whole .

f.. In Fig-16, *The Elements* $\rightarrow$ **Proton** $\equiv \oplus$,**Electron** $\equiv \ominus$, is **The-Energy-Part of Atom**, while Neutron $\equiv [\oplus \leftrightarrow \ominus]$, is **The-Space-Part of Atoms** as $0 \equiv [\oplus \leftarrow \mathbf{r} \rightarrow \ominus]$, 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 of Energy is $2,03.10^8$ J and with the **Cyclotron-Frequency** $f_R = 1, 189676.10^{15}$ H ,

In (2) is , The **Vector-Space-Cave** m = 1 ,with *Two-Nucleus-masses* of *One-Charge* and with $2m^2 = 2$ Permitted-Orbit-Positions , per 2 Electrons for Stability, $\rightarrow$ consists the first , **3** , Perpendicular-Plane-Permitted-Positions in Cave , for the $\rightarrow$ **Lissajous – Eight - Shapes** . This happens because of the **Linear-Vibrations** $[\ddot{x} + w^2 x = 0]$ of **The three-masses** , which Occur on the Two **Perpendicular each other** , Line-Vectors of , $\mathbf{x} \perp \mathbf{y}$, in Plane above Shapes which are for ,

a.. Difference of Phase $d_{\varphi} = 90^o$ emission is $\rightarrow$ The Eight-Shapes ∞ .
b.. Difference of Phase $d_{\varphi} = 0^o$ emission is $\rightarrow$ The Ellipse-Shapes $\propto$.
c.. Difference of Phase $d_{\varphi} = 45^o$ emission is $\rightarrow$ The Double-Saddle-Shapes . $\mathcal{B}$, CD .

For *One-Nucleus-mass* and *One-Orbit-mass* is produced the **Atom-Nucleus-Orbit-Hook** + Plane + , Prior [ANOH] , which accumulates the Nutation-frequency used for the Atoms

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Bonding . For any two masses in Nucleus and one mass on Orbit , *three masses problem* , issues the $\mathbf{x} \perp \mathbf{y}$, 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$\rightarrow$ consists the Second **Onion Plane-Energy-Volume** , Enveloping the Priors , **Vector-Space-Cave** - m + Plane +Vector + Point + , Prior[ANOH] , and For the **n**-Proton [$\oplus$] , **n**-Electron [$\ominus$] , **n**-Neutron [$\oplus \cup \cup \ominus$] , issues the logic for Total number of Positions in the Hydrogen-Caves .

Onion Summation ,Issues under the condition of the Three-masses which consist a Plane .

In (3) is ,The **Volume-Space-Cave** m = 3 , with [14x2] = **28-*Nucleus-masses*** of **11- *Charges*** and $2m^2$ =18 Permitted-Orbit-Positions , per 2 Electrons for Stability$\rightarrow$ consists the Third **Onion Space-Energy-Volume** ,enveloping the Priors ,**Vector-Space-Cave**-m + Volume + Plane +Vector + Point +, Prior [ANOH] , and for The Total Positions 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 $\mathbf{P}_1^2 . \mathbf{RP}_2^n \equiv \mathbf{2} \ \mathbf{n^2}$,$\rightarrow$ 28 , referring and all the Prior.

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

Because Magnetic field $\overline{B}_F$ **is Independent** of the **Electron-velocity** , v_e , and of the Cave radius , r , therefore the rotating Electrons are not accelerated in Magnetic-Field , but their Strength is **Dependent on frequency , f** , and of Charge , **q** only. Because of this Velocity-lag allows the in Hydrogen-Storage without Inverse Impedance which exists in M-Point . Above Property makes the Hydrogen-Cave a ***Uniform-Magnetic-field*** , $\overline{B}_F$.

Photon was proved to be a Material-point in cave , **r** , where its **Inner Storage** is *the Stationary-Standing-wave* the Electromagnetic - Wave [E²+H²] =2(2r).c.sin 2φ.[$\varphi = \frac{\overline{B}}{\Phi}$] with **n-**Lobes representing the ***Normal mode vibration*** with frequencies $f_n = n.f_1 = \frac{E}{h} = \frac{n.v}{4r} = \frac{n\sigma}{8r} [1+\sqrt{5}] = \frac{2n\overline{B}}{\pi^2 r^4}$, and **Outward the Storage** *is the Electromagnetic-Wave*

$$\rightarrow \{ [\varepsilon E^2 + \mu B^2] = 2.\lambda c.\sin.2\varphi.[\varphi = \frac{\overline{B}}{\Phi}] \} \leftarrow where \quad \textbf{Particle } 2r = n\lambda , \textbf{ Cave} , r ,$$

Is the ***Electromagnetic Energy - Storage ,*** and Electromagnetic Radiation **, E , B , is**   *the* **Wave Conveyer of Cave , r , with** frequency **f** = Energy E / Planck-constant h , or f = E / h which Duality-Photon-velocity is $\overline{\mathbf{v}} \equiv \overline{\mathbf{c}} .[\frac{\sigma}{2\pi r} + \frac{\sigma \Phi}{2\pi r}] \equiv \overline{\mathbf{c}} .[\boxed{\overline{f_n}} + \mathbf{f_n}]$ ....…....(f-v)

From Force-relation $G = \sigma A = (2\pi f\, r)\frac{A}{\Phi} = w\, r = \overline{\mathbf{c}} . \frac{A}{\Phi}$,   i.e. Action of $G \rightarrow$ on $\overline{\mathbf{c}}$ and , following relation $\mathbf{\sigma\ x\ \Phi^3 \equiv G}$, from Energy-force F_g in , r = L_P , Planck`s scale of mass m_g = J.w² , where angular-velocity $w = \frac{c}{r}$ and , from 3-Dimensional $[2^3 = (\oplus \leftrightarrow \ominus)^3]$ Impedance g_z , of Space , ln(3) , and Anti-Space , $\pi\sqrt{3}$, then the Centrifugal-Force is

$$\mathbf{F_g} = \overline{g} = m_g [\frac{c^2}{r}] = m_g [\frac{c^2}{r}] = J\, w^2.\frac{c^2}{r}.g_z = [\frac{\pi r^4}{2}].[\frac{c}{r}]^2. [\frac{c^2}{r}]. 2^3.\ln(3). \pi\sqrt{3} \} =$$
$$\mathbf{4\sqrt{3}.\ln 3 .\pi^2 r c^4} = \ \mathbf{9,8076754}\ \ \text{m/s , which is a Force acting on}\ \ r = L_P\ \ \text{mass .}$$

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i.e.   Gravity $\bar{\mathbf{g}}$, Is The effection of   **G** Force , on light-velocity $\bar{\mathbf{c}}$, In the 3-Dimensional Impedance of Space ln(3) and Anti-Space $\pi\sqrt{3}$ in **2³** , Planck-length $\mathbf{L_P = r}$,   ……..(g)

A wide analysis of what is Impedance in Propagating-Photon $\bar{\mathbf{v}} = \lambda_n . f_n = \bar{c} . [\frac{\sigma}{2\pi r} + \frac{\sigma\Phi}{2\pi r}]$

= Energy = $\bar{c} . \boxed{f_n} + \bar{c} . f_n$ **,** in Material-Geometry [57-58] .

G … THE   GRAVITATION   CONSTANT   G .
1g..   The Gravitation Constant   G   and Photon   :
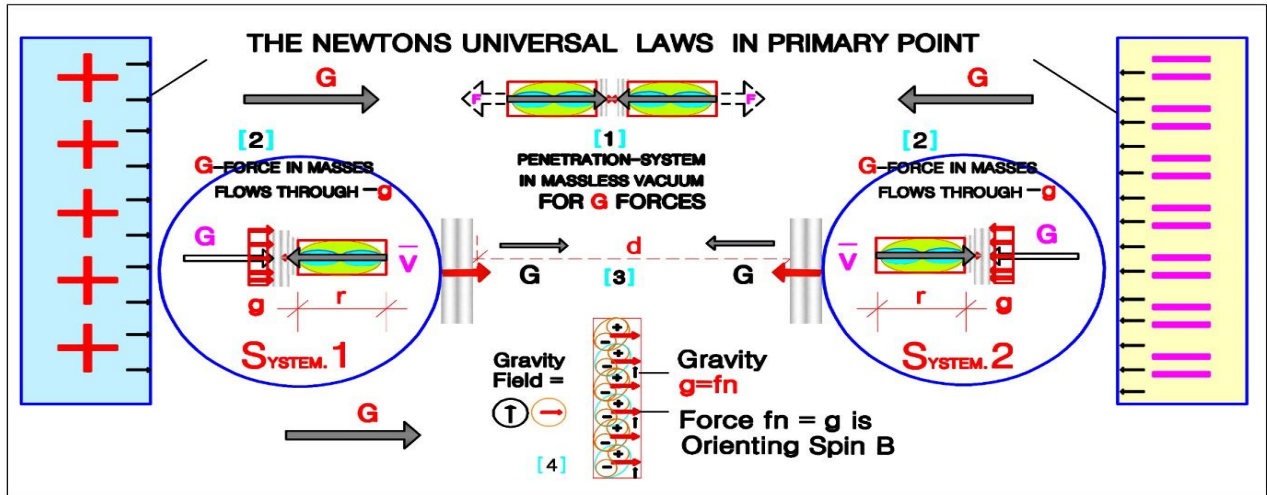
Figure – 17.   The Newton`s Universal Laws in **Primary-Material-Points** :

> Above , is consisted of Two-Primary-Opposite-Spaces ,{+}→ ←{-},The Poles with Infinite points for Parallel-lines such that **G** is a **Uniform- Pointy–Force**. The STPL - Mechanism is for constructing the Elementary Particles while the Material - Point , Photon and Photon - Charge , Light velocity c , Gravity g , Electrons e and e– Charge , Hydrogen cave by the Gravitational constant G .

In universe **exists Only-One-Force** , **The Gravitational-force G** , which is constant in all universe , therefore being constant , becomes from an Conservative –System .
In Mechanics , a force **F** produces the Work **W** , when it removes the point of its action from a Position , A , to another Position , B , as Work 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** only .

Gravitational force G $\equiv \sigma.\Phi^3 \equiv \Phi^2.[\{\sigma\,\Phi\} \equiv [\frac{2B}{\pi r^3}] \equiv 2\pi f_P\, r \equiv w\, r \equiv \bar{v} \equiv m\, a = m\, g = \bar{c}]$

It was prior proved , that one of the smallest **Energy-Unit of Space** is that of Planck`s length , and **is an Energy-cave** , and this because from (s) Space s = 0 and Type-k = 1 .
Energy which is motion is kept in Massive-Box-B_P called **Photon** or *Energy-Storage* .

The velocity of Photon is $\bar{v} . [\frac{\sigma}{2\pi r} + \frac{\sigma\Phi}{2\pi r}] \equiv \bar{v} . [\boxed{f_n} + f_n]$, i.e. a Dual motion as ,

1.. Energy-Storage   S $\equiv \boxed{[\oplus \leftarrow r \rightarrow \ominus]}$ $\equiv$ **Particle** $[\bar{v} . \boxed{f_n}] \rightarrow [\bar{v} = \bar{c} = \lambda \frac{f}{\Phi}] \rightarrow$ i.e.
  a Stationary Standing - Wave $\rightarrow$ $[S \equiv [\text{EM-R} \equiv f_{1=N} , f_2 , f_3 , f_D ,, f_n = w^2]$.

2.. Energy-Motion M $\equiv \boxed{\bar{v} - \text{Vector}} \equiv$ **Wave** $[\bar{v} . f_n] \equiv [f_1 = (E^2+H^2) = n \frac{\Phi.\sigma}{2\pi r}$
  $= \frac{\bar{B}}{\pi^2\, r^4}] \rightarrow$ i.e. **a Propagating Wave** $\{W \equiv \text{EM-R} \equiv [\varepsilon E^2 + \mu B^2] = 2.\lambda c.\sin.2\varphi[\varphi = \frac{\bar{B}}{\Phi}]\}$.

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**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 $\bar{\mathbf{v}}$ which is axial also , *is needed to Have a Reaction to this motion* ,   i.e. Gravitational-Energy **G** is acting on Stress **g** → $\bar{\mathbf{g}}$ **,** through the Waves f $_n$ → [on Material-Point Unit Spin **S ≈ 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 Spins $\bar{\mathbf{S}}$ as Stress in all inter .

It was proved that The **Electron-Spin** is → **S /2 = 1 , 4603748. 10^{-34}** Joules ← which is the same to the Material-Point-Periodic-motion-Spin . From the **Bonded** *Tack - Geometry* ,

1.. **A Charged-Particle** ,*is a Particle with an electric-charge* , ⊕ or ⊖ , which produces an Electric - field $\overleftarrow{\mathbf{E}}$, which exerts a force $\overleftarrow{\mathbf{F}}$ on other charged Particles $\overleftarrow{\mathbf{e}}$. Positive charges $+\overleftarrow{\mathbf{e}}$ accelerate in the ← Direction of the Field $\overleftarrow{\mathbf{E}}$. and Negative charges $-\overleftarrow{\mathbf{e}}$ accelerate in the Opposite   →   Direction to that of the field $\overleftarrow{\mathbf{E}}$.

2.. **A moving Charged-Particle** , ⊕ or ⊖ ,   produces a Magnetic-field $\overleftarrow{\mathbf{B}}$, which   exerts a Force $\overleftarrow{\mathbf{F}}$ on other moving charges $\overleftarrow{\mathbf{e}}$. The Force $\overleftarrow{\mathbf{F}}$ of these charges is always   , ⊥ , perpendicular to the Direction of their Velocity-vector, therefore the *Velocity-magnitude* does not change , and the *Direction* only of the Velocity-vector changes .

3.. **An accelerated-Charged-Particle** ,$\overrightarrow{\oplus}$ or $\overrightarrow{\ominus}$, produces an Electro-Magnetic-Wave $\overleftarrow{\mathbf{E}} \perp \overleftarrow{\mathbf{B}}$ *Perpendicular each other*, which are Electric and Magnetic fields travelling through empty Space with the speed of light , **c** , and which is as a Charged - Particle oscillating about an fixed equilibrium Position . This oscillation frequency , f , is the   same to the E-M-Wave and which wavelength is λ = c / f = c T . The **E-M-Waves transport Energy** through Space , and may be delivered any distance away from the Source . This repelling force becomes from the beyond the Standing-Wave structure at the Two nodes of the wavelength

4.. **Accelerated-Charges** produce , *Changing Electric and Magnetic-fields alternately* ,which leads to the Propagating-Electromagnetic-Waves . In Zero-Periodic-motion {⊕→ **d** ←⊖} = 0 of a Distance , **d** , the motion as Pressure CANNOT act instantly between the two Stationary constitutes , unless a Mean , **d** , is mediated to transfer the Pressure of the ⊕ constituent , to the ⊖ constituent . This   Mean is a Stationary-Primary-Material-Point [⊕↔⊖] which is a **Standing-Wave-structure** becoming from {⊕ ,⊖} Charges at the **Two nodes** of the cave`s wavelength , Producing an *Constructive wave - interference* , ⊕ ↔ ⊕ ,   or , ⊖↔⊖ , and or Producing an *Destructive wave - interference* {⊕→ **d** ←⊖} where d ≡ the nodes distance in wavelength λ = c / f . Because ⊕ charge exerts a Force against ⊖ charge with Zero-Periodic motion and which two constituents equidistant , d = n.[⊕<→←⊖] , n = 1,2 …r , then the two Charges create an Electric and an Magnetic field Perpendicular each other ↑↔↓ which is the *Electric-Force* and the *Magnetic-Force* of the Standing wave structure .

This is the Way of Particles and Forces creation [91] .   Moreover ,
There is Not Vacuum , instead exist the **Infinite - Material-Points** created from the Periodic excitation and which **are Spinning in Opposite -Pairs for Stability**.
The Un bonded-Force , **G** , or   **Gravitational-constant** , **G** , was shown to be the
Electric-Field-lines , i.e. **The SPACE** is a **Huge-Electrostatic-Magnet** from the
Infinite-Dipole -Opposite-Primary –Charges which is THE-ENERGY- PART ,
of the Two-Primary-Points $\overrightarrow{\oplus}$ to $\overrightarrow{\ominus}$, [82-86]

2g..   The Electron and Photon charges :

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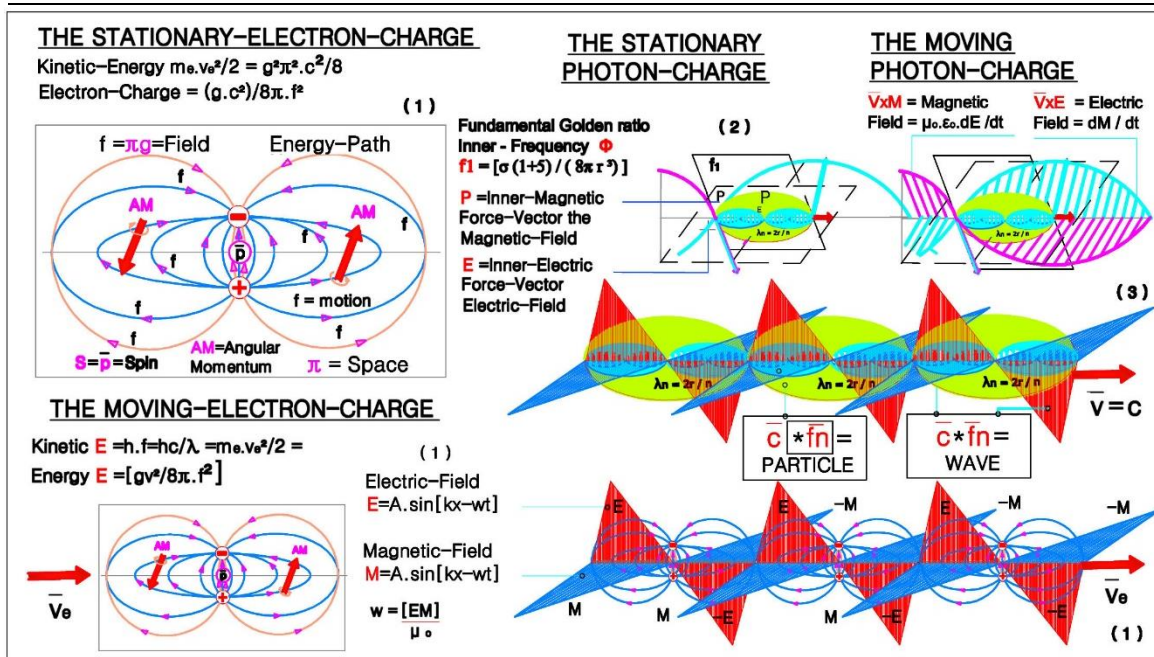
Figure 18. Conservation of **motion ≡ Energy** in the **Primary-Material-Point-Field-lines** :

Photon ≡ Energy ≡ motion / T ≡ $(\frac{v}{2\pi r})$. [σ +σ Φ] = $\bar{v}$. [$\frac{\sigma}{2\pi r} + \frac{\sigma\Phi}{2\pi r}$] ≡ $\bar{v}$. [$\boxed{\bar{f}_n}$ + f_n] ≡

Moving - Storage →[$\bar{v}$. $\boxed{\bar{f}_n}$]← + Moving-Frequency → [$\bar{v}.f_n$] ← ≡ Material-Point   i.e.

The Energy produced in Photon-Cave is consisted of **Two-moving-Storages** ,which travel.
The Stationary-Charged-Particle is from equation , **g .f ². π ³ = 1** , where **π** is the Closed
Space , **πg** is the Stationary-Electric-Lines , and $f_1 = \sqrt[2]{g^{-1}\pi^{-3}}$, the motion = Energy
= **the Stress** in the Two and Opposite-Spaces , [{+} → {-}] , or in the consisted Poles ,
with Infinite Points and Parallel-lines such as **G** which is as An-Uniform-Pointy-Force .
Electrons can be Spinning clockwise or anti-clockwise and Propagate on a Spiral trajectory.
A true definition of what is Electric-Charge and Electricity based on above follows .
In [**1**]   **The-Stationary-Electron-Charge**

Becomes from E-equation $\bar{q} \equiv \frac{m_e c^2}{2} = \frac{g}{4\pi f^2_e}\left[\frac{c^2}{2}\right] = \frac{g c^2}{8\pi f^2}$

while for Photon is directly from G = F = σ A = (2πf r) $\frac{A}{\Phi}$ = wr $\frac{A}{\Phi}$ = $\bar{v}$ $\frac{A}{\Phi}$ = σ Φ³, 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 **g** ocean then
continue to be *Straight-lines* , and this because Total-work W = F.s = [F⊥s] = 0 = h f = 0 .

The Geometry of cave (Tack-Geometry) ***controls the Electric-field*** and the Stability from g
while equilibrium from , g f² π ³ = 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 x[{+}→{-}] ,
and is acting on [{+}→{-}] axis . **i.e. The Stationary- Electron - Charge is the Storage of**
r ≡ L_p , cave in-where the *Space* and *Anti-space* , as **π g** ,and as Stationary-Electric-Lines are
creating Potential-Energy P_E **,** with such Geometry that , **to exist from the linear-motion** are
stored in the form of Dipole-Rotation with a changing-Spin , S , **and of frequency** f = 1/T
in the min-cave. Here is cleared that frequency f_e = B/(π²r⁴) of Electron is Energy as angular
velocity vector motion in **r** cave , and this is because in cave exists **the Natural-Frequency**
$f_n = \sqrt[2]{g^{-1}\pi^{-3}}$ of cave in Electric-Field-lines **E** = g π . Photon Frequency becomes from the

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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-Anti 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 $[\{+\} \to \{-\}]$ and consists the **Granular- Storage of Energy motion** , *which is vibration in a closed loop* , and it is a measurable Physical-quantity denoting the Geometry of Electron in **r** cave , and Periodic motion . The Geometry of the Periodic motion issues the same such as for Electron and for Material point with different cave and one-frequency as $f_e = \frac{(1 + \sqrt{5}\,)\,\sigma}{4\pi r} = \frac{\sigma.\Phi}{2\pi r} = \frac{\bar{B}}{\pi^2.\,r^4}$ 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 , **g π loop-level** , therefore IS the Property that controls all interactions between Bodies through these **Electrical-forces** .

In [**2**] **The-Stationary-Photon-Charge** is the case of Material point with **Periodic Orbital motion** where issues the **Tack-Geometry** i.e. the tracks of the Electric-lines Pattern are closed loops and not straight-lines , and also because of the Voltage between the ends , is created the motion as an *Eternal rotation* of the [⊕] *constituent* ***towards*** [⊖] *constituent* , [The opposite issues for Rotational motion where in the   *Moving-Photon-Tank* and because of Stress , **σ** , is created the Centrifugal-Force F_f]. and $\bar{v} = [\frac{G\,\Phi}{A}]$. Because $f_n = \frac{\bar{B}}{\pi^2.\,r^4} = \frac{\sigma^2.\Phi^2}{4.\bar{B}}$ **so ,** Stress $\sigma = 0 \to \sigma$, and $\bar{B}$ = Angular-Momentum = AM independent of σ .
$\to$ AM , and Spin is equal to   AM / Unit-Area = AM / π , and because of the Closed *One-way loops* ,**Spin is either Positive or Negative** and is $\to$ Electric-Charge $\bar{E} = \pm$ AM / π = E-Spin = The $\pm$ Electron . Above Spin disappears the ERP Paradox because is extended and actually is filling up the entire universe . These Stationary-Particles are permanently entangled , with Wave packets becoming from M-P-Photons , which Orientate and Re-orientate their Spins .

In [3] the **The-Moving-Photon-Charge** Is consisted of the above **Energy-Storage** , the g in **min-cave ,** occupying *All Properties of the Stationary-Electron-Charge* and **additionally** the Kinetic-energy E = $\frac{m_e\,v^2}{2}$ = g. v_e^2 / 8π f_e^2 = $\bar{q}_e V$ = h. f_e , and g. v_e^2 = 8πh. f_e^3 or
$[v_e^2/f_e^3]$ =8πh / g = constant , or v_e^2 / f_e^3 = k , and $v_e^2.T_e^3$ = k = $\frac{f^3}{f^3}$ = f³ $(\frac{T}{\lambda})^2$ = f³ . $[\frac{i}{\lambda f}]^2$ = k

i.e. The *Electron-velocity squared* to the *Electron`s - cube Frequency* is constant following the Orbit-Unit-Energy equation k = $f^2_e\,a^3$ , 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 **w** = 2E/B = $\frac{m_e\,v^2}{B}$ and the Inwards transverse Electromagnetic-Waves , **E ⊥ M** , travelling with v_e , inner velocity as
E = A . sin[kx-wt]   and as M = A . sin[kx-wt] , and E = M = A .[1 - sin wt] , since sin kx = 0 .

i.e. The Moving-Electron-Charge is The Electromagnetic-Wave , E ⊥ M **, which carries the Stationary-Electron-Charge ,** *and which is* **The STORAGE of g , in min-cave ,** in-where the Potential-Energy P_E , as linear-motion in **g ≡ r** cave is stored in the form of Dipole-rotation , *Angular-momentum due to curved motion* , with Spin , **S ,** directed from   {-} $\to$ {+} and to G-Primary-Direction of frequency **f = 1/T** , and which is the Source in cave **r** .

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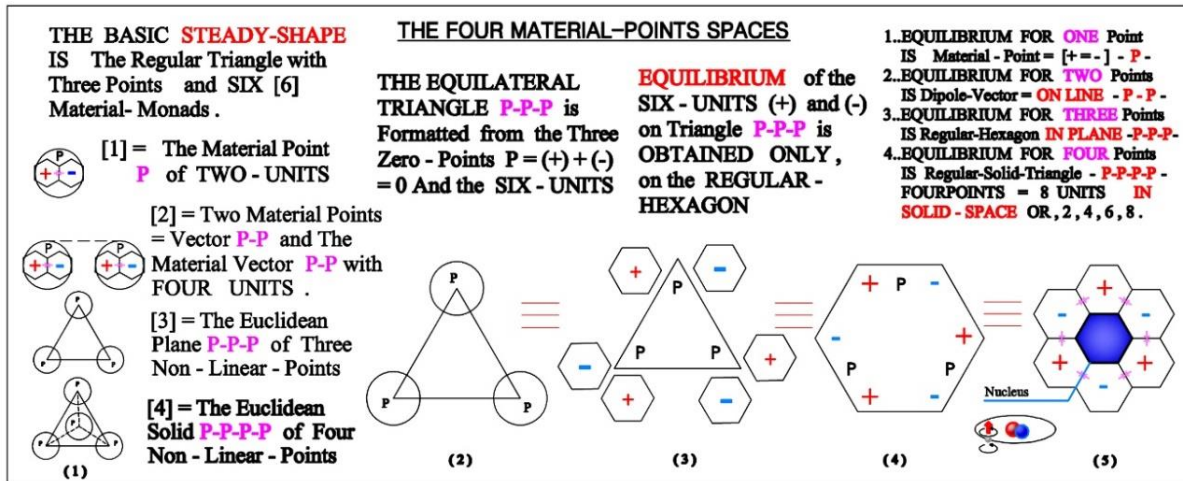
Figure – 19 - : The Relation of **Euclidean** to **Material-Geometry** in Three-Dimensions .
  In (1) , The Euclidean Geometry , E-G , is defined on the ***Number of Points***
  which can define a Space   i.e.

The **One-Point** in E-G is defining ***One-Material-Point-Space*** , the M-P.

The **Two-Points** are defining the ***Line-Segment-Space*** , the Line-M-P.

The **Three-Points** are defining the ***Plane-Triangle-Space*** , the Plane-M-P.

The **Four-Points** are defining the ***Volume Tetrahedron***-Space , the Volume-M-P.

The **Five-Points** are defining the Volume ***Regular Pentahedron***-Space , the SV-M-P.

and so on , representing the **Steady-Stable**-**Regular** Geometry-Formations.

The corresponding to the   **Material-Geometry-Units** are for :

1.. One-Point $\to$ Two-Units , [$\oplus$]**,**[$\ominus$] with Dimension as , ***the Material-Vector*** $\oplus \to \ominus$

2.. Two-Points $\to$ Four-Units , [$\oplus$]**,**[$\ominus$] with One Dimension as , ***the Material-Line***

3.. Three-Points $\to$ Six-Units ,   [$\oplus$]**,**[$\ominus$] with Two Dimension as , ***the Material-Plane***

4.. Four-Points $\to$ Eight-Units , [$\oplus$]**,**[$\ominus$] with Three Dimension as ,***the Material-Volume***

  Keeping ***the Property of Edge-points*** to be the Vector $\oplus \to \ominus$ then **Bond is the**

  Potential to the **Unique-Steady-Stable**-**Regular** Material-Geometry-Formations.

In (2-3-4-5). All Units in Vectors follow Quaternion $q = [s+\overline{v}\nabla i] = \overline{AB}$ Properties i.e.

  [$\oplus$] $\to$ the Positive constituent of Quaternion at , A point

   [$\ominus$] $\to$ the Negative constituent of Quaternion at , B point

In Euclidean-Geometry E-vector $\overline{AB}$ carries **Point A to Point** B as , Vector A $\to$ B

In Material-Geometry M-vector $\overline{AB}$ **carries Energy** , $\oplus$ **, from Point A** to

$\ominus$, **Energy of Point B**   as , $\oplus$ **moves to** $\ominus$, which is *The Periodic - Pattern* .

  Velocity $\overline{v}$ = The rate of change in AB , **Therefore Units are Formatted**

according to the ***Steady-Material-Geometry-Formations*** which are   :

The **Line-Vector in cave** , r ,which is the Simplest with **Double number of 4-Units**

The **Plane-Regular-Triangle in Orbits** ,is the most Stable Shape of **6-Plane-Units**

The **Volume-Regular-Tetrahedron in Space** is the most Stable Shape of **8-Volume**

Units , *the Cube* , which are Crystals . The Regular n-Hedron are for all others .

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

This is the Why The Glue-Bond ,**Potential is the Bond**, between the 6-Units formulates the **Regular-Hexagon** as the First **Steady- Plane - Formulation** in nature as in Fig-18-

4g..   The Elements needed in Cave for Black-Hole-Genesis .

Both motions , **Periodic and Rotational** , exist as the Mean between the Two Primary-Opposite in PNS ≡ Primary-Neutral-Space . This Mean is the Ocean of the , **Two kinds of Spins** created from the inner motion in Material-points both Oriented by the acceleration **g** ,created from Rotational-motion and which **g** , continually effects on Spins through which force   **G** , Flows to all Energy structures .

From $r_{min} = 1,07.10^{-7}$ m and $f^2{}_p = \frac{1}{r^3}$ then $f_{min} = 2,839844.10^{10}$ H , and Bonding Energy

$L \equiv E = h.f_N = 6.62607.10^{-34} . 2,8398447.10^{10}$ J $/1,6.10^{-19} = 1,176063.10^{-6}$ eV or in Joule

$= 1,8817009. 10^{-23}$ J $= (Kg.m2/s^2)$. Hydrogen cave was found $a_H = 2,11450164.10^{-11}$ m

and from Orbit-Quantum-Energy $f^2{}_H = \frac{1}{g.r^3} = \frac{1}{9,8076754.(2,1127839.10^{-11})^3} = 10,811069.10^{30}$.

$\mathbf{f_H} = 3,288019.10^{15}$H , while Nutation-Frequency $\mathbf{f_N} = \frac{sQ}{2\pi.J_3 w} = 2,8398447.10^{10}$ $s^{-1} = f_{min}$

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

magnitude $\bar{L} = \bar{a}$ x $\bar{v}$ = **Constant** for all central motions . For circular orbits gravitational force G_F equals the centripetal force C_F , so $C_F = G_F$ and $m_P v^2 / R = [G.m_P m_S]/R^2$ and velocity $v^2 = GM/R$. Substituting the expression into the formula for Kinetic - Energy then ,

$K_E = \frac{mv^2}{2} = \frac{m.GM}{2. R} = \frac{GMm}{2. R}$, or $K_E = (1/2) (-P_E) = -\frac{P_E}{2}$ and   → - $P_E = 2.K_E$ ←   ….(2)

The Total-energy $E = K_E + P_E = K_E - 2.K_E = - K_E$, i.e. *The Potential - Energy* P_E *is Always -Negative and Twice the Kinetic-Energy While The Total - Energy* E , *of an Central-Orbiting-System is Negative* .The ratio $L / E \equiv (-P_E / -3K_E) = (2.K_E)/(-3K_E) \equiv -2/3$

Placing (2) in Energy-equation $\mathbf{E} = \frac{1}{r^2}\left[\frac{4\pi^2}{c^2} + \frac{S^2}{2m}\right] = \frac{1}{9a^2 mc^2}$ [$36m\pi^2 + 2c^2 E^2$] then becomes

$2c^2.E^2 - 9mc^2 r^2.E + 36m\pi^2 = 0$, which is an 2nd degree Equation with solution →

$$E = \frac{9mc^2 r^2}{4c^2} \pm \frac{1}{4c^2} [\sqrt[2]{36mc^2 r^4 - 36.8. mc^2 \pi^2} \quad …….(3)$$

Since E must always be Negative then , $mc^2 r^4 - 8mc^2\pi^2 < 0$, or → $r^4 - 8\pi^2 < 0$, and from

$r^4 < 8\pi^2 → r^2 < \sqrt{2}.2\pi$ then $r < 2 , 980856$ m …….(4)

From Unit-energy relation $g f^2 a^3 = 1$, then $\mathbf{f_R} = \sqrt[2]{\frac{1}{g.a^3}} = \sqrt[2]{\frac{1}{(2,980856).10^3}} = 6,14453.10^6$ H **i.e.**

a frequency corresponding to Energy $\mathbf{E} = h f = 6,62606957.10^{-34}.6,14453.10^6/1,6022.10^{-19}$

$$= \mathbf{2,541136 .10^{-48}} \text{ eV in a cave } \mathbf{a} = \sqrt[3]{\frac{1}{g.f^2}} = \mathbf{2 , 980856 <} \quad \mathbf{3m} .$$

The kicked-Energy is → $\bar{B}. f_n = E \equiv [\frac{\sigma.\Phi.\bar{B}}{4\pi r}] = 1,4603748.10^{-34}.6,14453.10^6 = 8,97332.10^{-28}$

[Kg.m2.s/s = Kg.m2] , and from $c = \frac{G \Phi}{A} = \frac{G \Phi}{e^{-i.\left(\frac{\pi}{4}\right).b}}$, where $A = \sqrt[2]{-i} = e^{-i.\left(\frac{\pi}{4}\right).b}$, then are

The → **Anti-Space + Space-Positions** .

i.e. **as soon as →A = {The Space +Anti-Space Positions in Universe }** ,become **Inadequate** for Energy-Storage $A = e^{-i.\left(\frac{\pi}{2}\right).b} = 0, 207879576.b = 1,507.10^{-7}$m , then **Motion≡ Energy**

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is filling **The minimum cave** r **,** and with the **Necessary-Velocity-Vectors** $\rightarrow$ **Burst Into another cave** $a > A$ **of** L_p **, connected to G** , and which **Is an Overflow of the Energy in**, **Space +Anti-Space Positions** [58] . The needed Storages become from $E \equiv \bar{v} .[\ \boxed{\bar{f}_n} + f_n\ ]$.

The Black Holes :

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 Particles follows constant Elliptical Energy - Orbits on the same semi major axis as equation , $1 = c . f_n^2. a^3$, and of the same constant Energy . Semi major axis , **a** , is related to energy as $\rightarrow$, **a** = G M m / 2E **, and** for ellipse (a b axis) $\frac{B^2}{(mab)^2} = -\frac{q.q`}{(ma)^3}$ and Spin $|S|^2 \equiv [\bar{B}]^2 \equiv -m q q` [\frac{b^2}{a}]$ or $\bar{B} \equiv \sqrt[2]{maqq`}[\frac{b}{a}] = \bar{B} \equiv \sqrt[2]{maqq`}$ 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 $v = 2\pi.f_1[n\ c/2f_1] = n.\pi.c$. From prior relations in B-Holes-Energy is found the SPIN , $S \equiv B$, using equation of kicked-Energy as $\rightarrow \bar{B}. f_n = E \equiv [\frac{\sigma.\Phi.\bar{B}}{4\pi r_n}] \leftarrow$ for r_n .

Angular-Momentum $\bar{B} = \frac{2L}{\bar{w}} = \frac{2L}{2\pi f} = \frac{\pi^2 r^4.f}{2}$, and vector $\bar{B}$ = a m v , becomes $\bar{B}$ = a m v = $2,1127839.10^{-11}$ m $.7,237315.10^{-32}$ kg $.2,99798 . 10^8 = 4,5841758.10^{-34}\ /\ \pi$, and Spin **S/2** $= 1,4603748.10^{-34}$ which is the E-Spin . From cave-relation , **a** cave , as $d = a = \sqrt[3]{\frac{1}{g.f^2}} = $

$\sqrt[3]{\frac{1}{9,808.f_{3M}^2}} = \sqrt[3]{4,851734.10^{-30}} = $ **a** $= 1,69290399.10^{-10}$ m , then it is **Bracket-length** $\Delta = 2a = 3,3858078 . 10^{-10}$ m .The Black-Hole-Gravity-equation related to the Inner-Quantum-velocity v = c , and to its n **, lobes** is the frequency squared as ,

$$f^2 = \frac{k}{m.a^3} = \frac{\pi g}{a^3.[\frac{g}{4\pi f^2}]} = \frac{4\pi^2 f^2 g}{ga^3} = \frac{w^2}{a^3} = \frac{v^3}{a^4} , \text{ and } \rightarrow f_n = \frac{c}{a^2} = \frac{n.\pi.c}{a^2} \leftarrow \text{ Energy Increases} .$$

Constant-Force $G \equiv \sigma.\Phi^3 \equiv \Phi^2.[\{\sigma\ \Phi\} \equiv [\frac{2B}{\pi r^3}] \equiv 2\pi f_P\ r \equiv w\ r \equiv \bar{v} \equiv m\ a \equiv m\ g = \bar{c} = \frac{2.B}{\pi r^3}\ ]$

Energy of Photons $=$ motion $/ T = (\frac{v}{2\pi r}).[\sigma +\sigma\ \Phi] =$ velocity $\rightarrow \bar{v} .[\frac{\sigma}{2\pi r} + \frac{\sigma\Phi}{2\pi r}] \equiv \bar{v}.[\ \boxed{\bar{f}_n} + f_n\ ]$

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

i.e. **Velocity in Black-Holes is Related to Cave , r³, and Energy f² times of light velocity**. The Produced Work relation , $W = 2L = \bar{B} . \bar{w}$ = J.w² **,** and being as Centripetal-Force

$$F_G \equiv [\frac{v^2}{r}] Jw^2 = \frac{v^2}{r} [\frac{\pi r^4}{2}] \frac{v^2}{r^2} = \frac{\pi rv^4}{2} , \text{ which Generally represent} ,$$

The Black-Hole-Gravity-equation Related to the Inner **Quantum-velocity $\bar{v}$ to its ,n, lobes**. For gravity g $\cong$ **$\sigma = \frac{Force}{Area} = \frac{Mass}{Area}$** = Gravity-Acceleration and Impedance , s , then

$$g_G = s [\frac{\pi rv^4}{2}] = [\frac{3,1415926([\sqrt{5}+1].\sqrt[4]{2}.10^{-35}).(299793458)^4}{2}].e^3 =$$

$6,044981.10^{-35}.80,776078.10^{32}. 20,085536 =$ **9,8076925** , is a constant .

Moreover , from the Primary equation of Electron → $w^2_e \cdot m_e = \pi g = constant \equiv$ **Energy** $\equiv$ [*meter* of *area * meter of force*] $\equiv$ **Electrons on Orbits** , on *Traces* and also from the **Unit**-**Space** $\equiv$ **Massive -United-Unit-Space** $\equiv \to [+\bar{v}.s^2] \leftarrow$ **The Nucleus** is jointed through the Neutral Material-Points [(+) [↔] (-)] with the , **Strong-force** $\to S_F = h \cdot f_n \equiv h.\{[S \equiv B_P$ $\equiv$ **EM-R** $\equiv f_{1=N} , f_2 , f_3, f_D ,,f_n = w^2]\} \equiv h.n \frac{(1+\sqrt{5})\sigma}{4\pi r} \equiv h \frac{2.\bar{B}}{\pi^2.r^3}$, *Increasing-Energy* .....(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 $G \to$ 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 from the 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 ,

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

and $F_g = \bar{g} = 4. \sqrt{3}.1,0986122886681.\pi^2.1,616199. 10^{-35}. [2,99793458. 10^2]^4 = \mathbf{9,8076754}$

which agrees with the Prior .

5g...   Applications   :
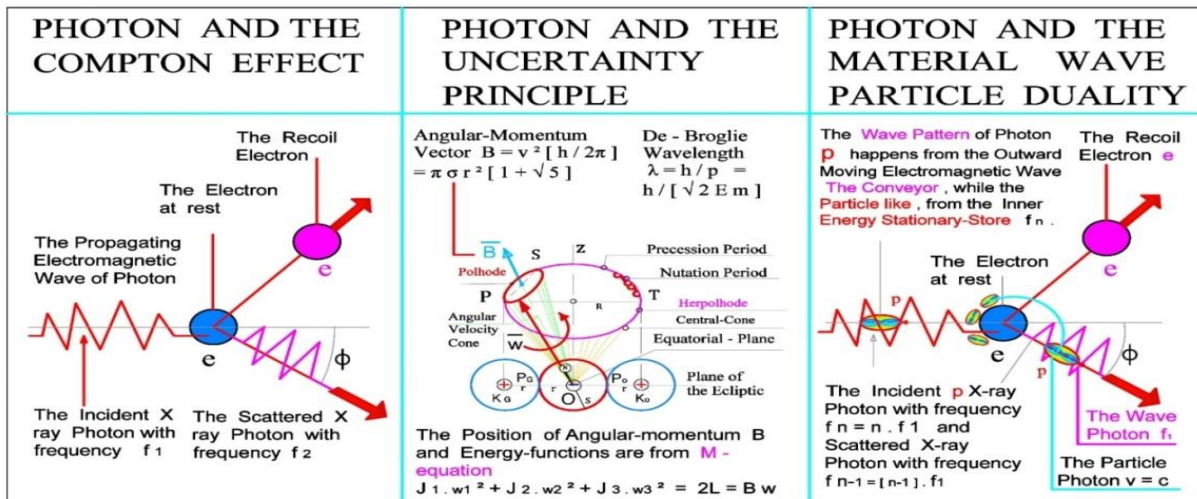
Figure – 20- : The Wave-Particle Duality of Photon as Wave and as Particle :
The equation of Photon is $\to \{\ \bar{c} \cdot \boxed{\bar{f}_n} + \bar{c} \cdot f_n\ \} \leftarrow$ i.e. Dual Frequencies ,

The **Wave** [$f_1 = (E^2 + H^2) = n\frac{(1+\sqrt{5})\sigma}{4\pi r} = \frac{2.\bar{B}}{\pi^2 r^4}$] - **Particle** [$\bar{v} = \bar{c} = \lambda\frac{f}{\Phi}$] $\to$ 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-20- Compton-effect is shown the Why Golden-ratio-frequency $f_P = \frac{\sigma.r}{\pi.\bar{B}} = \frac{n\sigma.\Phi}{2\pi r}$ 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

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[$\oplus$ moves to $\ominus$] and thus from Geometry-Shape are created the two opposite Angular - momentum vectors and from Dipole the Spin **S** = ½ in **r** cave filling the whole universe .

In Periodic-Orbital-motion issues **Tack-Geometry** i.e. the tracks of the Electric lines are Pattern **of closed-loops-Pairs , starting Clock-wise and Anti-clockwise from the $\oplus$ 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 $\overline{B}$, is equal to ± **Spin S .** Material Points , Segments etc. consisting the Physical Structures . In the finite-Space of Material-point , *cave **r** , is stored the Work as frequencies ,* Because Stress $\sigma > 0$, Spin $\equiv$ Angular momentum $\overline{B}$, is equal to AM /Unit-Area = AM / π ,and

frequency $f_n = \dfrac{\overline{B}}{\pi^2 r^4}$ so **Spin is either Positive or Negative** and equal to the Electric-Charge

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

Fundamental frequency $\mathbf{f_1}$ of equation $\rightarrow$ W = $[\dfrac{4\pi r^3}{3}].f_1 = \dfrac{(1+\sqrt{5}).\sigma.r^2}{3} = 2L = \overline{B}.\overline{w} = J.w^2$.

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

$\mathbf{F_{electron}} = k_c \dfrac{\mathbf{Q_1.Q_2}}{d^2} = \dfrac{[\oplus<\rightarrow\leftarrow\ominus]}{d^2} = k_c \dfrac{2\sigma}{|e|^2} = k_c [\dfrac{4\pi f_1}{r\Phi}] = k_c \dfrac{\sigma}{2r^2} = \mathbf{k_c} \dfrac{\mathbf{2\overline{c}}}{\mathbf{r^2\Phi}}$ in Box B_e ,and for Photon

$\mathbf{F_{photon}} = \dfrac{[\oplus<\rightarrow\leftarrow\ominus]}{r^2} = \dfrac{[\sigma.\sigma]}{r^2} = \left|\dfrac{\sigma.}{r}\right|^2 = \left|\dfrac{2\pi f.}{\Phi}\right|^2 = \left|\dfrac{w}{\Phi}\right|^2 = \left|\dfrac{2L}{\Phi\overline{B}}\right|^2 = \left|\dfrac{\overline{c}}{r.\Phi}\right|^2$, in the same Box B_e , since

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

Above relation agrees with *Laplace-equations* for Incompressibility and Irrotationality where $\nabla x\overline{q} = \overline{r}_x + \overline{v}_y = 0$,and $\nabla x\overline{v} = \overline{v}_x - \overline{r}_y = 0$, meaning that Space , $\overline{r}$, and Energy , $\overline{v}$ = motion are Interchanged $\rightarrow$ Because from the first relation the *Magnetic-field-Space* $\overline{r}_x$ creates the *Electric-field-Energy* $\overline{v}_y$, and from the second $\rightarrow$ *Energy* $\overline{v}_x$ Pushes the *Space* $\overline{r}_x$. From Electron-Orbit-equation $4\pi^2 f^2_e .m_e = k = \pi g$ or $4\pi f^2_e .m_e = g$, $\mathbf{k = \pi g}$, 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 [$\oplus<\rightarrow\ominus$] , *Tack-Geometry* . The **Chains of Stationary-Periodic-Spins** are Pointy-vibrating in Orbit LRC- Circuit with its frequencies {$\mathbf{f_1 = \dfrac{(1+\sqrt{5}).\sigma}{4\pi r}}$} x $\overline{B} = [\mathbf{\sigma \Phi \pi r^3}]$ f$= \dfrac{\overline{B}^2}{\pi^2.r^4} = |\dfrac{\pi r^3 \sigma \Phi}{2}|\overline{B}$, filling up the entire universe.

Stationary-Electron-Charge q $\equiv \ominus$, with **Orbit-Velocity-Vector** $\overline{v} = \sqrt{\dfrac{2}{m}[E - \{\dfrac{k}{r} + \dfrac{L^2}{2m r^2}\}]}$

occupies Zero Kinetic-energy between Q_1, Q_2 therefore , $K_E = \dfrac{mv^2}{2} = E - \{\dfrac{k}{r} + \dfrac{L^2}{2m r^2}\} = 0$

or $\mathbf{E} = \{\dfrac{k}{r} + \dfrac{L^2}{2m r^2}\} = \dfrac{2\pi g}{r} + \dfrac{S^2}{2(g/4\pi f^2) r^2} = \dfrac{2\pi}{\mathbf{g} r^2}[\mathbf{g^2 r} + \mathbf{S^2.f^2}]$..(s) Equation (s) issues for Spinning Points and Atoms-Stationary-nucleus and is **the Strong-Force** between **Nucleus-Protons**.

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ONION STRUCTURE

THE SPLIT - FOCUS
WITH
3 - LAYER - CORE
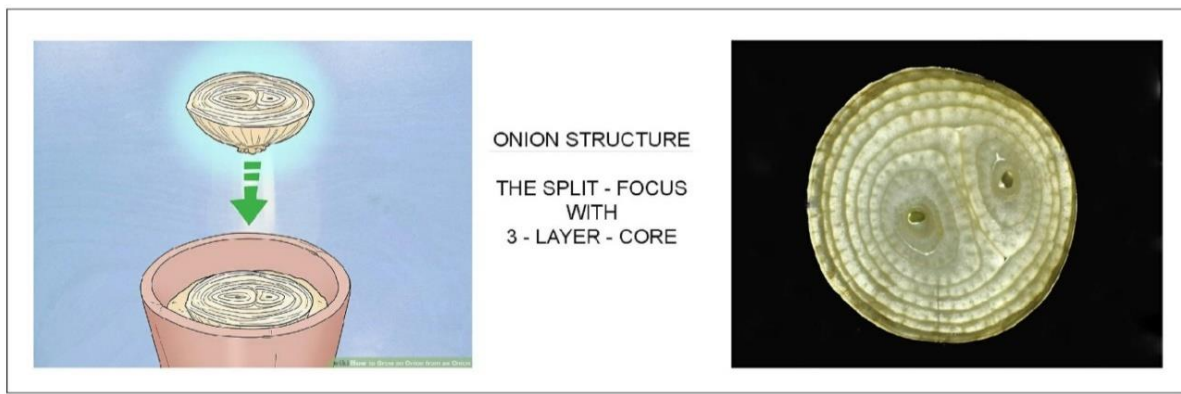
Figure – 21. The Newton`s Universal Laws in Atoms and in Onion - Structures .

The Slit-Focus-Atom structure with the three Hydrogen – Orbitals .

The Neutral Material-Points [(+) [↔] (-)] with the **Strong –Nuclear - Force**

$$S_F = h\, f_n \equiv h \cdot \{[S \equiv B_P \equiv \textbf{EM-R} \equiv f_{1=N}\,,\, f_2\,,\, f_3,\, f_D\,,, f_n\,]\} \equiv h.n\,\frac{(1+\sqrt{5})\sigma}{4\pi r} \equiv h\,\frac{n\sigma.\overline{B}}{8\,r^2}$$

are so because $f_n = |\frac{\sigma^2\Phi^2}{2\pi.c}|.\overline{B}$, and it is the DNA of all Energy-Structures .

In Fig-21- , The Vector-Space-Cave m = 1 , with Two-Nucleus-masses of One-Charge and with $2m^2 = 2$ Permitted-Orbit-Positions , per 2 Electrons for Stability, consists the first , **3** , Perpendicular-Plane-Permitted-Positions in Cave , for the → **Lissajous – Eight - Shapes** . The Linear-Vibrations [$\ddot{x} + w^2 x = 0$] 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 $d_\varphi = 90^0$ emission is → The Eight-Shapes   ∞ on Nucleus .
b.. Difference of Phase $d_\varphi = 0^0$ emission is → The Ellipse-Shapes ∝ , after 1st curve.
c.. Difference of Phase $d_\varphi = 45^0$ emission is → The Double-Saddle-Shapes . ჱ , ന് ,
   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 $\overline{v} = \overline{c}$ Acting on **an-cave** , $r \neq L_P$, faces-to the Impedance Z_c from Velocity $\overline{c}$, and Becomes the minimum-Energy-cave in L_P , and Equal to $E \equiv r\, Z_c\, \overline{c}$, and

$$r_H = \frac{h}{c.Z_c} = \frac{[6,62606957.10^{-34}]}{2,99798.10^8.1,0460975.10^{-31}} = \textbf{2,1127839.10}^{-11} \text{ m , which is the Hydrogen cave.}$$

a) the model of the hydrogen atom

b) the model of the carbon molecule C_6

c) the photo of the graphene

0.14nm

d) computer processing of the photo of graphene

a)

c)

d) The photo of the benzene cluster
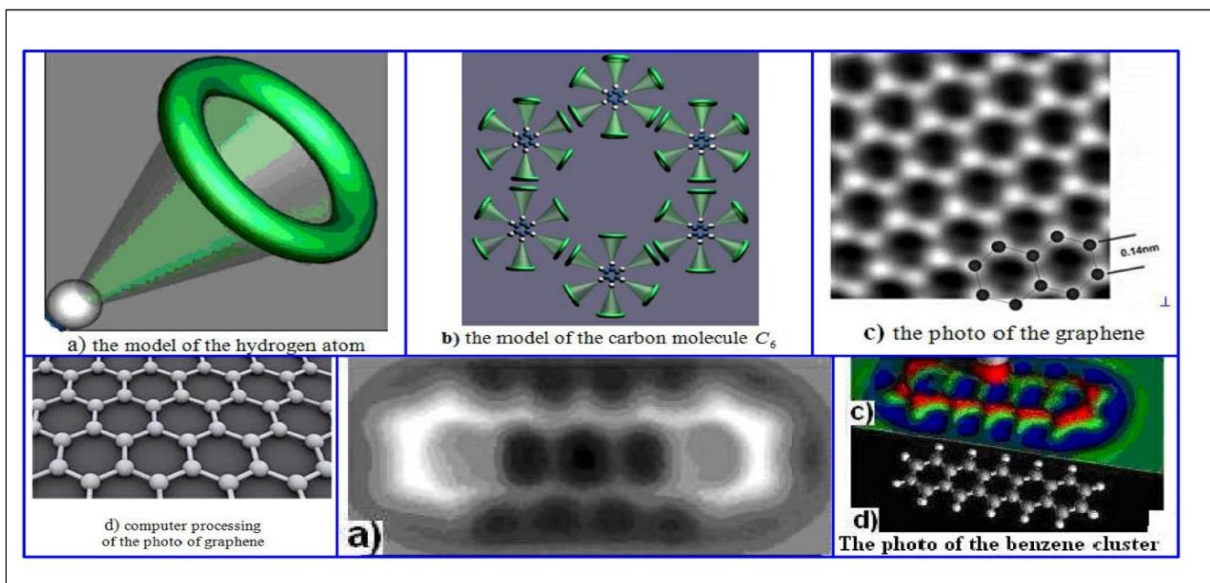
Particle & Wave Duality Photon , and   Cosmic-Particles Origination .

Figure – 22 - :   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 x 2 = 6 ($\pm$) elements ,is the
Regular-Hexagon-Plane-Bonding .The Hydrogen-Light-Photon-cave $2,114501610^{-11}$ m
as well the Inverse Electromagnetic-Radiation Show the above , Photos in 3-D .
The Plane Bonding of Atoms follows The Stability of Material-Geometry [86] .

6g...   The Atoms Bonding   :

a.. Because the motion of Atoms in a Conservative System is expressed in terms of the
Lagrange`s generalized coordinates , so are and their Bonding . It happens on **Slit-Vectors**
{ Bracket-Orbit-Hook } which occupy the **Unit-Energy-Space frequency** in order that
the Electron-Hoοk $\ominus$, to Joint with the Bracket-Proton $\oplus$. For this to happen is needed
a common equation for the *different* [**Bracket-Orbit-Hook $\equiv$ 2r] as** → $\ddot{r} + w^2 r = 0$
where $w = 2\pi f_1$ as above frequency , $2r = \Delta$ is the amplitude of vibration , and then

$T = 2\pi^2 \sqrt{\dfrac{m}{k}}$ and Natural $f_1 = T^{-1} = \dfrac{1}{2\pi}^2 \sqrt{\dfrac{k}{m}} = \dfrac{1}{2\pi}^2 \sqrt{\dfrac{g}{\Delta}}$ in cave $2r = \Delta = \dfrac{g}{k}$ .....(1)

From Orbit-relation $\mathbf{a} = \sqrt[3]{\dfrac{1}{g \cdot f^2}}$, and $f_1 = E / h = 13,6$ eV/h   = Energy-Space-frequency

$= 3,28393.10^{15}$/s , the Unit-Energy-Hydro-cave $\mathbf{a} = 2,1127839.10^{-11}$ m = **2r** ....1a)

From E-Orbit equations $1 = k.f_n^2.a^3$, $4\pi^2 f^2_e .m_e = k = \pi g$, then $m_e = \dfrac{g}{4\pi f^2_e}$ .....(2)

Because motions of masses happen under the same circumstances then from   (1) , (2)

$\dfrac{g}{4.\pi^2\Delta.} = \dfrac{g}{4\pi^1.m_e}$ and $\Delta = \dfrac{m_e}{\pi}$, for any mass $m_e = \Delta.\pi$. Exists also $4\pi^2 f^2.m = k$ ....(a)

From Orbit-frequency $f^2 = \dfrac{1}{4\pi^2}(\dfrac{k}{m}) = \dfrac{1}{k\,a^3}$ and $k^2 = \dfrac{4\pi^2 m}{a^3}$ then $k = 2\pi^2 \sqrt{\dfrac{m}{a^3}}$ .....(b)

From $k = \dfrac{4.\pi^2 m.f^2}{1} = \dfrac{1}{f^2 a^3}$ then $f^4 = \dfrac{1}{4\pi^2 m a^3}$ and $f^2 = \dfrac{1}{2\pi}^2\sqrt{\dfrac{1}{ma^3}}$ or $\mathbf{f} = \sqrt[4]{\dfrac{1}{4\pi^2 m.a^3}}$ ...(c)

The Resultance Harmonic-mean mass $\mathbf{M_T}$ is as $\dfrac{1}{\mathbf{M_T}} = [\dfrac{1}{m_1} + \dfrac{1}{m_2} + \dfrac{1}{m_3} + \dfrac{1}{m_4}]$, because
follows *The Parallel Connections Resistors* inverse law as in Electricity and it is thus
the Best Vector which Fits Harmonic to Galileo Center of masses m_i in molecules .

b..   Example   :   Water structure H_2O ,

    1.. Hydrogen mass → $m_H = 1,67355.10^{-27}$ Kg
    2.. Oxygen mass   → $m_O = 26,5663.10^{-27}$ Kg

3.. As in Electricity issues ,*The Parallel Connections Resistors* $\dfrac{1}{R_T} = [\dfrac{1}{R_1} + \dfrac{1}{R_2} + \dfrac{1}{R_3} +..]$

The Harmonic-Mean-Mass on the Center of the 3 masses is $\dfrac{1}{m_{2+1}} = [\dfrac{1}{m_1} + \dfrac{1}{m_2} + \dfrac{1}{m_3}]$

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$$= [\frac{10^{27}}{26,566} + \frac{10^{27}}{1,67355} + \frac{10^{27}}{1,67355}] = \frac{1}{m_{2+1}} = \frac{10^{27}}{0,811223} \text{ , or} \rightarrow \quad m_{3T} = 8,112232.10^{-28} \text{ Kg}$$

4.. From eq.(c) $f_{3T} = \sqrt[4]{\frac{1}{4\pi^2 m\, a^3}} = \sqrt[4]{\frac{1}{4\pi^2 8,1122.10^{-28}.9,45418.10^{-33}}} = \sqrt[4]{3,3027653.10^{56}} =$

$\mathbf{f_{3T}} = 1,3480916.10^{14}$ /s , which is the ***Resonance-frequency*** of H_2O Molecules .

5.. From cave-relation , **a** cave , as $\quad a = d = \sqrt[3]{\frac{1}{9,808.f_{3M}{}^2}} = \sqrt[3]{5,6102298.10^{-30}} =$

$\mathbf{a} = 1,77688867.10^{-10}$ m , then **Bracket-length** $\quad \Delta = 2a = \mathbf{3,5537772 . 10^{-10}}$ m

i.e. **On Oxygen Slit-Nucleus** , (4-2 = 2) the **TWO [Bracket-Orbit-Hooks]** $\equiv \Delta \equiv$ **2a = 3, 5537772.10^{-10}** m are **ORBIT-VECTORS , and Fixed at Plane angle** $> 90^o$, and **are the Vector`s Negative Electron-edges** ,$\ominus$, **Joint with an Positive Proton** $\oplus$. **of the Hydrogen-Nucleus . Ring** $\mathbf{O \leftrightarrow O}$ happens on the Water

Molecule -Structure as , $[H\oplus]\leftrightarrow\ominus\leftarrow\leftarrow \quad O \quad \rightarrow\rightarrow\ominus\leftrightarrow[\oplus H] \equiv OH_2$.

<div align="center">P   P   P</div>
<div align="center">P   P   P</div>
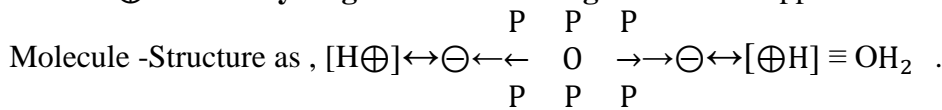
Bracket-Orbit-Hooks $\Delta = 2a$, follow above Mean-Harmonic-equation of motion . The Above property of Bracket-Hooks shows the deep relation between Material Geometry and that of all Nature , *Physics* .
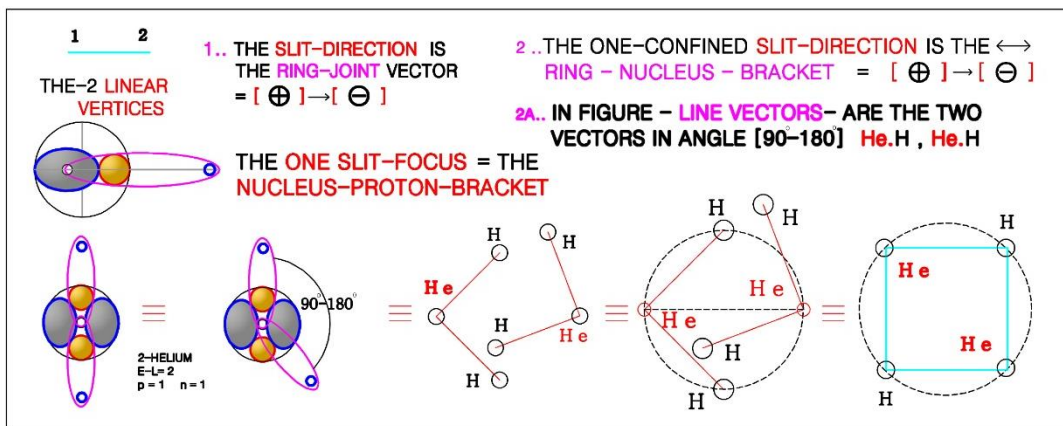
Figure – 23 - :   The One **HYDROGEN-SLIT** is The First – Nucleus-Bracket-Bond The One **HYDROGEN-ORBIT** is the **First PROTON-ORBIT-HOOK** on the **Helium -Atom-Nucleus-Bracket** and exist , **Two –Slit -Directions** . The One **Helium-Atom-Orbit** is for , **Two Proton-Hook-Directions** (90 -180º) so the Two Points-Hooks (H – H) > can Bond from **Square** bonding to any Rhombus Shapes .

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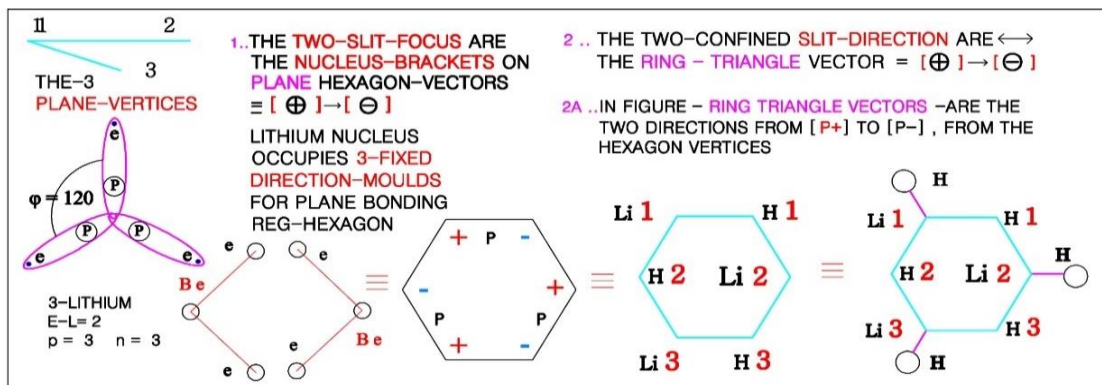
Figure – 24 - :   On The Lithium-Atom with the Three of angle **120⁰ -**Plane Directions of the Orbit-Hooks can Bond , *on Plane Directions* , in Steady – Triangle - Shape which is The **Regular-Hexagon-Plane-Bonding .**

    The size of Atom-Carbon   :

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

Carbon-density $C_L = \dfrac{\text{mass of molas(gm)}}{\text{Density}\left(\frac{gr}{cm3}\right)\text{Avogadro}-N} = \dfrac{12\ gr}{2,1(gr/cm3)6,02214.10^{23}} = 9,454184.10^{-24}$ cm³

and $C_L = 2,11.10^{-8}$ cm $= 2,11.10^{-10}$ m $= 10.[2,11450164.10^{-11}$ m] $= 10.[$ Hydrogen-cave]

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

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

Energy of Photons $=$ motion $/ T \equiv (\frac{v}{2\pi r}).[\sigma + \sigma\ \Phi] =$ velocity $\rightarrow \bar{v} .[\frac{\sigma}{2\pi r} + \frac{\sigma\Phi}{2\pi r}] \equiv \bar{v}.[\ \boxed{\bar{f_n}} + f_n\ ]$

7g... The **Greatest Energy-Pressure-Level** :
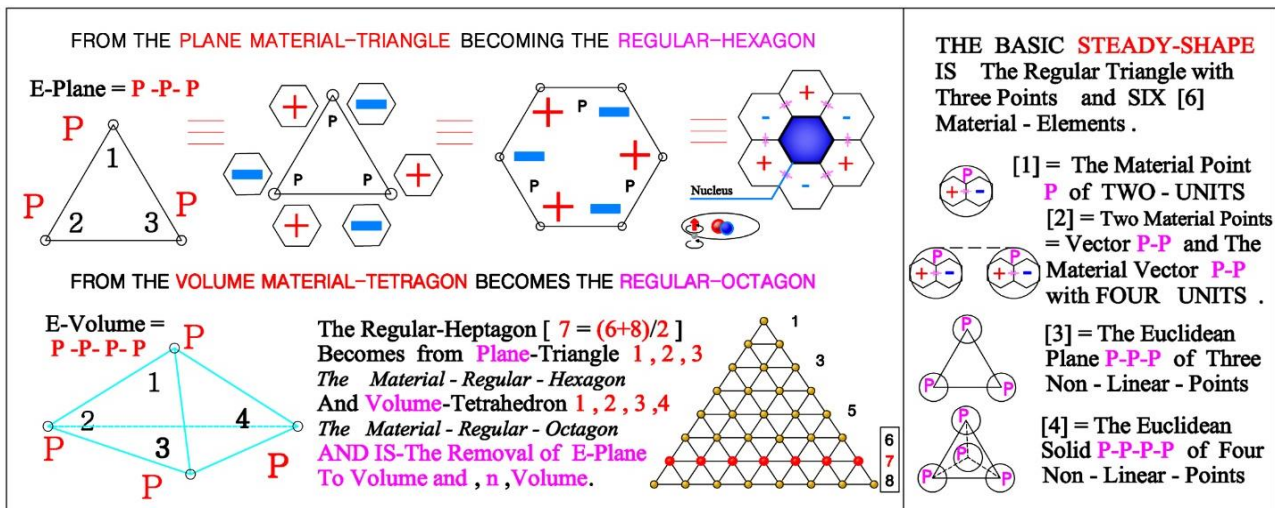
Figure – 25 - : The [+] Spaces , [-] Anti-Spaces , [+ -] Sub-Spaces in a circle (R , OA)
         The Material-Geometry explanation of Pascal`s-Triangle

Stress $\sigma = \dfrac{\text{Force}}{\text{Area}}$, and is the Pressure executed by the Force on Surface A . Sound Pressure

SP, is the Pressure measured within the wave relative to the surrounding air Pressure.

The SP , *like other kinds of Pressure* ,is commonly measured in units of Pascal`s (Pa) $= \dfrac{N}{m^2} =$

$\dfrac{Kg}{ms^2} = \dfrac{J}{m^3}$,with minimum SP ,equal to Quantum $p_o = 2.10^{-5}$ Pa $\equiv 0$ (dB) the Decibel .

The equation of Sound-Pressure-Level ,SPL , is $L_{SP} = 20.\log_{10}(\frac{P}{Po})$ dB ,where P $=$ Pressure

$L_{SPo} = 0$ dB corresponds at frequency $f_s = 1$ kHz . The Sound-Intensity-Level ,SIL is ,

$L_{SI} = 10.\log_{10}(\frac{I}{Io})$ dB   , where Intensity $I = \dfrac{P^2}{Z_0}$ and Impedance $Z_0 = 400$ Ns/m³

The greatest SP, cannot be exceeded the average air pressure which is 101325 Pa and fixed

$$\textbf{SPL , is} \quad \textbf{L}_{SP} = \textbf{20.log}_{10}(\frac{101325}{0,00002}) = \textbf{194 dB} \quad \ldots\ldots.(s1)$$

In Material Geometry Photon-frequency $f_{ph} = [\frac{\sigma}{2\pi r} + \frac{\sigma\Phi}{2\pi r}]$ which is related to the Stress ,

$\sigma =$ Force/Area , and is the **Energy-Pressure-Level** , **EPL** , of the ,**Wave + Particle Photon** ,

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for its frequency .The Greatest EPL for the two Opposite-Elements $\{\oplus , \ominus\}$ in Space is their Permutation $\mathbf{P}_{1S}^{2} = 2$ and for Anti-Space $\mathbf{P}_{1AS}^{2} = 2$ or for both $\mathbf{P}_{1,S+A}^{2} = 2 . 2 = 4$ min-Levels .
Because [9] , The Circumscribed-Regular-Polygons in a circle (R,OA) Denote the Spaces and Anti-Spaces $[(\oplus \leftrightarrow \ominus)]$, and Inscribed-Regular-Polygons of the circle Denote the Sub-Spaces *and Because* [63] ,The Regular-Polygons Denote the Structure of Material-Geometry to be as ,

A Point $\rightarrow n = 1$ $m = 2$, $\{ S \equiv \oplus$ $\leftrightarrow$ $\ominus \equiv A\} \rightarrow S =$ Space , $\mathbf{A} =$ Anti-Space

Line-sector $\rightarrow n = 2$, $m = 4$, $\begin{pmatrix} S & \leftarrow\rightarrow & S \\ S & \rightarrow\leftarrow & A \\ A & \leftarrow\rightarrow & A \end{pmatrix} \rightarrow$ $\mathbf{S} =$ Space , $\mathbf{A} =$ Anti-Space

Plane-Triangle $\rightarrow n = 3$, $m = 6$, $\begin{pmatrix} S & A & S \\ s & s & s \\ A & S & A \end{pmatrix} \rightarrow$ $\mathbf{S} =$ Space , $\mathbf{A} =$ Anti-Space $\mathbf{s} =$ Sub-Space

A Volume $\rightarrow$ $n = 4$, $m = 8$, $\begin{pmatrix} S & A & S \\ s & S & s \\ A & S & A \end{pmatrix} \rightarrow$ $\mathbf{S} =$ Space , $\mathbf{A} =$ Anti-Space $\mathbf{s} =$ Sub-Space

and Because   **Regular-Hexagon** is of $3x2 = 6$ Vertices on *Plane-Triangle*   +
                    Regular--Octagon is of $4x2 = 8$ Vertices on *Volume-Tetrahedron* **then** ,
                    Regular-Heptagon-Anti Heptagon is of , $7x2 = 14$ Vertices [63-P70].

Regular-Heptagon Between the Two-Regions , *Plane –Volume* , Needs more **Pressure** ,and consists the Upper - Largest Energy-Level with Permutation , the number of   **Permutation** with Repetition of the **Seventh** - Element as , $RP_2^n \equiv n^2 \rightarrow \mathbf{P}_2^7 = 7^2 = 49$,   and

    The Greatest **EPL** is $\rightarrow$ $\mathbf{P}_{1,S+A}^{2}$ x $\mathbf{P}_2^7 = 4x49 = 196 =$ $\mathbf{L_{EP}} = \mathbf{196\ dB}$ ....(s2)

Remarks :

1… The Stress **σ** is executed on all Surfaces , either in Planes or on Surfaces of Volumes , and
    consists the exclusive-meter of measurements , in dB , in all nature .

2… Stress **σ** , occupies minimum and maximum limits , $0 \approx 196$ dB ,differing 2 Units which
    can be changed by altering the Base of Pressure from $101325 \rightarrow 102389$ Pa .

3… Minimum and Maximum limits , $0 \approx 194 \approx 196$ dB , become from $L_{EP} = [\frac{\pi^2}{Nc}]^3 = 194$ dB

4… Stress **σ** , occupies Minimum and Maximum because is related to frequency and velocity
    $f_{ph} = [\frac{\sigma}{2\pi r} + \frac{\sigma\Phi}{2\pi r}] \equiv \frac{\sigma + \sigma\Phi}{2\pi r} = \frac{\sigma[1+\Phi]}{2\pi r} = \frac{\sigma[\Phi]^2}{2\pi r}$, or **σ** $\equiv \frac{f_{ph}.2\pi.r}{\Phi^2} \equiv \frac{w.r}{\Phi^2} \equiv \frac{v}{\Phi^2} \equiv \bar{c}\frac{1}{\Phi^2}$
    and is **The-Stress-Way** of Photon-Storages $\boxed{\bar{f}_n} \equiv \frac{\sigma}{2\pi r}$,and Photon-Information $\mathbf{f_n} \equiv \frac{\sigma\Phi}{2\pi r}$
    From force $G \equiv \sigma.\Phi^3 \equiv \Phi^2.[\{\sigma \Phi\} \equiv [\frac{2B}{\pi r^3}] \equiv 2\pi f_P r \equiv w r \equiv \bar{v} \equiv m a = m g = \bar{c}\ ]$ then
    Stress $\{\ \boldsymbol{\sigma \Phi}\ \} \equiv [\frac{2B}{\pi r^3}] \equiv 2\pi.\mathbf{f_P} r \equiv w\ \mathbf{r} \equiv \bar{\mathbf{v}} \equiv m\ \mathbf{a} = m\ \mathbf{g} = \bar{\mathbf{c}}\ ]$ is dependent on Total-Prior.

5…**As soon as $\rightarrow$ A = {The Space +Anti-Space Positions in Universe }** ,become **Inadequate**
    for an **min-Energy-Storage** $A = e^{-i.(\frac{\pi}{2}).b} = 0 ,207879576.b = 1,507.10^{-7}$m ,then **Motion**
    $\equiv$ **Energy** is first filling **The minimum cave** , r , and with the Necessary **Velocity-Vectors**
    $\rightarrow$ **Burst Into another cave** $a > A = 1,507.10^{-7}$m   **in** L_p , **connected to G** , and which

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Is an Overflow of the Energy in the , **Space +Anti-Space Positions** [58] . From relation $E_{Ph} \equiv \vec{c}. \{ \boxed{\bar{f}_n} + f_n \}$ is seen the Storages and from $\bar{q}_{Photon} \equiv \dfrac{\vec{c}.\sigma\Phi}{2\pi r} \equiv \dfrac{\vec{w}.\sigma\Phi}{2\pi}$ the Stresses .

8g... The size , *the In-Positions* **, of Cosmic Particles** :   [Part of article 91]

1.. The **Three Elements** $\equiv$ Digits of Material-Geometry are , $\{ \oplus , [\oplus\leftrightarrow\ominus] , \ominus \} \equiv [+, 0 , -]$
The **Permutation** , *arrangement* , of the Two-Elements $P_1^2 = 2$, i.e. the $\rightarrow [\oplus,\ominus] - [\ominus,\oplus]$
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
maximum Growth for $\log_x x$ and Base x = 10 is $\log_{10} 10 = 10^{10}$ and for the two elements
$[\oplus , \ominus]$, the Growth is $10^{[10]^2} = 10^{20}$ **Positions** $\equiv$ Distances $\equiv$ r , and since also issues
$10^{-x} = \dfrac{1}{10^x}$, then **Impedance b for Two Elements in Space Anti-Space** , $b = 36.10^{-20}$ m .
and for $\rightarrow \bar{v} = \bar{c} = \dfrac{F \Phi}{A = b} = [\dfrac{G \Phi}{A}] = [\dfrac{6,673692 .10^{-11}.1,6180339887}{36 .10^{-20} .}] = 2.9995163. 10^8$ m/s , and
200-times the Impedance = 200.b =$3,6.10^{-19} = 7,2.10^{-21}$ = Netrino-cave $a_v = 7,2.10^{-21}$ m
2.. 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** , $r \neq L_P$, as that is STPL-**Common circle**
then finds The-Impedance Z_c of the Velocity $\bar{c}$, and becomes the minimum-Energy-cave
in 2r and Equal to $E \equiv r\ Z_c\ \bar{c}$ …...(1) where , E = The Planck`s-Total-Energy $E_p = h = $
$6,62606957. 10^{-34}$ J.s , r = The min-Energy cave of Common-circle, Z_c = The Total
Impedance in Universe $\equiv$ Space + Anti-Space from velocity motion , $\bar{c}$ = The light-velocity in
m/s . Equation (1) becomes $\rightarrow$ r Z_c c = h ….(1a)   { From **3f..** Page 55 }

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* $\mathbf{10^{-10}}$ of their **g-Position** so Antilog $_{10}^{-g/10} = 0,10460975$
For the three dimensions Total-Impedance $Z_c = 0,10460975.(10^{-10})^3 = 1,046097.10^{-31}$ and

$$r_H = \frac{h}{c.Z_c} = \frac{[6,62606957.10^{-34}]}{2,99798 .10^8 .1,0460975.10^{-31}} = \mathbf{2,1127839.10^{-11}} \text{ m , and is the Hydrogen cave i.e.}$$

$L_H = \mathbf{r} = \dfrac{h}{c.Z_c} = 2,1127839.10^{-11}$ m is the min-cave in Planck`s-cave with max-Energy **h** .

3.. It was shown that **The [Magnetic-Fields]** $\equiv$ **[Energy-Baskets] is the Way for Energy**
Propagation because Strength-field $\bar{B}_F = [\dfrac{2\pi.m_T}{q_T}].f \equiv \bar{B} = \dfrac{\pi r^3 \Phi.\sigma}{4} \rightarrow$ **Wave** $\equiv \{[\varepsilon E^2 + \mu B^2]$
$= 2.\lambda c. \mathbf{\sin}[\dfrac{2\pi c}{\lambda}]\}$, $\bar{w} = 2\pi f = \dfrac{S_p}{m}$, issuing that Tangent of Ellipsoid , $\bar{B} \perp \bar{w}$ Vector , and
the Tangent of Ellipsoid $\rightarrow \bar{w} \perp \bar{B}$ Vector . Also the Moving Electron of charge $\bar{q} \equiv \ominus$,
with the **Orbit-Velocity-Vector** , $\bar{v}$, as $\bar{v} = \sqrt{\dfrac{2}{m}[E - \{\dfrac{k}{r} + \dfrac{L^2}{2m\,r^2}\}]}$, 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 , and are

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Perpendicular to Magnetic-circles **O** , i.e. The Magnetic-field $\overline{B}_F = [\frac{2\pi.m_e}{q_e}].f$ ....(1)

It has been shown [82] that in a cave , *say Hydrogen cave* , Electron-Spin is the Angular momentum-vector $\overline{B}$ which rotates according to equation $\frac{dB}{dt} = [\overline{u}\overline{B}] = u\ B.[\overline{k}\overline{k}`]$ in the Gravitational Potential $U_g = [mg].s.\cos\theta = -sQ.[\overline{k}\overline{k}`]$, so the change of $\overline{B}$ 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** $T = \frac{2\pi}{u} = \frac{2\pi.J_3 w}{sQ}$, and **N-Frequency** $f_N = \frac{sQ}{2\pi.J_3 w}$ ...(n) where , s = amplitude of vibration and $Q = Q_+ =$ the force = mass .g . In the case of Null-Potential in a cave , equation (n) is ,

$f_N = \frac{s.Q_+}{2\pi.J_3 w} = \frac{r.F}{2\pi.(\pi r^4/2)(v/r)} = \frac{r^2 F}{\pi^2 r^4 \overline{v}.} = \frac{F}{\pi^2 r^2 \overline{v}.} = \frac{r^2 F}{[\frac{B}{f}]\overline{v}.} = \frac{r^2 F.f_N}{B.\overline{v}.} = \frac{r^2 F.f_N}{S.\overline{v}.}$, or $F = [\frac{\overline{v}.S}{r^2}]$ ...(2) and

from **Lorentz-force** $F = \overline{q}\ \overline{v}x\overline{B}_F$ and the Magnetic field $q\ v\ B = mv^2/r \rightarrow q\ B\ r = m\ v = m\ r\ w$

$\overline{B}_F = \frac{m.2\pi}{q}.f = [\frac{2\pi.m}{Q_+}].f$ and so , $F = \overline{q}\ \overline{v}x[\frac{2\pi.m}{Q_+}f] = 2\pi.\overline{q}\overline{v}.[\frac{m}{mg}].f \equiv \frac{\overline{v}.S}{r^2}$ or $\rightarrow \frac{2\pi\overline{q}}{g}\ f = \frac{v.S}{r^2}$ and

M-Force $\overline{B} = \frac{\overline{v.S}}{q.r^2}$ .....(3) and $\overline{B} = \frac{3.10^8\ 5,691952.10^{-34}}{1,602.10^{-19}[10^{-19}]^2} = 1,065127.10^{41}T$, half Plank-M-Field

Nutation-Force $F_N = q\ c\ B = 1,602.10^{-19}.[2,9978.10^8].1,065.10^{41} \equiv \mathbf{5,1146.10^{30}}$ Newton .

Equation (3) relates the Inside existing force **F** , which becomes from Charge Q_+ only , from Spin **S** , and of from **r ,** cave , and in STPL Mechanism creates the **Six-Forces** of Nature , i.e.

In the same cave **r** , Charge $\overline{Q}_+$, creates the Magnetic field $\overline{B}_F$, in where gravity **g ,** acts on Charge mass m_+ and creates the Nutation-frequency f_N , and the Inertial-Force **F** .

The Hydrogen cave $L_H = r = \frac{h}{c.Z_c} = 2,1127839.10^{-11}$ m is the min-cave in Planck`s-cave with max-Energy **h** . The cave with [**Anti-Space + Space-Positions**] is $0,707106781.10^{-20}$ m and is the **Border-line** between the , **Weak and Strong Forces** , because in cave exist the maximum Space-Positions . Placing the above **r** Nucleus-Cave in charge Q_+ then .

$\overline{q}_{W-S} = \frac{g.\overline{S}}{2\pi r^2} = \frac{9,8076754.[5,691952.10^{-34}]}{2.\pi.[10^{-20}]^2} = 8,8850576.10^1 J/1,602.10^{-19} eV = 5,546.10^{25}$ eV

or **Border-line** W-S Forces $\rightarrow \overline{q}_{Weak-Strong} \equiv \mathbf{5,546 .10^{16}\ GeV} \leftarrow$

From Magnetic-field $\overline{B}_F = [\frac{2\pi.m_+}{q_+}].f = [\frac{2\pi.m_+}{q_+}].|\frac{Ff}{\pi^2 r^2 \overline{v}.}| = [\frac{2.m_+.F.f}{\pi r^2.\overline{v}.q_+}]$ is , $F = \overline{q}\ \overline{v}x\overline{B}_F = 2\pi.\overline{q}\overline{v}.[\frac{f=1}{g}]$

which is equal to the Nutation-force $F = [\frac{\overline{v}.S}{r^2}]$ and , therefore $\rightarrow$ **M-Force** $\overline{Q_{P.E}} = [\frac{g.\overline{S}}{2\pi r^2}] \leftarrow$

are the Potential-Energy-Forces in caves r , from which become all known Forces ,

a). Gravitational-force as $F_g = m_e.g$ The min-Quantum-Energy E = 1,1745 eV

b). Strong - force   as $F_S.r = [\frac{g.S}{2\pi r^2}] = 2,8.10^4$ N   for , $10^{-14} < d < 10^{-16}$ m ,

c). Electric-force.   as $F_e = q_+.\overline{E} = 2,8.10^3$ N   for , $10^{-\infty} < d < 10^{+\infty}$ m ,

d). Magnetic-force   as $F_m = \overline{c}.q_+\ B_F = 2,8.10^2$ N   for , $10^{-\infty} < d < 10^{+\infty}$ m ,

e). Weak - force   as $F_W.r = [\frac{g.S}{2\pi r^2}] = 2,8.10^{-2}$ N   for , $10^{-17} < d < 10^{-19}$ m ,

f). Strong - force   as $F_S.r = [\frac{g.S}{2\pi r^2}] = 2,8.10^4$ N   for , $10^{-14} < d < 10^{-16}$ m ,

g). X–Strong-force   as $F_{xS}.r = [\frac{g.S}{2\pi r^2}] = 2,8.10^{10}$ N   for , $10^{-17} < d < 10^{-20}$ m ,

Conclusions :

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1.. The Total Impedance Z_c, is either Growth or Anti-Growth depending on the **velocity** $\bar{c}$ *Energy*, and the Number of Element=Positions, h . Neutrino-cave is $a_v = 7,0.10^{-21}$ m

2.. The Total Impedance $Z_c = 1,0460975.10^{-31}$m , for the Three elements [+, 0 , -] $\equiv \oplus, \varnothing, \ominus$, $\equiv$ Breakages { $s^2 \equiv$ + Charge , $-s^2 \equiv$ - Charge , $2s^2 \equiv 0$ Charge } issues in STPL - Line Common circle , 2r , which is the Physical-Rotor for the Cosmic-Particles origination .

3... The Duality-Photon Energy is $\rightarrow$ { $\bar{c} \cdot \boxed{\bar{f}_n}$ + $\bar{c} \cdot f_n$ } $\leftarrow \equiv \rightarrow$ Particle + Wave $\leftarrow$ and is NOT becoming from STPL Mechanism , BUT from prior as a Material-Point. [91] .

From Voltage $V = \frac{h.f}{q} = \frac{h.c}{q.\lambda}$ and $\lambda = 10^{-7}$m $V = \sqrt[2]{\frac{1}{a^3}} = \sqrt[2]{\frac{1}{10^{-21}}} . 4,1361232.10^{-15} = \textbf{12,398eV}$

4... For the in-Planck`s length Spin-Energy **Gamma-ray** , γ , is the minimum Energy in caves $E = h\,f\,/\,q = 4,1361232 . 10^{-15}\,f = 4,1356586.10^{-15}.\sqrt[2]{\frac{1}{r^3}} \leftarrow$ eV and is in the Smallest acceleration Space-cave $a_\gamma = 1.10^{-15}$ m where issues $f_\gamma = 3,1622776.10^{28}$ H.

5... For the Beyond Planck`s length Spin-Energy is $\rightarrow \textbf{E} = [\ \Phi\,\frac{\sigma}{4\pi r}\ ] . \bar{B} \equiv \frac{|\,B\,|^2}{2\,\pi^2 r^4} \leftarrow$

6... The Resonance-Energy for caves is $E_R = \frac{1}{a^2} [\frac{4\pi^2}{c^2} + \frac{L^2}{2m}] = \frac{1}{a^2} [\frac{4\pi^2}{c^2} + \frac{S^2}{2m}]$ and is a **Signal**

7... From **Lorentz-Force** $\textbf{F} = \bar{q}\ \bar{v}x\bar{B}\ F = \frac{m.v^2}{r}$ equation , and from **Cave-Spin** $S = r\,m\,v$, then Force/cave $\equiv \bar{q}\,\bar{B}$ r=mv, $\bar{q}\,\bar{B} = \frac{S}{r^2}$, Common-Force/cave $\bar{q}\,\bar{B}\,c = \frac{c.S}{r^2}]$, originating E-Caves i.e. **Forces** $Q_+ = [\frac{c.S}{r^2}] = \frac{2,9978.10^8 . [5,691952.10^{-34}]}{[1,602.10^{-19}] . \,r^2} = 10,649939.10^{-7} .[\frac{1}{r^2}]$ eV ...(Forces)

The Force in Charged-Particle , related to their Cave **r** (m) ,

1-Particle $r = 1.10^{-7}$ m $\rightarrow Q_{-7} = 1,0649939.10^{-6} .[\frac{1}{[10^{-7}]^2}] = 10,65.10^{\,7}$ eV.

2-Particle $r = 1.10^{-8}$ m $\rightarrow Q_{-8} = 1,0649939.10^{-6} .[\frac{1}{[10^{-8}]^2}] = 10,65.10^{\,9}$ eV.

3-Particle $r = 1.10^{-9}$ m $\rightarrow Q_{-9} = 1,0649939.10^{-6} .[\frac{1}{[10^{-9}]^2}] = 10,65.10^{\,11}$ eV.

4-Particle $r = 1.10^{-10}$ m $\rightarrow Q_{-10} = 1,0649939.10^{-6}.[\frac{1}{[10^{-10}]^2}] = 10,65.10^{\,13}$ eV.

5-Particle $r = 1.10^{-11}$ m $\rightarrow Q_{-11} = 1,0649939.10^{-6}.[\frac{1}{[10^{-11}]^2}] = 10,65.10^{\,15}$ eV.

6-Particle $r = 1.10^{-12}$ m $\rightarrow Q_{-12} = 1,0649939.10^{-6}.[\frac{1}{[10^{-12}]^2}] = 10,65.10^{\,17}$ eV.

7-Particle $r = 1.10^{-13}$ m $\rightarrow Q_{-13} = 1,0649939.10^{-6}.[\frac{1}{[10^{-13}]^2}] = 10,65.10^{\,19}$ eV.

8-Particle $r = 1.10^{-14}$ m $\rightarrow Q_{-14} = 1,0649939.10^{-6}.[\frac{1}{[10^{-14}]^2}] = 10,65.10^{\,21}$ eV.

9-Particle **$r = 1.10^{-15}$ m** $\leftarrow \rightarrow Q_{-15} = 1,0649939.10^{-6}.[\frac{1}{[10^{-15}]^2}] = \textbf{10,65.10}^{\,\textbf{23}}$ **eV**.

10-Particle $r = 1.10^{-16}$ m $\rightarrow Q_{-16} = 1,0649939.10^{-6}.[\frac{1}{[10^{-16}]^2}] = 10,65.10^{\,25}$ eV.

11-Particle $r = 1.10^{-17}$ m. $\rightarrow Q_{-17} = 1,0649939.10^{-6}.[\frac{1}{[10^{-17}]^2}] = 10,65.10^{\,27}$ eV.

12-Particle $r = \textbf{1.10}^{-18}$ **m** $\leftarrow \rightarrow Q_{-18} = 1,0649939.10^{-6}.[\frac{1}{[10^{-18}]^2}] = \textbf{10,65.10}^{\,\textbf{29}}$ **eV**.

13-Particle $r = 1.10^{-19}$ m $\rightarrow Q_{-19} = 1,0649939.10^{-6}.[\frac{1}{[10^{-19}]^2}] = 10,65.10^{\,31}$ eV.

14-Particle $r = 1.10^{-20}$ m $\rightarrow Q_{-20} = 1,0649939.10^{-6}.[\frac{1}{[10^{-20}]^2}] = 10,65.10^{\,33}$ eV.

15-Particle $r = 1.10^{-21}$ m $\rightarrow Q_{-21} = 1,0649939.10^{-6}.[\frac{1}{[10^{-21}]^2}] = 10,65.10^{\,35}$ eV.

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16-Particle r = 1.10^{-22} m   → $\mathbf{Q_{-22}}$ = $1{,}0649939.10^{-6}.[\frac{1}{[10^{-22}]^2}]$ = $10{,}65.10^{\,37}$ eV.

17-Particle r = 1.10^{-23} m   → $\mathbf{Q_{-23}}$ = $1{,}0649939.10^{-6}.[\frac{1}{[10^{-23}]^2}]$ = $10{,}65.10^{\,39}$ eV.

18-Particle r = 1.10^{-24} m   → $\mathbf{Q_{-24}}$ = $1{,}0649939.10^{-6}.[\frac{1}{[10^{-24}]^2}]$ = $10{,}65.10^{\,41}$ eV.

Voltage in caves becomes from **Lorentz-force**   F = $\bar{q}$ $\bar{v}x\bar{B}_F$, from the Magnetic field
q v B = mv²/r → q B r = m v = m r w , and Energy equation   E = h f = F / c = q V   i.e.

Voltage V in a cave **r** is → $\mathbf{V} = \frac{\mathbf{h.f}}{\mathbf{q}} = \frac{h}{2\pi qeV} \sqrt[2]{\frac{g}{r^3}} = \frac{6{,}62606957.10^{-34}}{2\pi.1{,}602{,}10^{-19}\sqrt{r^3}} = \mathbf{0{,}6582148.10^{-15}.}\sqrt[2]{\frac{g}{r^3}}$ ←

<u>**The Voltage**</u> in Charged-Particles , and the relation to their **Cave r** (m)   is ,

1-Energy in   r = 1.10^{-7}m → $\mathbf{V_{-7}}$ = $0{,}6582148.10^{-15}.\sqrt[2]{\frac{g}{[1.10^{-7}]^3}}$ = $6{,}518653.10^{-5}$ eV.

2- Energy in   r = 1.10^{-8} m → $\mathbf{V_{-8}}$ = $0{,}6582148.10^{-15}.\sqrt[2]{\frac{g}{[1.10^{-8}]^3}}$ = $2{,}061375.10^{-3}$ eV.

3- Energy in   r = 1.10^{-9} m → $\mathbf{V_{-9}}$ = $0{,}6582148.10^{-15}.\sqrt[2]{\frac{g}{[1.10^{-8}]^3}}$ = $6{,}518653.10^{-2}$ eV

4- Energy in   r = 1.10^{-10} m → $\mathbf{V_{-10}}$ = $0{,}6582148.10^{-15}.\sqrt[2]{\frac{g}{[1.10^{-10}]^3}}$ = $2{,}061375.10^{\,0}$ eV.

5- Energy in   r = 1.10^{-11} m → $\mathbf{V_{-11}}$ = $0{,}6582148.10^{-15}.\sqrt[2]{\frac{g}{[1.10^{-11}]^3}}$ = $6{,}518653.10^{2}$ eV

6- Energy in   r = 1.10^{-12} m → $\mathbf{V_{-12}}$ = $0{,}6582148.10^{-15}.\sqrt[2]{\frac{g}{[1.10^{-12}]^3}}$ = $2{,}061375.10^{\,3}$ eV.

7- Energy in   r = 1.10^{-13} m → $\mathbf{V_{-13}}$ = $0{,}6582148.10^{-15}.\sqrt[2]{\frac{g}{[1.10^{-13}]^3}}$ = $6{,}518653.10^{\,4}$ eV

8- Energy in   r = 1.10^{-14} m → $\mathbf{V_{-14}}$ = $0{,}6582148.10^{-15}.\sqrt[2]{\frac{g}{[1.10^{-14}]^3}}$ = $2{,}061375.10^{\,6}$ eV.

9- Energy in   **r = 1.10^{-15} m** → $\mathbf{V_{-15}}$ = $0{,}6582148.10^{-15}.\sqrt[2]{\frac{g}{[1.10^{-15}]^3}}$ = $\mathbf{6{,}518653.10^{\,7}\ eV}$

10- Energy in r = 1.10^{-16} m → $\mathbf{V_{-16}}$ = $0{,}6582148.10^{-15}.\sqrt[2]{\frac{g}{[1.10^{-16}]^3}}$ = $2{,}061375.10^{\,9}$ eV.

11- Energy in r = 1.10^{-17} m → $\mathbf{V_{-17}}$ = $0{,}6582148.10^{-15}.\sqrt[2]{\frac{g}{[1.10^{-17}]^3}}$ = $6{,}518653.10^{\,10}$ eV

12- Energy in **r = 1.10^{-18} m** → $\mathbf{V_{-18}}$ = $0{,}6582148.10^{-15}.\sqrt[2]{\frac{g}{[1.10^{-18}]^3}}$ = $\mathbf{2{,}061375.10^{\,12}\ eV.}$

13- Energy in **r = 1.10^{-19} m** → $\mathbf{V_{-19}}$ = $0{,}6582148.10^{-15}.\sqrt[2]{\frac{g}{[1.10^{-19}]^3}}$ = $6{,}518653.10^{\,13}$ eV

14- Energy in **r = 1.10^{-20} m** → $\mathbf{V_{-20}}$ = $0{,}6582148.10^{-15}.\sqrt[2]{\frac{g}{[1.10^{-20}]^3}}$ = $2{,}061375.10^{\,15}$ eV.

15- Energy in   **r = 1.10^{-21} m** → $\mathbf{V_{-21}}$ = $0{,}6582148.10^{-15}.\sqrt[2]{\frac{g}{[1.10^{-21}]^3}}$ = $6{,}518653.10^{\,16}$ eV

16- Energy in   **r = 1.10^{-22} m** → $\mathbf{V_{-22}}$ = $0{,}6582148.10^{-15}.\sqrt[2]{\frac{g}{[1.10^{-22}]^3}}$ = $2{,}061375.10^{\,18}$eV

17- Energy in   **r = 1.10^{-23} m** → $\mathbf{V_{-23}}$ = $0{,}6582148.10^{-15}.\sqrt[2]{\frac{g}{[1.10^{-23}]^3}}$ = $6{,}518653.10^{\,19}$ eV

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18- Energy in $\mathbf{r} = 1.10^{-24}$ m $\rightarrow$ $\mathbf{V_{-24}} = 0{,}6582148.10^{-15}.\sqrt[2]{\dfrac{g}{[1.10^{-24}]^3}} = 2{,}061375.10^{21}$ eV

19- Energy in $\mathbf{r} = 1.10^{-25}$ m $\rightarrow$ $\mathbf{V_{-25}} = 0{,}6582148.10^{-15}.\sqrt[2]{\dfrac{g}{[1.10^{-25}]^3}} = 6{,}518653.10^{22}$ eV

20- Energy in $\mathbf{r} = 1.10^{-26}$ m $\rightarrow$ $\mathbf{V_{-26}} = 0{,}6582148.10^{-15}.\sqrt[2]{\dfrac{g}{[1.10^{-26}]^3}} = 2{,}061375.10^{24}$ eV

Remarks :

1.. Caves $\mathbf{r}$, determine the Voltage V = U Potential energy in caves . The Kinetic - Energy is ,

$K_E = \dfrac{mv^2}{2} = \dfrac{m.GM}{2.\ R} = \dfrac{GMm}{2.\ R}$, or $K_E = (1/2)\,(-P_E) = -\dfrac{P_E}{2}$ and $\rightarrow$ $-P_E = U = 2.K_E$ $\leftarrow$

The Total-energy is E = $K_E + P_E = K_E - 2.K_E = -K_E$, i.e. *The Potential - Energy* P_E *is Always -Negative* **and Twice** *the Kinetic-Energy* **While The Total - Energy** E , *of any Central-Orbiting-System* **is Negative .**

This Property $U = 2.K_E = h f = h / T$ is very interesting for caves with changeable frequency because the two unknowns K_E , T , may be measured or be calculated . For Weak Force Z in caves $\mathbf{d = 10^{-17}}$ m then Period T = $\dfrac{d}{c} = \dfrac{10^{-17}\ m}{[2{,}998.10^8 m/s\,]} = \mathbf{3{,}3358.10^{-26}}$s ,and the produced

Energy in $\mathbf{d}$, is $E_Z = \underline{h} / T = \dfrac{1{,}055.10^{-34}\ \text{J.s}}{2.[\,3{,}3358.10^{-26}\text{s}].[1{,}602.10^{-19}\ \text{J/eV}\,]} = 98{,}84.\,10^9$ eV $\equiv$ **99 GeV**

2.. From the equation of **Forces** $Q_+ = [\dfrac{c.S}{r^2}] = 10{,}649939.10^{-7}\,.[\dfrac{1}{r^2}]$ eV is seen that Strong and Weak-Forces **Converge** at cave $5{,}546.10^{-16}$ m ,of Voltage $\mathbf{V_{-16}} = \mathbf{n}.[1 / r^2] = = 2{,}06.10^9$ eV. **to** smaller than , $r < 10^{-15}$ m , caves . The Range of action is analogous to the cave on STPL. In all caves **Exist** the Fundamental Particles [The Six-Quarks and The Six-Leptons] and their Antiparticles as well as **Their combinations** of these twelve monads , **Plus** those of **Forces** .

3.. Kinetic Energy equation of Elementary-Particles is given from E = q V = mc²/2 ..(1)

From B = r m v = r² m w = r² m (2πf) = π².r⁴.f , then $\rightarrow$ m = π r²/2 $\leftarrow$ and (1) becomes

$\mathbf{q} = \dfrac{\pi c^2}{4}[\dfrac{r^2}{V}] = 7{,}0590672.10^{16}\,.\,[\dfrac{r^2}{V}]$, $V = 0{,}658.10^{-15}.\sqrt[2]{\dfrac{g}{r^3}}$ and for the three types of Particles ,

lepton.. r $= 10^{-15}$m $\rightarrow$ $\mathbf{V_{Leptons-Ecave}} = 0{,}6582148.10^{-15}.\sqrt[2]{\dfrac{g}{[1.10^{-15}]^3}} = 6{,}5188857.10^7$ eV

$\mathbf{Q_{Leptons-Charge}} = 7{,}0590672.10^{16}\,.\dfrac{10^{-30}}{[6{,}5188857.10^7\,]} = \mathbf{1,\,082864\,.10^{-21}}$ C

quark.. r $= 10^{-17}$m $\rightarrow$ $\mathbf{V_{Quarks-Ecave}} = 0{,}6582148.10^{-15}.\sqrt[2]{\dfrac{g}{[1.10^{-17}]^3}} = 6{,}5188857.10^{10}$ eV

$\mathbf{Q_{Quarks-Charge}} = 7{,}0590672.10^{16}\,.\dfrac{10^{-34}}{[6{,}5188857.10^{10}\,]} = \mathbf{1,\,082864\,.10^{-28}}$ C

neutrino.. r $= 10^{-19}$m $\rightarrow$ $\mathbf{V_{Netrinos-Ecave}} = 0{,}6582148.10^{-15}.\sqrt[2]{\dfrac{g}{[1.10^{-19}]^3}} = 6{,}5188857.10^{13}$ eV

and $\mathbf{Q_{Neutrinos-Charge}} = 7{,}0590672.10^{16}\,.\dfrac{10^{-38}}{[2{,}0814579.10^{13}\,]} = \mathbf{1,\,082864\,.10^{-35}}$ C

i.e. Energy in Elementary-Particles is related to cave $\mathbf{r}$, and Voltage $\mathbf{V}$ of cave .

4.. From above is seen the following **Diagram of Forces** in $[\text{eV}]^2$.

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Cave r (m)   **Force   -   Strength** (eV)   **Voltage** $U \equiv V$ (eV)   **Action-Range** (m) $\rightarrow$**In** r

1.. 10^{-13}m   Gluon **G** , $Q_G = 12,2.10^{14-16}$ eV $V_G = 10^{9}$ eV $a = 10^{-15}$ eV $\rightarrow 10^{-[14-15]}$ m

2.. 10^{-14}m   Weak **Z^o**, $Q_Z = 12,2.10^{13}$ eV $V_Z = 10^{10}$ eV $a = 10^{-16}$ eV $\rightarrow 10^{-[16]}$ m

3.. 10^{-15}m   Weak **Z^1**, $Q_Z = 12,2.10^{14}$ eV $V_Z = 10^{11}$ eV $a = 10^{-16}$ eV $\rightarrow 10^{-[16]}$ m

4.. 10^{-16}m   Higgs **H^o** $Q_H = 13,6.10^{1}$ eV $V_H = 10^{9}$ eV $a = 10^{-15}$ eV $\rightarrow 10^{-[16]}$ m

5.. $10^{-17,}$m   Weak **W$^+$** $Q_W = 12,2.10^{10}$ eV $V_W = 10^{9}$ eV . $a = 10^{-18}$ eV $\rightarrow 10^{-[18]}$ m

6.. $10^{-18,}$m   Weak **W^o** $Q_W = 12,2.10^{9}$ eV $V_W = 10^{14}$ eV $a = 10^{-19}$ eV $\rightarrow 10^{-[19]}$ m

7.. $10^{-19,}$m   Weak **W$^-$** $Q_W = 12,2.10^{10}$ eV $V_W = 10^{15}$ eV $a = 10^{-20}$ eV $\rightarrow 10^{-[20]}$ m

8.. $10^{-20,}$m   Strong **X$^+$** $Q_X > 12,4.10^{28}$ eV $V_X = 10^{17}$ eV $a = 10^{-21}$ eV $\rightarrow 10^{-[20-23]}$ m

5.. Question? **How** Forces as Strength-Voltage **V** , (eV) , Quarks **q** , as Charges (2/3 -1/3).e

Leptons *l* , as Charges (-1).e and Neutrinos , **v** ,with 0 Charge , in Caves **D , P**

Linearly Effect (Interact) and How these are ***Connected***   ???

Answer $\rightarrow\rightarrow$ Charge $_D = + \overrightarrow{DI}$, and **Charge of Point P** is $\rightarrow$ Charge $_P = - \overleftarrow{P_AI}$. i.e.

It is proved in [90-91] that , External-Power of all Points on STPL is Related only to their (+)

Distance $\rightarrow$ and (-) Distance $\leftarrow$, from Null-Point **I** , where I is the foot of , **OI $\perp$ PD . i.e.**

D$_A$ Content-Charge $\equiv [D_AM]^2 \equiv |+\rightarrow [D_AI]$, **P$_A$** Content-Charge $\equiv [P_AM]^2 \equiv [D_AI]\leftarrow -|$, or

u-Charge $\equiv$ Charge $_u = +\overrightarrow{D_AI} = +\frac{2}{3}$, **d**-Charge $\equiv$ Charge $_d = -\overleftarrow{P_AI} = -\frac{1}{3}$, linear Effect and Clipping .

W$^+$ $= [\rightarrow D_AI] > [\leftarrow P_AI]$, **W$^-$** $= [\rightarrow D_AI] < [\leftarrow P_AI]$, **W^o** $= [\rightarrow D_AI] = [\leftarrow P_AI]$ …(w)
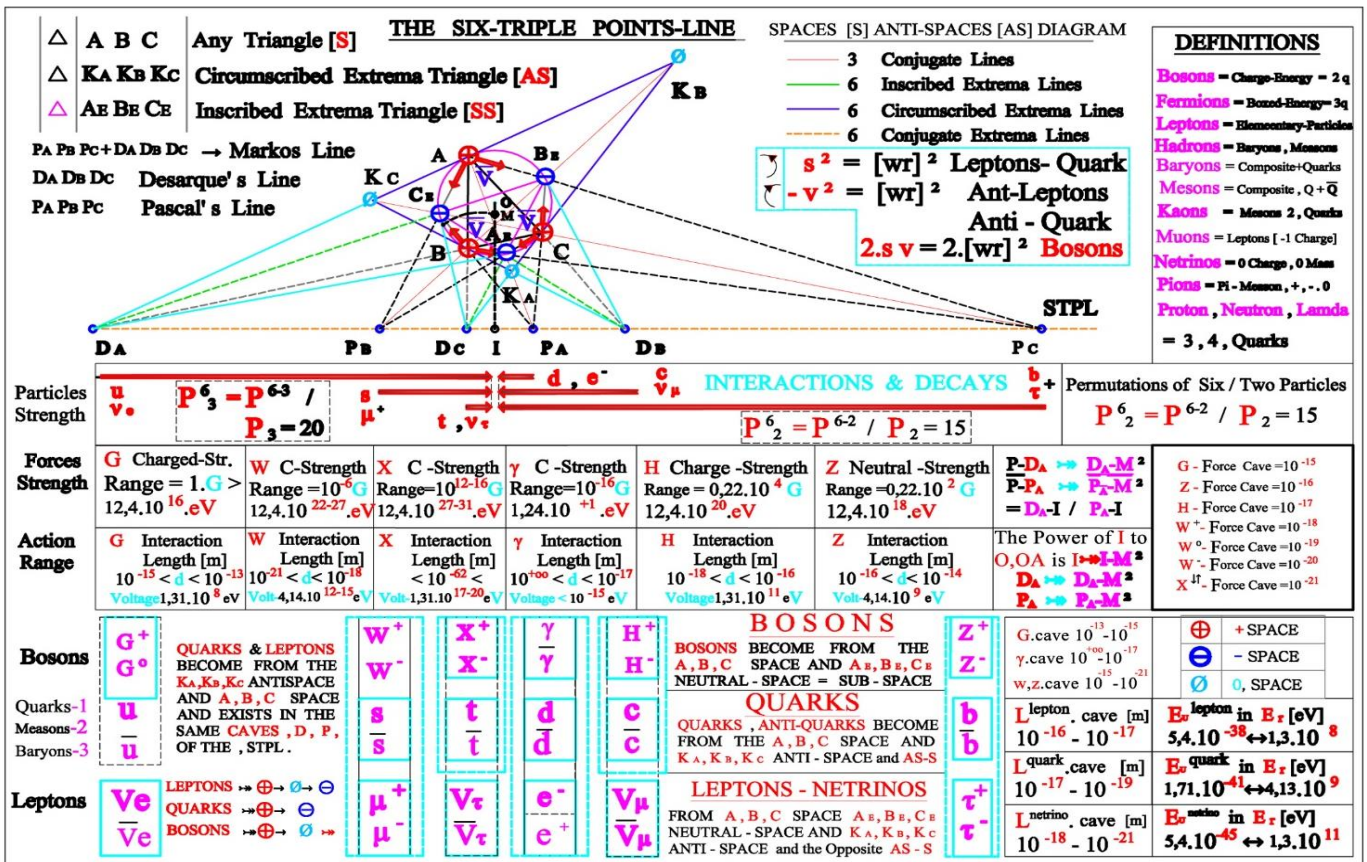
Figure –27 - : The [STPL] Physical-Mechanism -Cave-axis of $\rightarrow$ Forces and Energy-Caves $\leftarrow$

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1..The $\oplus$ Breakage being alternative at Space-Points **A , B , C** $\rightarrow$ **Attacks** to the $\ominus$ **Charges** at Anti-Space-Points K_A ,K_B ,K_C , and forms **Leptons** { e^-, μ^+, τ^+, ν_e , ν_μ , ν_τ } and **Quarks** {**d , s , b , u , c , t** } , **on STPL** Points P_A , P_B , P_C--D_A , D_B , D_C respectively.

2..Because the $\oplus$ Breakage **Attacks** $=\gg$to $\ominus$ **Charge** thus Anti-Particles are Generated only from the Opposite-motion , *opposite direction* , in their Conductors . D,P $\rightarrow$ I $\leftarrow$ P,D

3.. From [91] The Geometry of STPL line allows Six Quantities on the three Loads as The **Artificial 3-Phase-Star**-Circuit and The-**Physical 6-Phase-Delta**-Circuit for $Q_{\overrightarrow{AK_A}}$, and $Q_{\overrightarrow{A_E K_A}}$, Elementary-Particles are launched at P_A and D_A Points of STPL .

4.. **BOSONS** are formed **Axially** to Common-circle in Sub-Space A_E , B_E , C_E , such for Space , A , B , C , as for Anti-Space K_A , K_B , K_C , and thus acquire their Spin and , *Instead of Charge* $\rightarrow$ a **Voltage-Force** $\equiv$ **Motion-in-Magnet** $\equiv$ **Material-Point** from their Conductors , AP_A , AD_A , as $\oplus$ Breakage **Attacks** $=\gg$ to , $\varnothing$ **Zero-**Charge , $\oplus$ $=\gg\varnothing$ $=\gg$

$Q_+ = \frac{g.S}{2\pi r^2}$ and are Launched with $Q_{\overrightarrow{AK_A}}$, $Q_{\overrightarrow{A_E K_A}}$ Quantities at P_A , D_A Points of the STPL line with the (w) above Linear-relation.

9g... The Interactions and Decays , of Cosmic Particles :

A$\rightarrow$[L+Q] Interactions in Space , Anti-Space for Leptons-Quarks Origination .
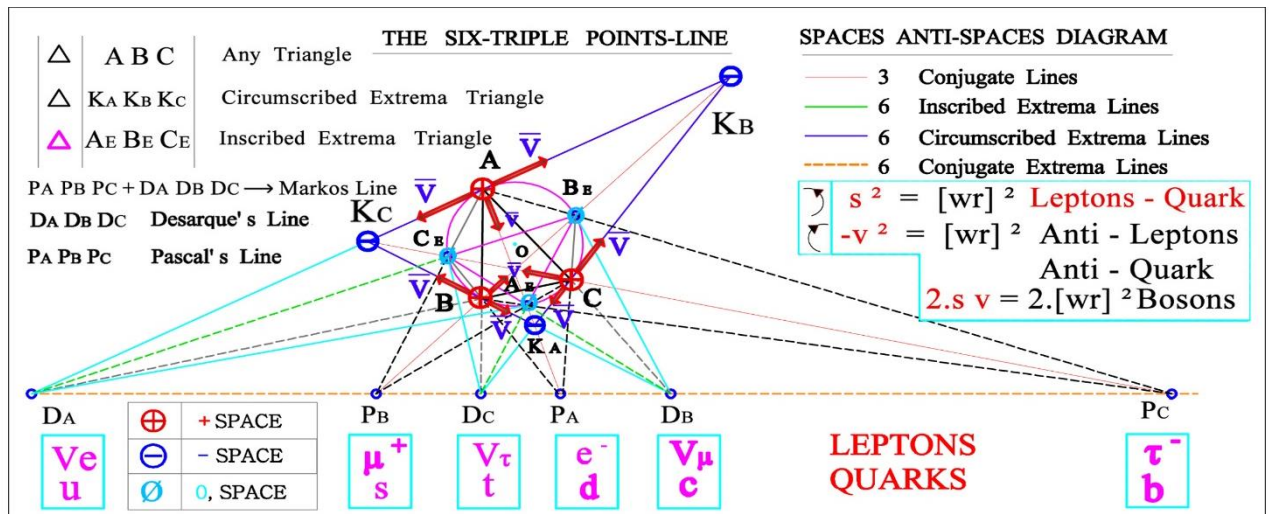
Figure - 28 - : The Physical-Rotor in [STPL]-Mechanism Produces at Pascal`s and Desargues Points P_A , P_B , P_C --- D_A , D_B , D_C , The **Leptons** and **Quarks** :

1A.. Breakage $s^2 = +|\bar{v}|^2 = |\bar{w}x\bar{r}|^2 \equiv \oplus$ being at Point **A** $\rightarrow$ **Attacks** Breakage **Charge** ,- $s^2 = \ominus$ at Point K_A with an **Impressed-Force** $Q_{\overrightarrow{AK_A}} = Z_{AK_A} \frac{d}{r} \equiv |\bar{e}|$ x $\frac{3}{3}$, with $\bar{c}$ velocity and forms *electron*-**Lepton** { e^-} in Conductor $[\frac{d=AK_A}{AK_A}] = \frac{3}{3}$, as $\frac{3|\bar{e}|}{3}$, and being at Point A_E forms *down*–**Quark** { **d** } in Conductor $[\frac{d=A_E K_A}{AK_A}]$, as $\frac{|\bar{e}|}{3}$, and Both the Work-Energy-Storages $Q_{\overrightarrow{AK_A}} \equiv |\bar{e}|$ x $\frac{3}{3}$, $Q_{\overrightarrow{A_E K_A}} \equiv \frac{|\bar{e}|}{3}$, are Launched-Off the common-circle at the Pascal Point , P_A , of the [STPL] line.

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2A.. The $\oplus$ Breakage being at Point **A** → **Attacks the** $\ominus$ **Charges** at Points K_B , K_C ←

with the **Impressed-Force** $Q_{\overrightarrow{AK_B}} = Z_{AK_B} \frac{d}{r} \equiv |\bar{e}| \times \frac{1}{1}$, with $\bar{c}$ velocity forming the

electron -neutrino-**Lepton** $\{\nu_e\}$ in Conductor $[\frac{d=AK_B}{AK_A}] = \frac{1}{1}$ as $\frac{0|\bar{e}|}{0}$, and in $[\frac{d=AK_C}{AK_A}] = \frac{2}{3}$

up-**Quark** { u } in Conductor $[\frac{d=AK_C}{AK_A}] = \frac{2}{3}$, as $\frac{2|\bar{e}|}{3}$, and Both the Work-Energy-Storages

$Q_{\overrightarrow{AK_B}} \equiv \frac{1|\bar{e}|}{3} \equiv$ Charge $_{Ve} = +\overrightarrow{D_A I} = \frac{1}{3}$, $Q_{\overrightarrow{A K_C}} \equiv \frac{2|\bar{e}|}{3} \equiv$ Charge $_u = +\overrightarrow{D_A I} = +\frac{2}{3}$, are

Launched -Off the common-circle at the Desargues Point , D_A , of the [STPL] line .

as → ν_e- Charge $\equiv +\overrightarrow{D_A I} = +\frac{1e}{3}$, **u-** Charge $\equiv + \overrightarrow{D_A I} = +\frac{2e}{3}$.

B→[- L-Q] Interactions in Space ,Anti-Space for Anti Leptons -Anti Quarks Origination
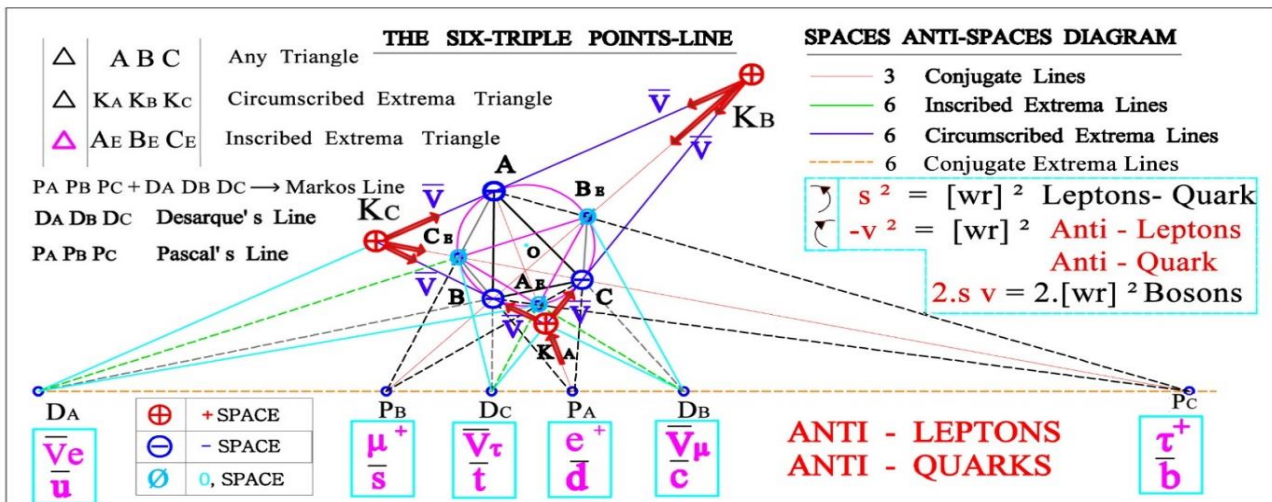
Figure - 29 - : The [STPL] line Machine Produces the Anti-Leptons and Anti-Quarks :
1A.. Breakage $s^2 = +|\bar{v}|^2 = |\overline{w} \times \overline{r}|^2 \equiv \oplus$ being at Point **A** → **Attacks** Breakage **Charge, -s² =** $\ominus$
at Point K_A , and forms $Q_{\overrightarrow{AK_A}}$, $Q_{\overrightarrow{A_E K_A}}$ Quantities which are Launched at Points P_A of
[STPL] line as → *electron*-**Lepton** $\{e^-\}$ and *down*–**Quark** { d } ← Simultaneously[F-13]
Breakage s^2 , being at Point K_A , **Attacks** Breakage **Charge (- s²)** at Point **A On-Opposite**
Conductors $[\frac{d=K_A A}{A K_A}] = \frac{-1}{1}$, and at Point A_E $[\frac{d=K_A A_E}{A K_A}] = \frac{-1}{3}$, forms the Energy-Quantities as
$Q_{\overrightarrow{K_A A}} \equiv - |\bar{e}| \times \frac{3}{3}$, *Positron*-**Lepton** $\{e^+\}$, and $Q_{\overrightarrow{K_A A_E}} \equiv - |\bar{e}| \times \frac{1}{3}$, *Anti-down*–**Quark** $\{\bar{d}\}$.
which are Launched-Off the common-circle at the Pascal Point , P_A , of the [STPL] line.
2A.. The $\oplus$ Breakage being at Point **A** → **Attacks the** $\ominus$ **Charges** at Points K_B , K_C ←
and forms $Q_{\overrightarrow{AK_B}}$, $Q_{\overrightarrow{A K_C}}$ Quantities which are Launched at Point , D_A of the [STPL]
line as → *electron -neutrino*-**Lepton** $\{\nu_e\}$, and *up*-**Quark** { u } ← Simultaneously[F-13]
$\oplus$ Breakage s^2 being at Points , K_B , K_C , **Attacks** Breakage **Charge (- s²)** at Point **A** ,

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

On-Opposite Conductors $[\frac{d=K_B A}{A\,K_A}] = \frac{-1}{1}$,and $[\frac{d=K_C A}{A\,K_A}]= \frac{-2}{3}$,forming the Energy Quantities

$Q\,\overrightarrow{K_B A} \equiv -\frac{1|\bar{e}|}{1}$, $Q\,\overrightarrow{K_C A} \equiv -\frac{2|\bar{e}|}{3}$, the *Anti-electron -neutrino-*Lepton $\{\bar{v}_e\}$, and the

*Anti-up-*Quark $\{\,\bar{u}\,\}$ which are Launched-Off the common-circle at the Desargues

Point D_A , of the [STPL] line .

C→[F-V] Interactions in Space Anti-Space , for Forces and Voltage Origination :
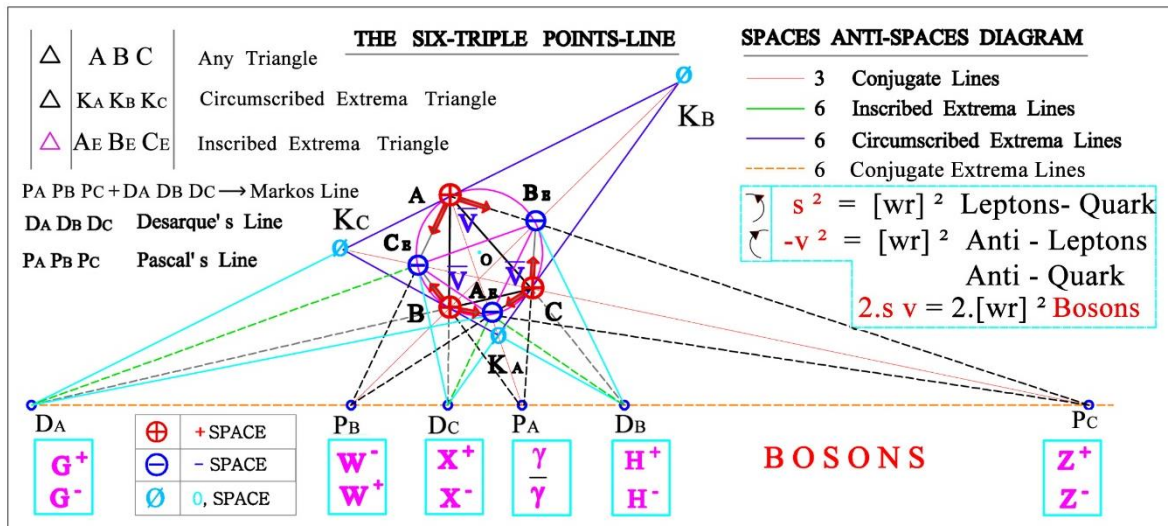
Figure - 30 - : The [STPL] line Machine Produces the **Force carriers** as **Material-Points :**
It is known that **a Force F is** , Any influence that causes an Object to , Undergo a Change
in speed , a Change in Direction , or a Change in Shape . In Material-Geometry the [⊕]
Charge Attacks [⊖] Charge , *the motion* , and are created Interactions between the Charges .
All Above actions happen in Sub-Space and 12 Leptons , 12 Quarks , 12 kind of Forces are so
launched into the Pascal **P** , Desargues **D** , Points which occupy a different **Energy-Magnitude**
and **Voltage** . The Two Positions of these [⊕] , [⊖] Charges exist in Standing and Travelling
Wave , since there are only Two-Positions , *possible-nodes* , in a Wavelength $\lambda = 2r$.

As in **Duality-Photon** $\rightarrow \{\,\bar{c}\,.\,\boxed{\bar{f}_n}\,+\,\bar{c}\,.\,f_n\,\}\,\leftarrow$ $\equiv$ Stationary- Storage in Standing-Wave
+ Travelling -Wave → Particle + Wave ← *therefore* **Force F** is the Space → Anti-Space
influence of the [⊕] , [⊖] Charges at the Two - Positions of Wavelength $\lambda = 2r$.

The Two Positions in Wavelength follow all laws of Mechanics and the Cauchy-Stresses.

From **Lorentz-Force** $F = \bar{q}\;\,\bar{v}x\bar{B}_F = 2\pi.\bar{q}\bar{v}.[\frac{f=1}{g}]$ equation , and from **Nutation-Force**

$F = [\frac{\bar{v}.S}{r^2}]$ is found the Common **Charge** $\bar{q} = Q_+ = [\frac{g.S}{2\pi r^2}]$, which originates Forces as ,

Forces $Q_+ = [\frac{g.S}{2\pi r^2}] = \frac{9,8076754.[5,691952.10^{-34}]}{2.\pi.[1,602.10^{-19}].\;r^2} = 5,5457194.10^{-15}\;[\frac{1}{r^2}]$ eV ...(*Forces*)

Voltage in caves becomes from **Lorentz-force** $F = \bar{q}\;\,\bar{v}x\bar{B}_F$, from the Magnetic field
$q\,v\,B = mv^2/r \rightarrow q\,B\,r = m\,v = m\,r\,w$, and Energy equation $E = h\,f = F / c = q\,V$ i.e.

Voltage V in a cave **r** is $\rightarrow V = \frac{h\,f}{eV} = \frac{h}{eV}\,^2\sqrt{\frac{g}{r^3}} = \frac{6,62606957.10^{-34}]}{[1,602.10^{-19}].\sqrt{r^3}} = \mathbf{4,1356586.10^{-15}}.^2\sqrt{\frac{g}{r^3}}\,\leftarrow$

All Particles and Forces End in STPL , Pascal`s , $P_A$ , and Desargues`s Points , D_A .

AK_C , Creates the , + Force $G^+ = \oplus \rightarrow \varnothing$, and $AK_C = \oplus \leftarrow \varnothing$, Creates the , – Force G^-.

Particle & Wave Duality Photon , and ^{87} Cosmic-Particles Origination .

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STPL / Forces $\,$ F $\;\rightarrow$	D_A $\;$ P_B $\;$ D_C $\atop$ G $\quad$ W $\quad$ X	(I)	P_A $\;$ D_B $\;$ P_C $\atop$ γ $\quad$ H $\quad$ Z

Positive (+) Charge-Magnitude / $\rightarrow$ $\qquad\qquad$ $|\,\backslash\;\leftarrow$ **Negative $\quad$ (-) Charge**

Charge $\qquad$ $Q_\pm$ $\rightarrow$	$\frac{2}{3}$ $\quad$ $-\frac{1}{3}$ $\quad$ $\frac{2}{3}$	.	$-\frac{1}{3}$ $\quad$ $\frac{2}{3}$ $\quad$ $-\frac{1}{3}$
Quarks. $\qquad$ q $\rightarrow$	u $\quad$ s $\quad$ t	.	d $\quad$ c $\quad$ b
Anti-Quarks $\quad$ $\bar{q}$ $\rightarrow$	$\bar{u}$ $\quad$ $\bar{s}$ $\quad$ $\bar{t}$	.	$\bar{d}$ $\quad$ $\bar{c}$ $\quad$ $\bar{b}$
Charge $\qquad$ $Q_\pm$ $\rightarrow$	0 $\quad$ -1 $\quad$ 0	.	-1 $\quad$ 0 $\quad$ -1
Leptons. $\qquad$ L $\rightarrow$	ν_e $\quad$ μ^+ $\quad$ ν_τ	.	e^- $\quad$ ν_μ $\quad$ τ^+
Anti-Leptons $\quad$ $\bar{L}$ $\rightarrow$	$\overline{\nu_e}$ $\quad$ $\bar{\mu}$ $\quad$ $\overline{\nu_\tau}$	.	$\overline{e^+}$ $\quad$ $\overline{\nu_\mu}$ $\quad$ $\bar{\tau}$

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

It was referred that two **u**-Charge $\equiv \{\rightarrow D_A I = \frac{+2}{3} \}$, one **d**-Charge $\equiv \{\leftarrow P_A I = \frac{-1}{3} \}$,
are Effecting linearly and Connected by linear-Forces , **as** $\rightarrow$[u-d-u]$\leftarrow$ with Resultant-charge
$2[\frac{+2}{3}]+\frac{-1}{3} = \frac{+3}{3} = +\mathbf{1e} \equiv$ Charge $\mathbf{C_e} = 1{,}602.10^{-19}$ C in cave $\mathbf{a} = 5{,}0.10^{-17}$ m , and are ,
$\mathbf{W^+} = [\rightarrow D_A I\,] > [\leftarrow P_A I\,]$, $\mathbf{W^-} = [\rightarrow D_A I] < [\leftarrow P_A I\,]$, $\mathbf{W^o} = [\rightarrow D_A I] = [\leftarrow P_A I\,]$ …(w)
It was shown [Page-55] that , **Forces between** the **Opposites Equilibrium-Linearly ,** as this
is for two or three Particles $\rightarrow$[u-$\bar{c}$]$\leftarrow$ or , $\frac{2}{3}$ e - $\frac{2}{3}$ e = 0 , $\leftarrow$[d-u-d]$\rightarrow$ where is the Resultant
for the **Neutral-cave** issues $q_n = 2.q_d + q_u = -2.\frac{1}{3}$ e $+ \frac{2}{3}$ e $= 0.$e , and the Stability of forces
is axial as in Proton and this because the Dynamic-Strip-Polygon doesn`t close . $\leftrightarrow$

$\qquad$ **Electric-Force** *is the Dominant where Particles are responding to the* **Constructive**
$\quad$ **[$\oplus\rightarrow$(+)$\leftarrow\oplus$]** or **[$\ominus\rightarrow$(+)$\leftarrow\ominus$] ,** *and to* **Destructive [$\oplus\rightarrow$(-)$\rightarrow\ominus$]** **Interference as** ,
Constructive-Interference [$\oplus\rightarrow\oplus=\oplus\oplus$]$\equiv$CI$^{+,+}_{=+1}$ $\equiv$ $\mathbf{W^+}$, [$\ominus\rightarrow\ominus=\ominus\ominus$]$\equiv$ CI$^{-,-}_{=0-}$ $\equiv$ $\mathbf{W^-}$,
$\qquad\qquad$ [$\oplus\rightarrow = \oplus$] $\equiv$ CI$^{+,\rightarrow}_{=+n}$ $\equiv$ $\mathbf{W^{++}}$ $\quad$ ….3-Types of CI-Forces .
Destructive - Interference [$\oplus\rightarrow\ominus =0_+$] $\equiv$ DI$^{+,-}_{=0+}$$\equiv$ $\mathbf{Z^+}$, [$\oplus\rightarrow\ominus = 0$] $\equiv$ DI$^{+,-}_{=0}$ $\equiv$ $\mathbf{Z^o}$,
$\qquad\qquad$ [$\oplus\rightarrow\ominus =0_-$] $\equiv$ DI$^{+,-}_{=0-}$ $\equiv$ $\mathbf{Z^-}$ $\qquad$ ….3-Types of DI-Forces .
Because Force *can`t exist by itself* , there must always be an equal and opposite reaction force
acting on the Opposite Position or Direction . *Coulomb-Force* acting between two Particles is
$\mathbf{F_c} = C\,\frac{q_1.q_2}{r^2}$,while the *Voltage* is $\mathbf{V_r} = C\,\frac{q_1.q_2}{r}$ of cave , r , and is $\rightarrow$ $\mathbf{V_r} = \mathbf{F_c} . \mathbf{r} \leftarrow$ …(v)
i.e. when Two Particles are in a cave , **r** , then exists an Interaction between the two Particles .

The $\oplus$ Charged-Particle produces an **Electric-field** $\overset{\leftarrow}{\mathbf{E}}$ which exerts a force $\overset{\leftarrow}{\mathbf{F}}$ on the other
charged Particle creating the-Constructive or the Destructive Interference in an Homogenous
Harmonic vibration Voltage , as Dynamic Matrix [λ M+K] X = 0 where $\bar{\lambda} = 1/w^2 = 1/\lambda$.
The moving Charged Particle , $\oplus$ or $\ominus$, produces a **Magnetic-field** $\overset{\leftarrow}{\mathbf{B}}$,which exerts a Force
$\overset{\leftarrow}{\mathbf{F}}$ on other moving charge . The Force $\overset{\leftarrow}{\mathbf{F}}$ of these charges is always perpendicular to the
Direction of their Velocity vector , therefore the *Velocity-magnitude* does not change , and only
the *Direction* of the Velocity-vector changes . With this way is created the *Electromagnetic*
Wave **in cave** , **r** , with Wavelength , $\lambda = 2r$, on Two or more Possible nodes . This formation
is that of the Material-Point , i.e. *a Standing-Wave* , with the Two $\pm$ Charges at the two-nodes .

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

The Permutations-**Per-Two** for Six **Leptons** is 15 , and the same 15 for the Six Anti-Leptons.

$\mathbf{Ple}\,_2^6 \rightarrow$ $e^-\mu^+, e^-\tau^+, e^-\nu_e, e^-\nu_\mu, e^-\nu_\tau - \mu^+\tau^+, \mu^+\nu_e, \mu^+\nu_\mu, \mu^+\nu_\tau$,

$\tau^+\nu_e, \tau^+\nu_\mu, \tau^+\nu_\tau, \nu_e\nu_\mu, \nu_e\nu_\tau, \nu_\mu\nu_\tau$ = **15**-Ple

$\mathbf{P\overline{le}}\,_2^6 \rightarrow$ $e^+\overline{\mu}, e^+\overline{\tau}, e^+\overline{\nu_e}, e^+\overline{\nu_\mu}, e^+\overline{\nu_\tau} - \overline{\mu}\,\tau^+, \overline{\mu}\,\overline{\nu_e}, \overline{\mu}\,\overline{\nu_\mu}, \overline{\mu}\,\overline{\nu_\tau}$

$\overline{\tau}\,\overline{\nu_e}, \overline{\tau}\,\overline{\nu_\mu}, \overline{\tau}\,\overline{\nu_\tau}, \overline{\nu_e}\overline{\nu_\mu}, \overline{\nu_e}\,\overline{\nu_\tau}, \overline{\nu_\mu}\,\overline{\nu_\tau}$ = **15**-Ple

The Permutations-**Per-Two** of the Six **Quarks** is 15 ,and the same 15 for the Six Anti-Quarks.

$\mathbf{Pqu}\,_2^6 \rightarrow$ u s , u t , u d , u c , u b − s t , s d , s c , s b − t d , t c , t b − d c , d b , c b = **15**-P

$\mathbf{P\overline{qu}}\,_2^6 \rightarrow$ $\overline{u}\,\overline{s}, \overline{u}\,\overline{t}, \overline{u}\overline{d}, \ \overline{u}\,\overline{c}, \overline{u}\,\overline{b} - \overline{s}\,\overline{t}, \overline{s}\,\overline{d}, \overline{s}\ \ \overline{c}, \overline{s}\,\overline{b} - \overline{t}\,\overline{d}, \ \overline{t}\,\overline{c}, \overline{t}\,\overline{b} - \overline{d}\,\overline{c}, \overline{d}\,\overline{b}, \overline{c}\,\overline{b}$ = 15-P

The Permutations-Per-Three , Not the same , of the Six Quarks is **20-P**

while with repetition is $\mathrm{PR}\,_3^6 = [7^3+1]/2 = \mathbf{172}$ as below .

$\mathbf{P}_3^6 \rightarrow$ u s t , u s d , u s c , u s b - u t d , u t c , u t b - u d c , u d b , u c b -

s t d , s t c , s t b , s d c , s d b , s c b - t d c , t d b , t c b , d c b = **20**-P

$\mathbf{PR}\,_3^6 \rightarrow$ u u u , u u d , u d d , d d d , u d s , u u s , u d s , d d s ,u s s ,d s s , s s s , . , . , ,

$\mathbf{P}_2^6$, $\mathbf{P}_3^6$, $\mathbf{Pqu}\,_2^6$, $\mathbf{P\overline{qu}}\,_2^6$, $\mathbf{P}_3^6$, $\mathbf{PR}\,_3^6$, and generally $\mathbf{P}_n^6$ are the **Basic-Permutations of the Primary-Particles** , while others are Composite , for Interactions and Decays .

10g... AN NEW INTERACTION - METHOD   based on – 2f-3f - P48-56 :

Interaction of Electron $\mathbf{e}^-$,and Electron-neutrino $\boldsymbol{\nu_e}$,is$\rightarrow$ $\mathbf{e}^-\,\boldsymbol{\nu_e} \equiv [\text{-1-0+}\mathbf{W}^-] \equiv \Sigma\,_{D_A>P_A}^{[\,\nu_e\,e^-]}$

From Summation E-neutrino $[\nu_e\text{=-0}]$ in Cave P_A ,**attacks** >> Electron $[e^-\text{=-1}]$ in Cave P_A Of STPL as (v) **,** creating the Constructive-Interference $[\ominus \rightarrow \ominus = \ominus\ominus] \equiv CI\,_{=0-}^{-,-} \equiv \mathbf{W}^-$.

The Process from measurements ,

1… DATA .

Electron-mass $\mathbf{m_e}$ =9,11.10^{-31} Kg ,Charge $\mathbf{q_e}$ =1,602.10^{-19} C , Diameter $\mathbf{a}$ = 5,0.10^{-17} m

E-neutrino $\mathbf{m_{ev}}$ = 3,922.10^{-36}Kg ,Charge $\mathbf{q_{ev}}$ =1,602.10^{-19} C, Diameter $\mathbf{a}$ = 5,0.10^{-18} m

From $\mathbf{m_e}$ = 0,511.10^6 eV/c² = (17,826614. 10^{-37}).0,511. 10^6Kg = 9,1094.10^{-31} Kg

$\mathbf{m_{ev}}$ = 22.10^{-7} MeV/c²= 22.10^{-7}.10^6eV/c²= 2,2eV=2,2.(17,8266.10^{-37}) =3,922.10^{-36}Kg

2… THE SYSTEM .

The two Particles are two Waves { y_1=cos(kx-wt , y_2=cos(kx-wt+δ) }where , $\boldsymbol{\delta}$ **,** is the Phase difference , **k** is the wave number , **x** is the wave Position and , **t** is the time which Interact as **One Parallel-Harmonic-Resistors-Connection** as $\rightarrow$ $[\nu_e\,e^-]$

The System Total-Harmonic-mass $\equiv M_T$ is $\rightarrow$ $\dfrac{1}{M_T} = \dfrac{1}{m_e} + \dfrac{1}{m_{Ve}} = \dfrac{10^{32}}{0,911} + \dfrac{3.10^{32}}{0,0003922} =$

$= \dfrac{0,9113922.10^{32}}{0,0003572} = \dfrac{10^{32}}{0,0003919}$ and , $M_T = 0,0003919.10^{-32}$ Kg = 3,919.10^{-36} Kg .

The System Total- Harmonic-Charge $\equiv Q_T \equiv q_e + q_{ev}$ = - 1,6022.10^{-19} + 0

and the Resonance-Charge is $Q_T = -1,6022.10^{-19}$ C

Frequency Unit-Cave is the Stationary-System becoming from Kepler second Planetary-law equation , $4\pi^2 m\,f_o^2 = k$, and constant law of Areas $1 = k\,.f_o^2\,\mathbf{a}^3$. Their common k , is the

Constant-Energy $\rightarrow k = 4\pi^2 m\,f_p^2 = \dfrac{1}{f_p^2\,\mathbf{a}^3}$ or , $f_p^4 = \dfrac{1}{4\pi^2 ma^3}$ and $f_p = \sqrt[4]{\dfrac{1}{4\pi^2 m.a^3}}$, so

the frequency becoming from this equal Resonance-Energy is the one Mass frequency and is

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$$f_{Ve \to e} = \sqrt[4]{\frac{1}{4\pi^2 m.a^3}} = \sqrt[4]{\frac{1}{4\pi^2 3,919.10^{-36}(5.10^{-18})^3}} = \sqrt[4]{51,707428.10^{84}} = 2,6815643.10^{21} \text{ H}$$

The Energy of System is $E_{Ve \to e} = h.f_{Ve \to e} = 6,62606957.10^{-34} \cdot 2,6815643.10^{21} =$
$= 17,768231.10^{-13}$ Joules $/ 1,6022.10^{-19}$ C $= 11,089895.10^6$ eV $= $ **11,089895 MeV.**

The Magnetic-fields laws for Charges and Periods are, $T = \frac{2\pi.m_T}{q.\overline{B}_F}$, $\overline{B}_F = \frac{2\pi.m_T}{q.T} = \frac{|2\pi.m_T|}{Q_T}$ f

so $\to$ $\overline{B}_F = \frac{|2\pi.m_T|}{Q_T}$ $f_{Ve \to e} = \frac{2\pi.[3,919.10^{-36}].2,6815643.10^{21}}{1,6022.10^{-19}}$ (Kg/Cs) $= $ **0,4121237.10^6** Tesla.

From Energy-Relation W $=2E= B$ w $=$ J.w^2 , or **$2E = 2\pi f B$** then **Total -Spin*Frequency**

$\overline{B}$ $f = \frac{E}{g}$, and $E = \overline{S}.g.f = 5,691952.10^{-34}$ {Kg/m/s}.g.[$2,6815643.10^{21}$ H]$/1,6022.10^{-19}$

$9,3433859.10^6$ eV $= $ **9,3433859** MeV , **i.e. the Energy produced from total System-Spin** .

From Planck`s length $a = \sqrt[3]{\frac{k}{f^2}}$ then $k = a^3.f^2$, and since **Energy** E $= k$ then Cave $a = \sqrt[3]{\frac{E}{.f^2}}$

or $\to$ $a = \sqrt[3]{\frac{E}{f^2}}$, $= \sqrt[3]{\frac{9,3433859.10^6}{(2,6815643.10^{21})^2}} = \sqrt[3]{1,299355.10^{-36}} = 1,09121235.10^{-12}$ m .

The **Weak Force** W^- in System is Coulomb`s Force $\to [e^- \nu_e] \equiv [-1-0+W^-]$ which may be calculated from the Time needed , for Harmonic-mass to vibrate in cave r , from Energy

equation $r = \frac{m.v}{q.B} = \frac{[3,919.10^{-36} \text{ Kg}].2,9978.10^8}{1,6022.10^{-19}.[0,4121237.10^6]} = $ **17,792361.10^{-15}** m , and for Weak Force

W^- in cave $d = 10^{-15}$ m then Period $T = \frac{d}{c} = \frac{17,792361.10^{-15} m}{[2,998.10^8 m/s]} = $ **5,9351394.10^{-23}** s , and

The produced Energy in d , is $\to$ $E_{W^-} = h / T = \frac{1,055.10^{-34} \text{ J.s}}{2.[5,9351394.10^{-23} s].[1,602.10^{-19} \text{ J/eV}]} =$
$= 5,5472.10^6$ eV $\equiv$ **5,55 MeV** , and because from Coulomb-Force $F_C = \frac{C.Q}{r^2}$ and $V_C = \frac{C.Q}{r}$

then issues $\to$ Weak-Force $W^- = [\frac{E_{W^-}}{r}] = \frac{5,5472.10^6}{17,792361.10^{-15}} = $ **3,1177424.10^{20}** eV , so

the Weak-Force is $W^- = [\frac{h/T}{2.r}] = [\frac{h.c/d}{2.r}] = \frac{h.c}{2.d.r} = \frac{h.c}{2e.r^2}$ eV ……..(w-f)

The **above Interaction-System is figured** as follows ,

$[e^- \nu_e] \equiv \{-1-0+W^- = [-1]+\langle W^- \rangle\} \equiv \Sigma \, ^{[\nu_e \to e^-]}_{D_A \to P_A}$, $(-1|W^-)$**Force** $\equiv$CI $^{-o \to -1}_{G \to \gamma} \equiv \to$ n-p $\leftarrow$ or

$[e^- \nu_e] \equiv [-1-0+W^-] \equiv$ $(-1|W^-)$ $\equiv [\mu^+ \nu_\mu] \equiv [\tau^+ \nu_\tau]$ i.e. Leptons Combinations **Produce**

The Same Composites $(-1|W^-)$ $\equiv [d\overline{u}] \equiv [s\overline{c}] \equiv [b\overline{t}]$, in Quark Combinations , i.e.

The, Interaction of Electron , e^-, and Electron-neutrino , ν_e ,gives Charges , -1 , - 0 , and an Coulomb-Force W , which according to Voltage (v) , is the **Constructive-Interference** (- 0) $\to$(-1) $= W^-$.**The Summation** of Charges shows the **Action** [$\oplus$ is -0]$\to$[$\ominus$], of the Coulomb-Force W $\equiv W^-$ as above because , $\oplus >> \ominus$, and the Direction of motion is from D_A to P_A Voltage-Point-Cave , with Energy-Voltage from , **G** to γ , Forces .

For Combinations $\to [e^- \overline{\nu_e}] \equiv [-1+0+Z^-] \equiv (-1|Z^-) \equiv [\mu^+ \overline{\nu_\mu}] \equiv [\tau^+ \overline{\nu_\tau}] \equiv [e^- \overline{\nu_\mu}] \equiv [e^- \overline{\nu_\tau}]$

For Combinations $\to [e^- \mu^+] \equiv [-1-1+W^{--}] \equiv$ $(-2|W^{--})$ $\equiv [e^- \tau^+] \equiv [\mu^+ \tau^+]$

For Combinations $\to [e^- e^+] \equiv [-1+1+Z^o] \equiv (0|Z^o) \equiv [\mu^+ \mu^-] \equiv [\tau^+ \tau^-] \to [e^+ \overline{\nu_e}] \equiv (1|Z^+)$

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For Combinations $\rightarrow [\nu_e \overline{\nu_e}] \equiv [-0+0+Z^o] \equiv$ ($0 |Z^o$) $\equiv$ ($0 |Z^o$) $\equiv [\nu_\mu \overline{\nu_\mu}] \equiv [\nu_\tau \overline{\nu_\tau}]$

For , **Quarks → Quarks** , Combinations issues ,

For 2-Combinations $\rightarrow [u\,d] \equiv [+\frac{2}{3} - \frac{1}{3} + Z^+] \equiv \left(+\frac{1}{3} \middle| Z^+\right) \equiv [u\,s] \equiv [u\,b] \rightarrow K^o \equiv [\overline{s}\,d] \equiv (0|Z^o)$

For 2-Combinations $\rightarrow [u\,c] \equiv [+\frac{2}{3} + \frac{2}{3} + W^{++}] \equiv \left(+\frac{4}{3} \middle| W^{++}\right) \equiv [u\,t] \equiv [c\,t]$

For 2-Combinations $\rightarrow [u\,\overline{u}] \equiv [+\frac{2}{3} - \frac{2}{3} + Z^o] \equiv (0|Z^o) \equiv [c\,\overline{c}] \equiv [t\,\overline{t}] \equiv [d\,\overline{d}] \equiv [s\,\overline{s}] \equiv [b\,\overline{b}]$

For 2-Combinations $\rightarrow [u\,\overline{d}] \equiv [+\frac{2}{3} + \frac{1}{3} + W^+] \equiv \left(+\frac{3}{3} \middle| W^+\right) \equiv [c\,\overline{s}] \equiv [t\,\overline{b}]$

For 2-Combinations $\rightarrow [d\,\overline{d}] \equiv [-\frac{1}{3} + \frac{1}{3} + Z^o] \equiv (0|Z^o) \equiv [s\,\overline{s}] \equiv [b\,\overline{b}] \equiv \rightarrow [e^- e^+]$

The Combinations $\rightarrow [d\,\overline{u}] \equiv [-\frac{1}{3} - \frac{2}{3} + W^-] \equiv (-\mathbf{1}|W^-) \equiv [c\,\overline{d}] \equiv [t\,\overline{s}] \equiv [e^- \nu_e] \equiv [\mu^+ \nu_\mu] \equiv [\tau^+ \nu_\tau]$

Are Common for all Particles Leptons , Anti-leptons and Quarks , Anti-Quarks .

Since $[\mu^+ \nu_\mu] \equiv \pi^+ \equiv (-1|W^-)$ then $\pi^- = -\pi^+ = [\mu^- \overline{\nu_\mu}] \equiv (+1|W^+) \equiv (+1|Z^o)$ and

$\pi^o = [\mu^+ \nu_\mu] + [\mu^- \overline{\nu_\mu}] = [\mu^+ \mu^-] + [\nu_\mu \overline{\nu_\mu}] = \equiv$ ($0|Z^o$) + ($0|Z^o$) $\equiv 2.Z^o = 2\gamma$

For 3-Combinations $\rightarrow [u\,d\,c] \equiv [+\frac{2}{3} - \frac{1}{3} + \frac{2}{3} + Z^+] \equiv \left(+\frac{3}{3} \middle| Z^+ W^+\right) \equiv [c\,s\,t] \equiv [t\,b\,u] \equiv [t\,b\,c]$

For 3-Combinations $\rightarrow [u\,u\,d] \equiv [+\frac{2}{3} + \frac{2}{3} - \frac{1}{3} + W^+] \equiv \left(+\frac{3}{3} \middle| W^+ Z^+\right) \equiv [ccs] \equiv [t\,t\,b] \equiv [u\,c\,s]$

For 3-Combinations $\rightarrow [d\,d\,u] \equiv [-\frac{1}{3} - \frac{1}{3} + \frac{2}{3} + W^-] \equiv (\mathbf{0} |W^- Z^o) \equiv [ssc] \equiv [bbt] \equiv [dsc] \equiv [sbt]$

EXAMPLE :

PROTON is $\rightarrow$ **[u u d]** $\equiv [+\frac{2}{3} + \frac{2}{3} - \frac{1}{3} + W^+] \equiv \left(+\frac{3}{3} \middle| W^+ Z^+\right) =$ Two **u**-Quarks and One **d**-Quark .

Interaction of Up-Quark **u** , and Up-Quark **u** , is $\rightarrow$ u u $\equiv [+\frac{2}{3} + \frac{2}{3} + W^+] \equiv \Sigma_{D_A > D_A}^{[u\,u]}$ and the

Summation of Up-Quarks [u+u] of Cave D_A , **Attacks** >> Down-Quark $[d = -\frac{1}{3}]$ in Cave P_A

Of STPL as (v) **,** creating the Destructive-Interference $[\oplus \rightarrow \ominus = +] \equiv DI_{0\ +}^{+,-} \equiv Z^+$

Since ,u u, Summation occupies Constructive-Interference , W^+ , therefore is Stable .

The Process from measurements ,

1… DATA .

Up-Quark mass $\mathbf{m_u} = 8,91.10^{-30}$ Kg , Charge $\mathbf{q}_u = [+\frac{2}{3}].1,602.10^{-19}$ C , Diameter $\mathbf{a} =$

$5,0.10^{-17}$ m , The Down-Quark $\mathbf{m_d} = 10,7.10^{-30}$ Kg , Charge $\mathbf{q}_d = [-\frac{1}{3}].1,602.10^{-19}$ C,

mean-Diameter $\mathbf{a} = 5,0.10^{-18}$ m

From $\mathbf{m_u} = 5,0.10^6$ eV/c² $= (17,826614.\ 10^{-37}).5.10^6$ Kg $= 8,913307.10^{-30}$ Kg

$\qquad \mathbf{m_d} = 6,0.10^6$ eV/c² $= (17,826614.\ 10^{-37}).6.10^6$ Kg $= 10,695968.10^{-30}$ Kg

2… THE SYSTEM .

The three Particles are three Waves { $y_1 = \cos(kx - wt$, $y_2 = \cos(kx - wt$, $y_3 = \cos(kx - wt + \delta$) }

where , $\boldsymbol{\delta}$, is the Phase difference , $\mathbf{k}$ is the wave number , $\mathbf{x}$ is the wave Position and , $\mathbf{t}$ is the time which Interact as **One-Harmonic-mass-Resistor-System** as $\rightarrow [y_1 + y_2 \rightarrow y_3]$

The System Total-Harmonic-**Mass** $\equiv M_T$ is $\rightarrow \frac{1}{M_T} = \frac{2}{m_u} + \frac{1}{m_d} = \frac{2.10^{30}}{8,9133} + \frac{10^{30}}{10,696} =$

$= \frac{30,305243.10^{30}}{95,336656} = \frac{10^{30}}{3,1458799}$ and , $M_T = 3,1458799.10^{-30}$ Kg . ……(1)

The System Total- Harmonic-Charge $\equiv Q_T \equiv 2.q_u + q_d = 2.(2/3).e - (1/3)\ e = +\frac{3}{3}\ e =$

$+ 1,6022.10^{-19}$ C , and the **System-Resonance-Charge** $Q_T = + 1,6022.10^{-19}$ C ….(2)

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

Frequency Unit-Cave is the Stationary-System becoming from Kepler second Planetary-law equation , $4\pi^2 m\, f^2_o = k$, and constant law of Areas $1 = k\,.f^2_o\, a^3$. Their common k , is the Constant-Energy $\rightarrow k = 4\pi^2 m\, f^2_p = \frac{1}{f^2_p\, a^3}$ or , $f^4_p = \frac{1}{4\pi^2 m a^3}$ and $f_p = \sqrt[4]{\frac{1}{4\pi^2 m.a^3}}$, so the frequency becoming from this equal Resonance-Energy is the one Mass frequency and is

$f_{2u\rightarrow d} = \sqrt[4]{\frac{1}{4\pi^2 m.a^3}} = \sqrt[4]{\frac{1}{4\pi^2 3,1458799 .10^{-30}(5.10^{-19})^3}} = \sqrt[4]{805,18982.\,10^{80}} = 5,3269.10^{20}$ H

The System`s Energy is $E_{2u\rightarrow d} = h.f_{2u\rightarrow d} = 6,62606957.10^{-34}\,.\,5,3269.10^{20} = 35,29641.10^{-14}$ Joules $/\, 1,6022.10^{-19}$ C $= 22,029965.10^5$ eV $= \mathbf{2,2029965}$ **MeV** ….(3)

The Magnetic-fields laws for Charges and Periods are, $\mathbf{T} = \frac{2\pi.m_T}{q.\overline{B}_F}$, $\overline{B}_F = \frac{2\pi.m_T}{q\,.T} = \frac{|2\pi.m_T|}{Q_T}$ f

$\mathbf{so} \rightarrow \overline{B}_F = \frac{|2\pi.m_T|}{Q_T}\,\mathbf{f_{2u\rightarrow d}} = \frac{2\pi.[3,1458799.10^{-30}]5,3269.10^{20}}{1,6022.10^{-19}}$ (Kg/Cs) $= \mathbf{65,7.10^9}$ Tesla. ….(4)

From Energy-Relation W $=2E= B$ w $= J.w^2$, or $\mathbf{2E = 2\pi\, f\, B}$ then **Total -Spin*Frequency**

$\overline{B}\,\mathbf{f} = \frac{E}{g}$, and $E = \overline{S}.g.f = 5,691952.10^{-34}\{Kg/m/s\}.g.[\,5,3269.10^{20}$ H$]/1,6022.10^{-19} = 1,8562244.10^6$ eV $= \mathbf{1,85622}$ MeV , **i.e. the Energy produced from total System-Spin** .

From Planck`s length $\mathbf{a} = \sqrt[3]{\frac{k}{f^2}}$ then $\mathbf{k} = a^3.f^2$, and since **Energy** $E = k$ then Cave $\mathbf{a} = \sqrt[3]{\frac{E}{.f^2}}$

or $\rightarrow \mathbf{a} = \sqrt[3]{\frac{E}{f^2}}$, $= \sqrt[3]{\frac{[22,029965.10^5\,]}{(5,3269.10^{20})^2}} = \sqrt[3]{7,763628.\,10^{-36}} = 1,98010509.10^{-12}$ m .

The **Weak Forces , W^+Z^+,** in System is the Coulomb`s Force $\rightarrow [u+u] > [d] \equiv [\frac{4}{3}\frac{1}{3}+W^+Z^+]$ which may be calculated from the Time needed , for Harmonic-mass to vibrate in cave **r** ,

from Energy equation $\mathbf{r} = \frac{m.v}{q.B} = \frac{[3,1458799.10^{-30}\,Kg].2,9978.10^8}{1,6022.10^{-19}.[65,7.10^9]} = \mathbf{8,959064.10^{-14}}$ m ….(5)

and for Weak Forces **, W^+Z^+,** in cave $\mathbf{d = 10^{-14}}$ m then Period $\mathbf{T} = \frac{d}{c} = \frac{8,959064.10^{-14}m}{[2,998.10^8 m/s\,]} =$

$= \mathbf{2,9883468.\,10^{-22}}$ **s** , and The produced Energy in **d** , is $\rightarrow \mathbf{E_{W^+Z^+}} = \underline{h}\,/\,T =$

$= \frac{1,055.10^{-34}\,J.s}{2.[\,2,9883468.10^{-22}s].[1,602.10^{-19}\,J/eV\,]} = 1,10173.10^6$ eV $\equiv \mathbf{1,102\,MeV}$ ….(6) and from Coulomb

Force $F_C = \frac{C.Q}{r^2}$ and Voltage $V_C = \frac{C.Q}{r}$, then **Force** $[F_C]$ x **Cave** $[r]$ = **Voltage** $[V_C]$ $\rightarrow$ so

Weak-Forces $\mathbf{W^+Z^+} = [\frac{E_{W^+Z^+}}{r}] = \frac{1,1017.10^6}{8,959064.10^{-14}} = \mathbf{1,229736.10^{19}}$ eV...(7) or from Weak-Forces

$\mathbf{W^+Z^+} \equiv [\frac{h\,/\,T}{2.r}] \equiv [\frac{h.c/\,d}{2.r}] \equiv \frac{h.c}{2.d.r} \equiv [\frac{h.c}{2e.r^2}]$ eV $= \frac{1,055.10^{-34}\,J.[2,998.10^8 m/s\,]}{2.[1,602.\frac{10^{-19}J}{eV}.[8,95906.10^{-14}]^2]} = \mathbf{1,2297.10^{10}}$ eV

Remarks :

a.. The Mass and Charge of Primary-Particles is measured in eV and is changed to Kg.

b.. The Harmonic-Resistor-Connection Mass M_T follows the Ohm`s Inverse-Resistance law.

c.. The System of Masses and Charges is transformed to an-Resultant-mass Oscillating System.

d.. The System`s-Frequency follows Kepler-Planetary-laws and Plank`s Energy . Coulomb laws are for measuring the Magnetic fields , circular Orbits and Forces .

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

NEUTRON is→ [d d u] $\equiv$ [$-\frac{1}{3} -\frac{1}{3} +\frac{2}{3}$ +W⁻] $\equiv$ (0 |**W⁻Z⁰**) **= Two d-Quarks and One u-Quark.**

Interaction of Down-Quark **d** , and Down-Quark **d** , is → **d d** $\equiv$ [$-\frac{1}{3} -\frac{1}{3}$+**W⁻**]$\equiv \Sigma\ _{P_A > P_A}^{[d+d]}$ and

the Summation of Down-Quarks [d + d] of Cave P_A , **Is attacked** << by the , Up-Quark

[u $=+\frac{2}{3}$] in Cave D_A Of STPL as relation (v) **,** creating the Destructive-Interference as

[$\oplus \to \ominus$ = 0] $\equiv$ [$+\frac{2}{3} -\frac{2}{3}$ +**Z⁰**] or ,CI $_{-0-}^{-\to -}$ $\equiv$ [W⁻] + DI $_{-0-}^{+\to -}$ $\equiv$ **Z⁰** and [d d u] $\equiv$ (0 |**W⁻Z⁰**)

The Process from measurements ,

1… DATA .

The Down-Quark-mass $\mathbf{m_d}$ = 10,7.10^{-30}Kg , Charge $\mathbf{q}$ $_d$ = [$-\frac{1}{3}$].1,602.10^{-19} C,

mean-Diameter **a** = 5,0.10^{-18} m . Up-Quark mass $\mathbf{m_u}$ = 8,91.10^{-30} Kg ,

Charge $\mathbf{q}$ $_u$ = [$+\frac{2}{3}$].1,602.10^{-19} C , Diameter **a** = 5,0.10^{-17} m ,

From $\mathbf{m_d}$ = 6,0.10^6 eV/c² → (17,826614. 10^{-37}) .6.10^6Kg = 10,695968.10^{-30} Kg

$\mathbf{m_u}$ = 5,0. 10^6 eV/c² → (17,826614. 10^{-37}). 5.10^6Kg = 8,913307.10^{-30} Kg

2… THE SYSTEM .

The three Particles are three Waves { y_1= cos(kx-wt , y_2= cos(kx-wt , y_3= cos(kx-wt+δ) }

where , **δ ,** is the Phase difference , **k** is the wave number , **x** is the wave Position and , **t** is

the time which Interact as **One-Harmonic-mass-Resistor-System** as → [$y_1+y_2 \to y_3$]

The System Total-Harmonic-**Mass** $\equiv M_T$ is → $\frac{1}{M_T} = \frac{2}{m_d} + \frac{1}{m_u} = \frac{2.10^{30}}{10,696} + \frac{10^{30}}{8,9133}$ =

= $\frac{28,522108.10^{30}}{95,336656} = \frac{10^{30}}{3,3425529}$ and , M_T = 3 ,3425529 .10^{-30} Kg . …….(1)

The System Total- Harmonic-Charge $\equiv Q_T \equiv$ 2.q_d + q_u = 2.(-1/3).e + (2/3) e = 0 e ,

and the **System-Resonance-Charge** Q_T = 0 C ….(2)

Frequency Unit-Cave is the Stationary-System becoming from Kepler second Planetary-law

equation , 4 π² m f ^2_o = k , and constant law of Areas 1 = k .f ^2_o **a³** . Their common k , is the

Constant-Energy → k = 4 π² m f ^{2}$_p$ = $\frac{1}{f^2_p \ a^3}$ or , f ^{4}$_p$ = $\frac{1}{4\pi^2 m a^3}$ and f $_p$ = $\sqrt[4]{\frac{1}{4\pi^2 m.a^3}}$, so

the frequency becoming from this equal Resonance-Energy is the one Mass frequency and is

f $_{2u \to d}$ = $\sqrt[4]{\frac{1}{4\pi^2 m.a^3}}$ =$\sqrt[4]{\frac{1}{4\pi^2 3,3425529,.10^{-30}(5.10^{-19})^3}}$ = $\sqrt[4]{606,25053.10^{80}}$ = 4, 962072.10^{20} H

The System`s Energy is **E** $_{2d \to u}$ = h.f $_{2d \to u}$ = 6, 62606957.10^{-34} . 4,962072.10^{20} =

32,879031.10^{-14} Joules / 1,6022.10^{-19} C = 20,521177.10 ^{5} eV = **2 , 0521177 MeV** ….(3)

Lorentz Force F = q.($\overline{v}$ x $\overline{B}$) shows that + q charges turn Right while –q charges turn Left .

The Magnetic-fields laws for Charges and Periods are, **T** = $\frac{2\pi.m_T}{q.\overline{B}_F}$, $\overline{B}_F = \frac{2\pi.m_T}{q .T} = \frac{|2\pi.m_T|}{Q_T}$ f

so → $\overline{B}_F = \frac{|2\pi.m_T|}{Q_T}$ **f** $_{2d \to u}$ = $\frac{2\pi.[3,34255 .10^{-30}]4,962072.10^{20}}{1,6022.10^{-19}}$ (Kg/Cs) = **409 .10 ^{9}** Tesla. ….(4)

From Energy-Relation W =2E= B w = J.w² , or **2E = 2π f B** then **Total -Spin*Frequency**

$\overline{B}$ **f** = $\frac{E}{g}$, and E = $\overline{S}$.g.f = 5,691952.10^{-34}{Kg/m/s}.g.[4,962072.10^{20} H]/1,6022.10^{-19} =

17,289721.10 ^{6} eV = **17 , 289** MeV , **i.e. the Energy produced from total System-Spin** .

From Planck`s length **a** $=\sqrt[3]{k/f^2}$ then **k**= a³.f² ,and since **Energy** E =k then Cave **a** $=\sqrt[3]{E/f^2}$

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

or $\rightarrow$ $\mathbf{a} = \sqrt[3]{\dfrac{E}{f^2}}$, $= \sqrt[3]{\dfrac{[17,289721.10^{\,5}\,]}{(4,962072.10^{20})^2}} = \sqrt[3]{7,0220166.10^{-36}} = 1,91493462.10^{-12}$ m .

The **Weak Forces , $\mathbf{W^- Z^o}$,** in System is the Coulomb`s Force $\rightarrow$ [d+d] > [d] $\equiv [-\frac{2}{3}+\frac{1}{3}+W^-Z^o]$ which may be calculated from the Time needed , for Harmonic-mass to vibrate   in cave $\mathbf{r}$,

from Energy equation $\mathbf{r} = \dfrac{m.v}{q.B} = \dfrac{[3,3425529.10^{-30}\ Kg].2,9978.10^{\,8}}{1,6022.10^{-19}.[409.10^{\,9}]} = \mathbf{1,52911.10^{-14}}$ m ….(5)

and for Weak Forces , $\mathbf{W^- Z^o}$, in cave $\mathbf{d = 10^{-14}}$ m then Period $\mathbf{T} = \dfrac{d}{c} = \dfrac{1,52911.10^{-14}m}{[2,998.10^8 m/s\,]} =$

$= \mathbf{5,100773\ .10^{-23}}$ s , and The produced Energy in $\mathbf{d}$, is $\rightarrow$ $\mathbf{E_{W^-Z^o}} = \underline{h}\,/\,T =$

$= \dfrac{1,055.10^{-34}\ J.s}{2.[\,5,100773.10^{-23}s].[1,602.10^{-19}J/eV]} = 6,4554113.10^6$ eV$\equiv$ **6,455 MeV** ….(6) and from Coulomb

Force $F_C = \dfrac{C.Q}{r^2}$ and Voltage $V_C = \dfrac{C.Q}{r}$, then   **Force** $[F_C]$ x **Cave** $[r]$ = **Voltage** $[V_C]$ $\rightarrow$ so

Weak-Forces $\mathbf{W^- Z^o} = [\dfrac{\mathbf{E_{W^-Z^o}}}{r}] = \dfrac{6,4554.10^{\,6}}{1,52911.10^{-14}} = \mathbf{4,22141.10^{\,20}}$ eV ….(7) or from Weak-Forces

$\mathbf{W^- Z^o}\ \equiv\ [\dfrac{h\,/\,T}{2.r}] \equiv [\dfrac{h.c/\,d}{2.r}] \equiv \dfrac{h.c}{2.d.r} \equiv [\dfrac{\mathbf{h.c}}{\mathbf{2e.r^2}}]$ eV $= \dfrac{1,055.10^{-34}\ J.[2,998.10^8 m/s\,]}{2.\left[1,602.\frac{10^{-19}J}{eV}.[1,52911.10^{-14}]^2\right]} = \mathbf{4,22141.10^{\,20}}$ eV

Since [d d u] Summation occupy the **Zero-Constructive-Interference** therefore is Stable and Forces (W^-, Z^o) are equal and opposite as , > [W^- + Z^o = 0] $\equiv [\ominus \leftarrow \oplus \rightarrow \ominus\,]$<

Reams $\boldsymbol{\pi^+} \equiv (-1|W^-)$, $\boldsymbol{\pi^-} \equiv (+1|W^+)$, $\boldsymbol{\pi^o} \equiv 2.Z^o \equiv 2\gamma$, and $\mathbf{p} \equiv (+1|W^+Z^+)$

For 3-Combinations $\rightarrow$ [u u u] $\equiv [+\frac{2}{3}+\frac{2}{3}+\frac{2}{3}+W^+] = [\frac{4}{3}+W^+ +\frac{2}{3}+\ W^+] \equiv (+2|W^{++}) \equiv \boldsymbol{\Delta^{++}}$ and $\{\boldsymbol{\pi^-}\}+\{\ \mathbf{p}\ \} \equiv (+1|W^+)+(+1|W^+Z^+)\ =\ (+2|W^{++}Z^+) = (+2|W^{++}[Z^+]) = (|\Delta^{++}|Z^+|)$

i.e. $\boldsymbol{\Delta^{++}}$ Particle Decays to $\{\boldsymbol{\pi^-} + \mathbf{p}\ \}$ **through** The-Destructive-Interference-Force $\rightarrow [Z^+]$.

For 3-Combinations $\rightarrow$ [d d d] $\equiv [-\frac{1}{3}-\frac{1}{3}\frac{1}{3}+Z^-] \equiv (\mathbf{-1}\,|W^{--}Z^o) \equiv (-1|W^-)+(0|W^-Z^o) = \boldsymbol{\Delta^-}$
For 3-Combinations $\rightarrow$ [$e^-e^-\ e^-$] $\equiv$ [-1-1-1+Z^o] $\equiv$ $(-2\,|W^{--} - \mathbf{1}\,) \equiv (-3\,|W^{--}\ W^-)$
For 3-Combinations $\rightarrow$ [$\nu_e \nu_e \nu_e$] $\equiv$ [-0-0-0+Z^o] $\equiv$ ($0\,|Z^o - \mathbf{0}) \equiv$ ($0\,|\mathbf{Z^o\ Z^o}$)

For 3-Combinations $\rightarrow$ [s s s] $\equiv [-\frac{1}{3}-\frac{1}{3}\frac{1}{3}+Z^-] \equiv (\mathbf{-1}\,|W^{--}Z^o) \equiv (-1|W^-)+(0|W^-Z^o) = \boldsymbol{\Omega^-}$
For 3-Combinations $\rightarrow$ [d s s] $\equiv [-\frac{1}{3}-\frac{1}{3}\frac{1}{3}+W^-] \equiv (\mathbf{-1}\,|W^{--}\,) \equiv (-1|W^-Z^o)\ \equiv \boldsymbol{\Xi^-} \equiv\ \boldsymbol{\Omega^-}$

<u>Using above Reams , then All Elementary and Composite Particles are defined .</u>

Charged-Pions $\rightarrow \boldsymbol{\pi^+} \equiv (-1|Z^-) \equiv (+1|Z^-)$, $\boldsymbol{\pi^-} \equiv (+1|W^+) \equiv (1|Z^o)$, $\boldsymbol{\pi^o} \equiv 2.Z^o \equiv 2\gamma$,

Proton $\rightarrow \mathbf{p}\ \equiv\ (+1|W^+Z^+)$, *Stability is* > $[\oplus \rightarrow \ominus \leftarrow \oplus]$

Neutron $\rightarrow \mathbf{n}\ \equiv\ (\,0\,|W^-Z^o\,)$, *Stability is* > $[\ \ominus \leftarrow \oplus \rightarrow \ominus\ ]$

Delta $\rightarrow \boldsymbol{\Delta^{++}} \equiv (+2|W^{++}Z^+)\ \equiv\ (+1|W^+)+(+1|W^+Z^+) \equiv\ \boldsymbol{\pi^-} + \mathbf{p}$

Delta $\rightarrow \boldsymbol{\Delta^+}\ \equiv$ [u u d] , $\boldsymbol{\Delta^o}\ \equiv$ [u d d] ,

Delta $\rightarrow \boldsymbol{\Delta^{--}} \equiv (-1|W^{--}Z^0)\ \equiv\ (-1|W^-)+(0|W^-Z^o)\ \equiv\ \boldsymbol{\pi^+} + \mathbf{n}$

Omega $\rightarrow \boldsymbol{\Omega^-}\ \equiv\ (-1|W^{--}Z^0)$, Xi $\equiv (-1\,|W^{--}\,) \equiv (-1|W^-Z^o)$

THE STPL FORCES AND PARTICLES GENERATOR

CHARGES CLIP ⇄ LEPTONS AND THEIR COMPOSES IN STPL Caves P A , P B , P C , & Caves D A , D B , D C , THROUGH THE Constructive & Destructive Interference of Defined Range and Voltage IN BOSON`S -VOLTAGE

Anti-Part	Particles	Leptons - 1	
$e^+ \triangleright [P_A]$	$e^- = -1$	**Leptons.cave [m]** $10^{-17} > d > 10^{-19}$	
$\mu^- \triangleright [P_B]$	$\mu^+ = -1$		
$\tau^- \triangleright [P_C]$	$\tau^+ = -1$	**Netrino. cave [m]** $10^{-18} > d > 10^{-21}$	
$\overline{Ve} \triangleright [D_A]$	$Ve = -0$		
$\overline{V\mu} \triangleright [D_B]$	$V\mu = -0$		
$\overline{V\tau} \triangleright [D_C]$	$V\tau = -0$		

Constructive [⊕ x ⊕ = ⊕⊕] = CI⁺ = **W⁺**
Interference
Constructive [⊖ x ⊖ = ⊖⊖] = CI⁻ = **w⁻**
Interference
Constructive [⊕ x ∅ = ⊕⊕] = CI⁺⁺ = **w⁺⁺**
Interference
Destructive [⊕ x ⊖ = 0+] = DI⁺ = **Z⁺**
Interference
Destructive [⊕ x ⊖ = 0] = DI° = **Z°**
Interference
Destructive [⊕ x ⊖ = 0-] = DI⁻ = **Z⁻**
Interference

Z Range R ⟩→≫
$$R = \frac{c.h - (m)}{2E}$$
⊕ ATTACKS ⊖ IN STANDING WAVE - NODES

		Baryons - 3	
	p	**Barions = 3 - Quarks Composite**	
	n		
	Λ		
	Ω		

CHARGES CLIP ⇄ QUARKS AND THEIR COMPOSES IN STPL Caves P A , P B , P C , & Caves D A , D B , D C , THROUGH THE Constructive & Destructive Interference of Defined Range and Voltage IN BOSON`S VOLTAGE

$\overline{u} \triangleright [D_A]$	$u = +2/3$	**Quarks - 1**	
$\overline{d} \triangleright [P_A]$	$d = -1/3$		
$\overline{c} \triangleright [D_B]$	$c = +2/3$	**Quark. cave in [m]** $10^{-18} > d > 10^{-19}$	
$\overline{S} \triangleright [P_B]$	$S = -1/3$		
$\overline{t} \triangleright [D_C]$	$t = +2/3$	**Composite.cave in [m]** $10^{-14} > d > 10^{-15}$	
$\overline{b} \triangleright [P_C]$	$b = -1/3$		

THE **4 - FORCES** MOULD AS THE **TWO WAVELENGTH NODES** OF , + ⊕ SPACE , AND , - ⊖ SPACE , IN THE STANDING AND THE MOVING WAVES

C ⟩→≫ + Space
D ⟩→≫ - Space
ABCDEF ⟩→≫
E Current
AGCDF ⟩→≫
M Current

Wavelength λ = 2 r
⊕ = + Charge   ⊖ = - Charge

		Measons - 2	
	π	**Measons.cave in [m]** $10^{-16} > d > 10^{-17}$	
	K		
	B-zero		
	Eta-C		

Figure - 31 - : The [STPL] line Voltage-Machine Producing the **Forces** as **Material-Points** Joining the Elementary-Particles in an Higher to a Lower Voltage :

1.. The Constructive and Destructive Interference between Wave-Particles-System Regulates the Voltage , *the free energy motion ≡ \binding Energy* , in Nucleus or other Caves .

2.. When the Binding Energy of any Two Particles ≡ The-motion of ⊕ to ⊖ is as ,

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

$\oplus \rightarrow \ominus \gg 0 \;\equiv\;$ **Stable-System** $\rightarrow$XB   A$\leftarrow$ -----C-----0+++X++$\rightarrow$ B

$\oplus \rightarrow \ominus \ll 0 \;\equiv\;$ Un-Stable-System $\leftarrow$CA

$\oplus \rightarrow \ominus \approx 0 \;\equiv\;$ Radioactive-System $\leftarrow$0X=0C$\rightarrow$

For Deuterium $_1^2\text{H} \equiv \mathbf{p} + \mathbf{n} \equiv$ - p + n − p = - p + $(0\,|\text{W}^-\text{Z}^\text{o})$-$(1\,|\text{W}^+\text{Z}^+)$ **=** - p + $(-1\,|\text{W}^-\text{W}^+\text{Z}^+\text{Z}^\text{o})$= -p +$(-1\,|\text{Z}^+\text{Z}^\text{o})$ = -p +$(-1\,|\text{Z}^+)$+$(0|\text{Z}^\text{o})$ = -p+$[\text{e}^-\overline{\mathbf{v_e}}]$ +$(0|\text{Z}^\text{o})$ = - p + $[\text{e}^-\overline{\mathbf{v_e}}]$ + $[\text{e}^-\text{e}^+]$ = - p + 2e$^-$+ $[\overline{\mathbf{v_e}}$ +e$^+]$ = **- p + 2e$^-$+ $\overline{\mathbf{v_e}}$ + [e$^+$]** …….(D)

Initial $\mathbf{D} =_1^2\text{H} \equiv \mathbf{p} + \mathbf{n} \equiv$ $(1\,|\text{W}^+\text{Z}^+)$ + $(0\,|\text{W}^-\text{Z}^\text{o})$ = $(\mathbf{1}\,|\mathbf{Z^+Z^o})$ = $(1|\text{Z}^+)$ + $(0|\text{Z}^\text{o})$ = = $[\text{e}^-\overline{\mathbf{v_e}}]$ + $[\text{e}^-\text{e}^+]$ = 2e$^+$+e$^-$+ $[\overline{\mathbf{v_e}}]$ = 2e$^+$+ $[\text{e}^-+ \overline{\mathbf{v_e}}]$ = 2e$^+$+$(-1|\text{Z}^-)$ …….(D)

From relation $_1^2\text{H} \equiv (1\,|\text{Z}^+\text{Z}^\text{o}) \gg 0$ is seen that Deuterium is an Stable-System although its bound is Weak . The Relation $\mathbf{p} \equiv (1\,|\text{W}^+\text{Z}^+)$ shows that W-Boson is the only force via which Particles can transform . In Hydrogen cave , Voltage = $\frac{\text{k.e}^2}{\text{r}}$ eV , and for Deuterium

$\mathbf{V_{p+n}} = \frac{[9.10^9.].[1,6022.10^{-19}]^2}{1,0.10^{-15}.[1,6022.10^{-19}]}$ =14,42.10^5 eV = 1,442 MeV which is Resonance Voltage .

i.e. in order to shift the Nucleons of a Deuterium into a Proton Spin-pair would require an extra input of 1,442 MeV , so **Proton paired with a Neutron is Stable** . The **Proton`s** Charge distribution is all Positive as $\mathbf{p} \equiv \mathbf{[u\ u\ d\ ]} \equiv (\mathbf{+1\,|W^+Z^+})$ , while the Neutron`s $\mathbf{n} \equiv \mathbf{[d\ d\ u\ ]} \equiv (\mathbf{0\,|W^-Z^o})$

The Stability of the Compound Particles :

From Coulomb-Energy equations issues , **Force** [F$_C$] x **Cave** [r] = **Voltage** [V$_C$] because Force $\text{F}_C = \frac{\text{C.Q}}{\text{r}^2}$, Voltage $\text{V}_C = \frac{\text{C.Q}}{\text{r}}$, meaning that Voltage , *Potential Energy* , in a cave defines the Strength of the Force included , since Gravitational constant, *the Newton`s-Force,* $\text{G} \equiv \Phi^2. \left[\{\sigma\ \Phi\} \equiv 2\pi f_P\ \text{r} \equiv \frac{2B}{\pi r^3} \equiv \text{w r} \equiv \overline{v} \equiv \text{ma} \equiv \text{m g} \equiv \overline{c}\ \right]$ can be expressed in all Spectrum.

Voltage $\text{V}_C \equiv \int_\infty^r \frac{q_1 q_2}{4\pi\varepsilon.r^2} = \frac{q_1 q_2}{4\pi\varepsilon.r}$ while Force $\text{F} = \frac{q_1 q_2}{4\pi\varepsilon.r^2}$ and $\text{V}_C \equiv \text{r F}_C$ ….(q) i.e.

In any cave , r , exists a Voltage V_C , and in which a Force F_C .

From Mechanics **Energy** $\text{E} = \frac{mv^2}{2}$ is dependent on mass and velocity-squared , and equal to Coulomb equation $\text{E} = q\,\text{V}_C$ dependent on Charge , q , and Voltage of Area or Volume.

Equating Energy then $\text{E} = \frac{mv^2}{2} = q\,\text{V}_C = \text{h f} = \frac{h}{T} = \frac{h}{r/v} = \frac{h}{2\lambda/v} = \frac{h.v}{2\lambda} = \frac{h.v}{4r}$, and $\rightarrow \mathbf{m\ v} = \frac{\mathbf{h}}{\mathbf{2r}}$,

$\mathbf{v} = \frac{\mathbf{h}}{\mathbf{2.m.r}} = \frac{\mathbf{h}}{\mathbf{m.\lambda}}$ …..(1) and Voltage $\text{V}_C = \frac{mv^2}{2.q}$ …..(2) . Placing (1) to (2) then becomes ,

$\text{V}_C = \frac{mv^2}{2.q} = \frac{m.h^2}{2m^2.\lambda^2.q} = \frac{m.h^2}{2q.m^2.\lambda^2} = \frac{h^2}{2.q.m.\lambda^2}$, or Voltage $\mathbf{V_C} = \frac{\mathbf{h^2}}{\mathbf{2.q.m.\lambda^2}}$, related to inverse squared cave $\lambda = 2r$, the Charge and mass .

Example 1 : For q = e = (1,602.10^{-19}C) , m $_p$= 3,3425529 .10^{-30} Kg , and wavelength $\lambda = 2r = 6.10^{-12}$ m , then Velocity of Proton $\text{v}_p = \frac{h}{m.\lambda} = \frac{6,626.10^{-34}\ \text{J.s}}{3,3425529.10^{-30}.[6.10^{-12}]} = 0,3303861.10^8 = 3,303861.10^7$ m/s , a velocity near light velocity .

Voltage of Cave is equal to the Kinetic Energy of Proton , $\mathbf{V_p} = \frac{3,3425529\ .10^{-30}.[3,964634.10^7]^2}{2.[1.6022.10^{-19}]} = 1,1386102$ Volt , or from $\mathbf{V_p} = \frac{\mathbf{h^2}}{\mathbf{2.q.m.\lambda^2}} = \frac{[6,626.10^{-34}]^2}{2[1.6022.10^{-19}]3,3425529.10^{-30}[6.10^{-12}]^2} = \mathbf{1,1386\ Volt}$.

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Example 2 :

Because the Wavelength of Particles in caves changes inversely to the velocity , so occupies Lower values when reaching light velocity , therefore its Energy increases and becomes greater than that of Voltage , *it is an Unstable-cave* , in Cave and when it is equal becomes , an *Radioactive cave* . If This Potential of caves is measured with light-velocity **c** , as equation $c = \frac{h}{m.\lambda}$, and m $= \frac{h}{c.\lambda}$ so $\rightarrow$ E $= \frac{mc^2}{2} = q\,V_C = \frac{h}{c.\lambda}[\frac{c^2}{2}]$, or $V_C = \frac{h}{2.q.\lambda}[\frac{c}{1}] = \frac{h.c}{2.q.\lambda}$, then Voltage is

$V_C = \frac{6,626.10^{-34}.[2,998.10^8]}{2.[1.6022.10^{-19}]6.10^{-12}} = \mathbf{1,0332016.10^5}$ Volts , i.e. **increases** $\mathbf{10^5}$ times .

With this way starting energy qV_C is converted to the final form h f , and is an **Stable-System** of an accelerated single elementary charge like that of electron or composite Proton , through a Potential given in Volts then their energy in eV have the same numerical value .Thus 50-kV Potential generates 50 k-eV electrons which in turn can produce Photons with a maximum energy of 50keV. This **accelerating-Potential** happens because of the Voltage increasing .

Equating the Lorentz and Nutation-Force in a   Cave $\equiv$ Magnetic-field , then becomes

$\rightarrow$ **Charge** $\overline{q} = Q_+ = [\frac{g.S}{2\pi r^2}] \leftarrow$ which originates the [$\oplus$] Forces as ,

a).. Lorentz-Force $\rightarrow$ $F_L = \overline{q}\ \overline{v}x\overline{B}_F = 2\pi.\overline{q}\overline{v}.[\frac{.f=1}{g}] \leftarrow$ where Magnetic-Field $\overline{B}_F = [\frac{2\pi.m}{Q_+}].f$

b).. Nutation-Force $\rightarrow$ $F_N = [\frac{\overline{v}.S}{r^2}] \leftarrow$ where   Spin **S** , is in , **r** cave .   Equating

$F_L = \overline{q}\ \overline{v}x\overline{B}_F = 2\pi.\overline{q}\overline{v}.[\frac{.f=1}{g}] = F_N = [\frac{\overline{v}.S}{r^2}]$, from where $\rightarrow$ Charge $\overline{q} = Q_+ = [\frac{g.S}{2\pi r^2}]$.

3.. It was shown [82] that Monads $\equiv$ Quaternions consist of the Real and Imaginary-Part as $z^{1/w} = [s + \overline{v}\,\nabla i]^{1/w} = |z_o|^{-w} \cos(\varphi + 2k\pi)/w + i.\sin(\varphi + 2k\pi/w)] \equiv |z_o|^{-w}.e^{-i.(\varphi+2k\pi).wt} \equiv$

$|z_o|^{-w}.\cos(\varphi+2k\pi) + i.\ |z_o|^{-w}.\sin(\varphi+2k\pi) \equiv x + i.y$ ……...(a)

where z^w=The Space , and $z^{1/w} = z^{-w}$ The Anti-space of Monad $\equiv$ Quaternion $\overline{AB}$.

Above equations define the Wave-nature of monads in all Levels or Sub-levels .

From above monads $(s + \overline{v}\,\nabla i)^{1/w} = |z_o|^{-w}.e^{-i.(\varphi+2k\pi).w}$, where $\cos\varphi = s / |z_o|$ and for *the Rotated Energy case* , where   s = 0 and $\cos\varphi = 0$, exists for angle $\varphi = \pi/2$ quaternion $(s + \overline{v}\,\nabla i)^{1/w}$ *as dimension power* $\rightarrow$ **w = b** $\leftarrow$ *and for* **k = 1** becomes ,

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

Equation (b) fits , *as minimum* , in the Planck length and is $L_p = e^{-i.(5\pi/2).10}$ …...(c)

Equation (c) is the smallest **Energy-Unit of Space** ,and this because of **s = 0 and k = 1** It was shown [31] that Space and Energy is quantized and measured on the two Constant and Natural numbers   , e , π , where for base the natural logarithm , e , and exponent the decimal base , b = 10 .

From $\rightarrow$ $z^{1/w} = (s + \overline{v}\ \nabla i)^{1/w} = |zo|^{-w}.[\cos.(\varphi + k\pi)/w + i.\sin.(\varphi + k\pi)/w] =$

$= |zo|^{-w}.e^{-i.(\varphi+k\pi).w}$, where for $\cos.(\varphi+k\pi)/w = 0$

exists only the **Imaginary-Part** of monad , $(\overline{v}\,\nabla i) \neq 0$, where $\varphi = \pi/2$ and then ,

$z^{1/w} = |zo|^{-w}.e^{i.(\varphi+k\pi)/w} = e^{-i.(\frac{\pi}{2}+k\pi).10}$ and it is the *Diffraction Energy mechanism*

while for **minimum-Space**   r $= e^{-i.(\frac{\pi}{2}).b} = 0$, 207879576.b = 1,507019.10^{-7} m

for all Space Levels of quantization which are , **The Energy Particles only**   i.e.

The Energy particles in Stationary caves as $z^{1/w} = |zo|^{-w}.L\,v$ = Energy Monads .

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Extending Quantization of Energy according to exponential formula , $\mathbf{L_v = e^{-i.(5\pi/2).10}}$

on the decimal base b = 10   then for k = ± 1 →   ± ∞ , are found the Energy caves as

For base e = 2,71828 and base b = 10 then e^ - (15,707963) = 1, 507 .10^{-7} m

which is the Space-Part as $\mathbf{L_S = e^{i.(-\pi).b}}$ = $\mathbf{e^{-i(-31,41593)}}$ = 2 , 27110104 .10^{-14} m

For base e = 2,71828 and base b = 10 then e^ - (47,123889) = 3, 42259 .10^{-21} m

For base e = 2,71828 and base b = 10 then e^ - (62,831853) = 5, 15790 .10^{-28} m

For base e = 2,71828 and base b = 10 then e^ - (78,5398) = 7, 7730546 .10^{-35} m

or $e^{-.(78,5398)}$= **8, 906**.10^{-35} m = { $\sqrt{3}.\pi.$ **1,616199**.10^{-35} m } ≡ $\mathbf{L_P}$ = Planck`s Length

For base e = 2,71828 and base b = 10 then e^ - (109,95574) = 1, 76534 .10^{-48} m

For base e = 2,71828 and base b = 10 then e^ - (141,37166) = 4, 00929 .10^{-62} m

i.e.   The **min**imum   **Energy-cave** for the   **Primary-Particles** is that of $\mathbf{10^{-21}}$ **m**   while

The **max**imum   **Energy-cave** for the   **Primary-Particles** is that of $\mathbf{10^{-11}}$ **m** ,   and

The **min**imum-**1D-Space-cave** for the **Primary-Particles** is that of 1,507.$\mathbf{10^{-7}}$ **m**

The **min**imum-**2D-Space-cave** for the **Primary-Particles** is that of 2,271.$\mathbf{10^{-14}}$ **m**

The **min**imum -**3D-Space-cave** for the **Primary-Particles** is that of 3,423.$\mathbf{10^{-21}}$ **m**

or the 3D-cave → $\mathbf{0,3423.10^{-20}}$ **m** , in where The **Strong** and **Weak- Forces**

converge to one value → 12,4.10^{25} eV ≡ 12,4.10^{16} MeV ,

meaning that Forces are Quantized in their Energy-Caves which are Energy-monads , where

Weak - force is as $Q_+.r = [\frac{g.S}{2\pi r^2}] < 1.10^{17}$ GeV for amplitude $r → 10^{-16} < r < 10^{-11}$ m

Strong - force is as $Q_+.r = [\frac{g.S}{2\pi r^2}] > 1.10^{17}$ GeV for amplitude $r → 10^{-21} < r < 10^{-16}$ m

Strongest-force is $Q_{++}.r =[\frac{g.S}{2\pi r^2}] =1.10^{22}$ GeV for amplitude $r → 10^{-21} < r < 10^{-27}$ m

3... Hydrogen-CAVE → 1-Proton [⊕] , 1-**Electron** [⊖] , **1-Neutron** [⊕↻↻⊖] – [⊕↔⊖]

Hydrogen is→ [p n e] ≡ [$\frac{3}{3}$ +0-$\frac{3}{3}$ +W^+] ≡ (0 |$\mathbf{W^+Z^o}$) = One Proton and One Electron .

Interaction of Proton and Electron is → **p e** ≡ [$+\frac{3}{3}$ -$\frac{3}{3}$ +$\mathbf{W^+Z^o}$]≡$\mathbf{\Sigma}$ $_{\mathbf{e→}}^{[\mathbf{N_p+N_e}]}$ and the Summation of

Nucleus-Charges [p + n] of Cave N^{p+n}**, attacks >>** the Electron [e = -1] of Cave $H_{N↻e}$

creating Destructive-Interference [⊕↻⊖=0] ≡[+1-1+Z^o] or , CI $_+^+$ ≡[1|W^+]+DI $_{++}^{+→-}$ ≡ $\mathbf{Z^o}$

and [p n e] ≡ (0 | $\mathbf{W^+Z^o}$)= - 8,72.10^{-20} J = - 5,45.10^{-1} eV = - 0, 545 eV

The Process from measurements ,

1… DATA .

From $\mathbf{m_p}$ = Resonance M_{Tp}= 3,1458799.10^{-30} Kg ,

$\mathbf{m_e}$ = 0,511 eV= 0,511.[1,7826614.10^{-36}] = 9,109399.10^{-35} Kg

$\mathbf{m_n}$ = Resonance M_{Tn}= 3,3425529.10^{-30} Kg

The Atoms Total-Harmonic mass ≡ M_A is → $\frac{1}{M_A} = \frac{1}{m_P} + \frac{1}{m_n} + \frac{1}{m_e} = \frac{10^{30}}{3,146} + \frac{10^{30}}{3,343} + \frac{10^{35}}{9,109} =$

$\frac{10^{31}}{31,46}+\frac{10^{31}}{33,43}+ \frac{10^3.10^{31}}{0,9109}= \frac{105,17078.10^{35}}{958}$ and the **Total-mass** M_{N-E}= 9,10899.10^{-35} Kg ...(1)

The Total-Harmonic-**Nucleus-Charge** ≡ Q_T≡ q_p ± 0 = 1,6022.10^{-19} = 1,6022. 10^{-19} C

and the **System-Resonance-Charge** Q_N = 1,6022. 10^{-19} C   ……...(2)

The frequency of the Closed-Nucleus-Orbit-System becomes from Kepler second Planetary law equation , $4\pi^2 m\, f^2_o = k$, and constant law of Areas $1 = k \cdot f^2_o\, a^3$. Their common k ,

is Constant-Energy $\rightarrow k = 4\pi^2 m\, f^2_o = \frac{1}{f^2_o\, a^3}$ or , $f^4 = \frac{1}{4\pi^2 m a^3}$ and $f = \sqrt[4]{\frac{1}{4\pi^2 m.a^3}}$ ...(f)

With this way , *Impedance $\equiv$ Resistor* and $w_0 = 1$, the Resistor in the System is unaffected by the frequencies of Inductive and Capacitive Reactance and the Total-Resistance becomes as the above **m** $= M_T = 9,10899.10^{-35}$ Kg . The Resonance-Cave-frequency is as ....(f) ,

$f = \sqrt[4]{\frac{1}{4\pi^2 m.a_H^3}} = \sqrt[4]{\frac{1}{4\pi^2 9,10899.10^{-35}(2,1145016.10^{-11})^3}} = \sqrt[4]{2,941347.10^{64}} = 1,3095936.10^{16}$H..(3)

Coulomb-law issues between Nucleus and orbit diameter *Charges* d $=10^{-10}$ m , while Newton`s-law issues for all *masses* between Nucleus and Nucleus-Orbit d $=10^{-14}$ m .

The System $M_{N-E} =$ **masses** , $Q_N =$ **Nucleus-Charges creates the constant Magnetic-field**

$\overline{B}_F = |\frac{2\pi.M_T}{Q_T}|\, f = \frac{2\pi.9,10899.10^{-35}..[1,3099329.10^{15}]}{[1,6022.10^{-19}]}$ (Kg/C.s) = **46,793163** Tesla ...(4) i.e.

$\overline{B}_F =$ **46,793163** Tesla $\rightarrow$ *the Strength in an* **High-Magnetic-Laboratory** ,

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

Resonance-Cave **a** $= \sqrt[3]{T^2/g} = \sqrt[3]{1/g\, f^2} = \sqrt[3]{1/g\, [1,3095936.10^{16}]^2} = \sqrt[3]{0,594136.10^{-33}}$

$= 8,401675854.10^{-12}$ m , and the **Resonance - Energy** $E = \frac{1}{a^3}[\frac{4\pi^2}{c^2} + \frac{L^2}{2m}]$, where

L = the Spin S = $5,691952.10^{-34}$ {Kg/m/s} , System-mass $M_{N-E} = 9,10899.10^{-35}$ Kg ,

c $\equiv 2,998.10^8$ m/s **.** and **E** = [$1,4166682.10^{22}$] x [$4,3923448.10^{-16} + 1,7783703.10^{-33}$] = $6,2224952.10^6$ J $+ 2,5193606.10^{-11}$ J $\rightarrow 3,8837193.10^{25}$ eV $+ 1,5724382.10^{-30}$ J ....(E)

The **Strong Forces , W^+Z^o,** in System is the **Hydrogen** [p n e] $\equiv [\frac{3}{3} + 0 - \frac{3}{3} + W^+] \equiv (0\, |W^+Z^o)$ which may be calculated from the Time needed , for Harmonic-mass to vibrate in cave **r** ,

From Energy equation $r = \frac{m.v}{q.B} = \frac{[9,10899.10^{-35}\, Kg].2,9978.10^8}{1,6022.10^{-19}.[46,793163]} = $ **3, 642283.10^{-9}** m ....(5)

and for Weak Forces **, W^+Z^o,** in cave **d $=10^{-9}$** m then Period **T** $= \frac{d}{c} = \frac{3,642283.10^{-9}m}{[2,998.10^8 m/s]} =$

= **1,2149042.10^{-17}s** , and The produced Energy in Hydrogen cave **d** , is $\rightarrow$ **E $_{W^+Z^o}$** $= \underline{h}\, / T =$

$= \frac{1,055.10^{-34}\, J.s}{2.[1,2149.10^{-23}s].[1,602.10^{-19}J/eV]} = 0,2709965.10^2 \equiv$ **27, 10 eV** .....(6) and from Coulomb

Force $F_C = \frac{C.Q}{r^2}$ and Voltage $V_C = \frac{C.Q}{r}$, then **Force** [F_C] x **Cave** [r] = **Voltage** [V_C] $\rightarrow$ so

Nucleus-Forces **W^+Z^o** = $[\frac{E_{W-Z^o}}{r}] = \frac{27,09965}{3,642283.10^{-9}} =$ **7,4402922.10^{-9}** eV ...(7) or Strong-Forces

W^+Z^o $\equiv [\frac{h\,/\,T}{2.r}] \equiv [\frac{h.c/\,d}{2.r}] \equiv \frac{h.c}{2.d.r} \equiv [\frac{h.c}{2e.r^2}]$ eV $= \frac{1,055.10^{-34}\, J.[2,998.10^8 m/s]}{2.[1,602.\frac{10^{-19}J}{eV}.[3,642283.10^{-9}]^2]} =$ **7,4429.10^{-9}** eV

Neutron **n** $\equiv$ (0 |W^-Z^o) with Zero Charge , when is found in a Voltage **$V_r = F_c . r$** and then is executed on it the Weak Forces (0 |W^-Z^o) = - **7,4429.10^{-9}** eV **.**

4... The Gravitational constant $G \equiv \Phi^2$. [{$\sigma\, \Phi$} $\equiv 2\pi f_P\, r \equiv \frac{2B}{\pi r^3} \equiv$ w r $\equiv \overline{v} \equiv$ ma $\equiv$ m g $\equiv \overline{c}$]

11g... **The Periodic motion in all Displacements** :

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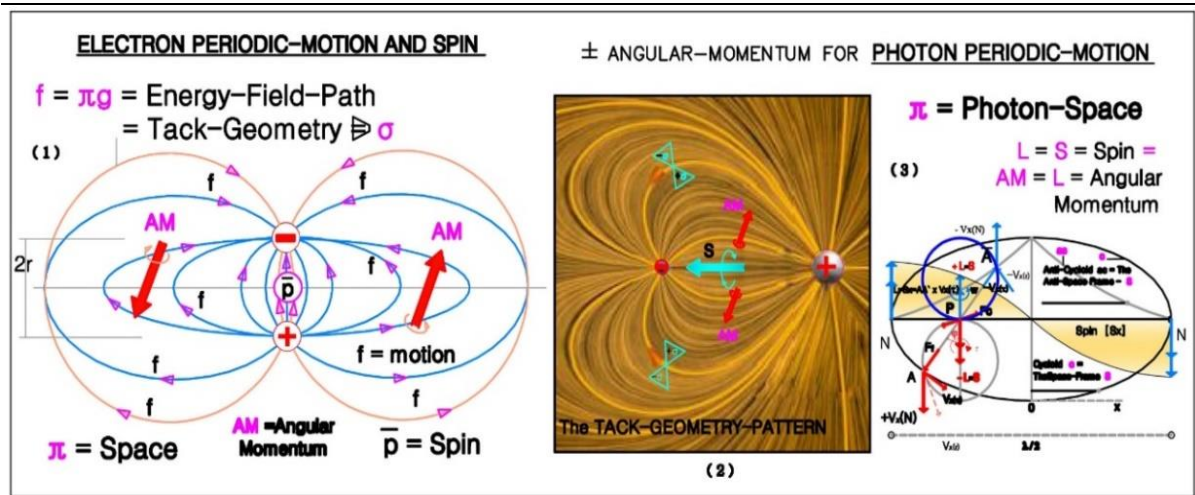Particle & Wave Duality Photon , and Cosmic-Particles Origination .

Figure – 31- : The Two Possible motions in caves , **The Periodic** and **The Rotational** :

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

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

f = $3,28393.10^{15}$/s , of cave a = $2,1127839.10^{-11}.10^{-11}$m . From Linear-Periodic-motion

$\dfrac{w_n}{2\pi} = f_e = \dfrac{1}{2\pi} \sqrt{\dfrac{k}{m}}$, or $4\pi^2 f^2_e .m_e = k = \pi g$, then for Electron $m_e = \dfrac{g}{4\pi f^2_e}$ so ,

$m_e = \dfrac{g}{4\pi f^2_e} = \dfrac{9,808238}{4.\pi.[3,28399.10^{15}]^2}$ = **- 7 , 2373149.10^{-32}** kg , **f** $_e$ = **3, 283998.10^{15}** /s ,

The Spin-Cave is equal to The Moment of couple from two $\uparrow \leftrightarrow \downarrow$ Angular-momentum
Vectors as $\overline{B}$ = **a m v** = $2,1127839.10^{-11}$ m .$7,2373149.10^{-32}$ kg .$2,99798.10^8$ =
$4,5841758.10^{-34}$ / π , and Spin $\rightarrow$ **S/2 = 1,4591885.10^{-34}** which is the **Electron-Spin**.
The k = π 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** [$\oplus \circlearrowleft ® \circlearrowleft \ominus$]directed to [$\oplus \rightarrow \ominus$] as it is ***Tack-Geometry.***

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

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 [E²+H²] =2.(2r).c.sin 2φ on where **does Not-exists the Skin-effect** and this because of
the Laplace $\nabla^2 f = 0$ equation issuing in ,***Tack-Geometry*** .The Property of Periodic-motion
in M-P conserves **The Inner-Magnetic-Wave** , into the Centre of mass- Charges with an
changeable Spin , S , between , - S , to + S , resulting to a Stationary-State . i.e. it is an
continuous – S + S = 0 , Torsional and Point-equilibrium , where Charge is equal to the
Angular Momentum-vector per Unit-Plane or $\rightarrow$ S =AM / π = r m v = [a m c] / π $\rightarrow$

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

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Above **Double-Orbital-Periodic motion** $[\oplus < \to \ominus]$ 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 $w_n \frac{2r}{v} = n \frac{4\pi r}{\lambda} = \frac{4\pi rf}{v}$, where n =1, 0, $\lambda = \frac{c}{f}$ and is the wavelength and , **f** , is the frequency of oscillation , *i.e.* The , **n = 1** ,defines *a Normal mode vibration* with **natural frequency** $\to$ $\mathbf{f_n = \frac{v}{2\pi\, r} = \frac{\sigma}{4\pi r}\ [1+ \sqrt{5}\,]}$ ….(n)

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

For Photons which force is $F_{photon} = \frac{[\oplus < \to \leftarrow \ominus]}{r^2} = \frac{[\sigma.\sigma]}{r^2} = \left|\frac{\sigma.}{r}\right|^2 = \left|\frac{2\pi f.}{\Phi}\right|^2 = \left|\frac{2\overline{B}.}{\pi.\Phi.r^4}\right|^2$,issue above .

Since for Electron $4\pi^2 f^2{}_e\,.m_e = \mathbf{k = \pi\,g}$, then for Gravity issues , $-\nabla E = -\nabla g = 4\pi.m_e f^2{}_e$.

$$\overline{q}\,_{Photon} = \frac{G}{\sqrt{2}.f} = \frac{G.h}{\sqrt{2}.E} = \frac{[6,680561\,.10^{-11}].[6,62606957.10^{-34}]}{\sqrt{2}\,.E=1} = 3,13\ 10^{-44}\ C\ .$$

All above Physical Structures Vibrate , *In-Sectors* with minimum Energy **, and form the** $\to$ **Electron-charge** $\leftarrow$ *In Surfaces* with minimum Energy **, and thus forming the Orbits .** The Orbit relation $\mathbf{r^3 f^2{}_p = Constant}$,as multiplication of Space-cave **r** and frequency **f ,** is Energy , **The Unit-Work done** $\equiv$ **motion** ,and conserved in orbit **r** as the **n** frequencies f_n , and after filling **the minimum cave** Burst Into another cave **connected to** $\mathbf{G} = \Phi^2[2\pi rf_P \equiv \frac{2B}{\pi r^3}]$

Remarks on EPR Argument :

The Point like Particles of Quantum Mechanics in Vacuum , are the three Elements , [66-68] $[\,s^2 = v^2 \equiv \oplus$ **,** $2s^2 = 2v^2 \equiv \varnothing$, $\mathbf{-\,s^2} = -\,v^2 \equiv \ominus\,]$, which are the content , *Primary material* , of the Cosmic Particles .[91] .The extension for a Deeper existence of the Particles is defined in Coulomb-Energy equation where Force $F_{\,C} = \frac{C.Q}{r^2}$ and Voltage $V_{\,C} = \frac{C.Q}{r}$,and so $V_{\,C} = r\ .\ F_{\,C}$ or **Force** $[F_{\,C}]$ x **Cave** $[r]$ = **Voltage** $[V_{\,C}]$, i.e. Voltage of caves defines Forces in caves . The Presented NEW Interaction Method , [10g.] is Based on the Common-Knowledge of the **Constructive** and **Destructive Interference of Waves** , Since Particles are Waves .For l-rays

    EG $\equiv$ Light ray $\to$ Straight line $\equiv$ The Euclidean-Geometry

    HG $\equiv$ Light ray $\to$ A Circle $\equiv$ The Hyperbolic-Geometry

    RG $\equiv$ Light ray $\to$ A Line-Sector, $\equiv$ The Riemann-Geometry

    MG $\equiv$ Light ray $\to$ A Line-Sector in Caves , and Straight line to Infinite .

$[\ \oplus \leftarrow \lambda \to \ominus\ ] \to \lambda \leftarrow [\ \oplus \leftarrow \lambda \to \ominus\ ]$ $\equiv$ **Material-Geometry** [9] . The answer is left to the Reader .   **[MG]**   **[MG]**   **[MG]**   Markos Georgallides 25/9/2020

A CRITIC   ON   THE - FUNDAMENTAL - FORCES

1.. Gravitational-Force   :

It was shown[81] that **The Primary-Material-Point** is composed of Infinite-Material-Points in the TwoAperon , $+\infty$, $-\infty$,which consist a Huge Magnet with Infinite Parallel-lineswhere the $\oplus$ constituent Attacks , *moves to* , *is the case of Newton-Gravitational-constant* G-*force* , *Periodically* to $\ominus$ constituent [82-86] . G Newtonian Constant of Gravitation is related to **g** ,

as $G = E = h . f_n = [\frac{c.r^3}{a^3}].[g_L k_L] = g .k_E = g .[g_L k_L]$, and is transformed into all types as , Force $G \equiv \sigma.\Phi^3 \equiv \Phi^2.[\{\sigma \Phi\} \equiv [\frac{2B}{\pi r^3}] \equiv 2\pi f_P r \equiv w r \equiv \bar{v} \equiv m a = m g = \bar{c}] \equiv 6,674.10^{-11} (\frac{Nm^2}{Kg^2})$

Stress $\{ \boldsymbol{\sigma} \Phi \} \equiv [\frac{2B}{\pi r^3}] \equiv 2\pi.\boldsymbol{f_P} r \equiv w \boldsymbol{r} \equiv \bar{\boldsymbol{v}} \equiv m \boldsymbol{a} = m \boldsymbol{g} = \bar{\boldsymbol{c}}]$, is dependent on Total-Prior.

From above , **There is Not any Vacuum** , instead exist **Infinite-Material-Points** which are created from the Periodic excitation and which **are Spinning** in Opposite-Pairs **for Stability** The **Un-bonded-Force** , **G** , or the   **Gravitational-constant** , **G** , was shown to be the **Electric-Field-lines** , i.e. that we call , **SPACE ,** is a **Huge-Electrostatic-Magnet** from the **Infinite-Dipole-Opposite-Primary–Charges which is** The-**ENERGY**- Part of the Two-**Primary**-Points $\overrightarrow{\oplus}$ to $\overrightarrow{\ominus}$ only . [82-86] .

The extension for a Deeper existence of the Particles is defined in Coulomb-Energy equation where Force $F_C = \frac{C.Q}{r^2}$ and Voltage $V_C = \frac{C.Q}{r}$, and so $V_C = r . F_C$, or

Force [F_C] x **Cave** [r] = **Voltage** [V_C] ,   i.e. Voltage of caves defines Forces in caves .

The Stress **σ** , occupies Minimum and Maximum because is related to frequency and velocity

as $\rightarrow$ $f_{ph} = [\frac{\sigma}{2\pi r} + \frac{\sigma\Phi}{2\pi r}] \equiv \frac{\sigma + \sigma\Phi}{2\pi r} = \frac{\sigma[1+\Phi]}{2\pi r} = \frac{\sigma[\Phi]^2}{2\pi r}$, or $\sigma \equiv \frac{f_{ph}.2\pi.r}{\Phi^2} \equiv \frac{w.r}{\Phi^2} \equiv \frac{v}{\Phi^2} \equiv \bar{c}\frac{1}{\Phi^2}$

and it is **The-Stress-Way** of Photon-Storages $\boxed{\bar{f_n}} \equiv \frac{\sigma}{2\pi r}$, and Photon-Information $\boldsymbol{f_n} \equiv \frac{\sigma\Phi}{2\pi r}$

so , Photon is directly related from   **G**   as $\rightarrow G = F = \sigma A = (2\pi f r)\frac{A}{\Phi} = wr\frac{A}{\Phi} = \bar{v}\frac{A}{\Phi} = \sigma \Phi^3$.

This **Stationary-**Energy-Storage follows the **Coulomb Electrical-Force** where the Electrical Force is added , while for Photon , an **Moving-**Energy-Storage ,exist Gravitational-Forces as ,

$\boldsymbol{F_{electron}} = k_c \frac{Q_1.Q_2}{d^2} = \frac{[\oplus < \rightarrow \leftarrow \ominus]}{d^2} = k_c \frac{2\sigma}{|e|^2} = k_c [\frac{4\pi f_1}{r\Phi}] = k_c \frac{\sigma}{2r^2} = \boldsymbol{k_c} \frac{2\bar{c}}{r^2\Phi}$ in Box B_e , and for **Motion**

$\boldsymbol{F_{photon}}$ $= \frac{[\oplus < \rightarrow \leftarrow \ominus]}{r^2} = \frac{[\sigma.\sigma]}{r^2} = |\frac{\sigma.}{r}|^2 = |\frac{2\pi f.}{\Phi}|^2 = |\frac{w}{\Phi}|^2 = |\frac{2L}{\Phi\bar{B}}|^2 = |\frac{\bar{c}}{r.\Phi}|^2$, in the same Box B_e , since

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

It is shown that Force , G , occupies Mass , **m** , from velocity , and Charge , **q** , from Stress, therefore   **G** is an Gravitational-Force as $\boldsymbol{F_{ele}}$ **,** and an Electromagnetic-Force   as $\boldsymbol{F_{pho}}$,

$G = E = h . f_n = [\frac{c.r^3}{a^3}].[g_L k_L] = g .k_E = g .[g_L k_L] \equiv \sigma x \Phi^3 = (2\pi f r)\frac{A}{\Phi} = \bar{v} \frac{A}{\Phi}$

Since for the **First Chemical-Neutral-***material-cave* , **r** , constants , g_L , k_L are equal to unity **i.e. $g_L = k_L = 1$** , then above Energy of   E =13,6 eV   in Hydrogen-Plane-orbit corresponds to the **minimum-energy-cave → The Phys-Quantized-Energy-Structure**. Since **G** Pushes → **g**

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on the Earth-Unit-coefficient , k_E , and because is the ***Starting ,*** *for first time begins* , of this ***Mechanism*** then from $G = g.[g_L\, k_L] \equiv g.[1*1] \equiv \to g$, or $\mathbf{G = g}$, meaning that in Earth System of gravity , the Newton`s Gravitational constant , **G** , and Gravity **g** are equal , while in all other relative Systems are equal to the proportionality of their Local-constant $\mathbf{k_L}$.

Now is proved that , ***Constant , G ,*** *is the mechanism* , *the mould* for the **First-kick-Start ,** upon this Unit-Granular-Energy-Stress-Layer , **g** , to formulate in that orbit , **a** , into Planck`s cave the lightest and the less-energy mass Particle of this universe , which is the Hydrogen with the minimum **Quantized-energy** of , **13,6 eV** , following the **Material -Geometry** Light-Ray $[\oplus \leftarrow \lambda \dashv \ominus] \to \boldsymbol{\lambda} \leftarrow [\oplus \leftarrow \lambda \dashv \ominus]$.

2.. Gravity-Force :

The Gravity-System , is an Infinite of $\pm$ Equilibrium-Rotating vectors $\bar{\mathbf{r}}$, where for the 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 $\to \nabla\mathrm{x}\overline{\mathrm{B}} = \nabla\mathrm{x}\overline{\mathrm{S}} = 0$, or $\nabla\mathrm{x}\overline{\mathrm{B}} = \nabla\,\bar{\mathrm{r}} + 2\pi\,\mathrm{mf}.\bar{\mathbf{a}} = 0$, and $\bar{\mathbf{r}} = \pm\, 2\pi\mathrm{mf}.\bar{\mathbf{a}}$. Vector $\bar{\mathrm{r}}$, occupies Both directions for Rotational-equilibrium , **i.e. The vector** $\bar{\mathbf{r}} = \pm\ \overline{\mathbf{B}} \equiv \overline{\mathrm{S}}_\mathrm{n} = 2\pi\mathrm{m}\mathbf{f_n}$, and $\mathbf{f_n} = \dfrac{\mathrm{B}}{2\pi\,\mathrm{m_e}} = \dfrac{\mathrm{E}}{\mathrm{h}}$, **is the Stationary-Filling-Ocean of the Spinning-Gravity-Material Points , in the called Empty-Space** ,with frequency that of Material-Point $f_n = n.f_1 = \dfrac{\mathrm{E}}{\mathrm{h}} = \dfrac{\mathrm{n.v}}{2\pi\mathrm{r}} = \dfrac{\mathrm{n}\sigma}{4\pi r}[1+\sqrt{5}\,] = |\dfrac{\sigma.\Phi}{2\pi.\mathrm{r_n}}|$, and from $\mathrm{v = w\,r} = 2\pi\mathrm{f\,r}$ then ,

$\mathbf{f_n} = \mathrm{v}/2\pi\mathrm{r} = \dfrac{(1+\sqrt{5})\sigma}{4\pi\mathrm{r}} = \dfrac{\sigma.\Phi}{2\pi.\mathrm{r_n}}$, and $\bar{\mathbf{v}} = \boldsymbol{\sigma}\,.\,\boldsymbol{\Phi}$ ...**(a)** , and $\pm$ Spin $\mathbf{S_G} = \overline{\mathbf{B}} = \mathrm{J\,w} = \boldsymbol{\pi}^2.\,\mathbf{r}^4.\,\mathbf{f_{n\,=\,g}}$

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

   From the Energy-force $\mathrm{F_g}$ in any cave , $\mathrm{r = L_P}$ of Planck`s scale of any reaction to any change of motion and ***which is mass ,*** the $\mathrm{m_g} = \mathrm{J.w}^2$, and in Electricity is Impedance , where angular-velocity $\mathrm{w} = \dfrac{c}{r}$ and in the 3-Dimensional Space of the Two Elements $[2^3 = (\ \oplus \leftrightarrow \ominus\ )^3]$, The Impedance , $\mathrm{g_Z}$, of the 3D-Space is $\to \ln(3) \leftarrow$ and of Anti – Space is $\to \pi\sqrt{3} \leftarrow$ and this because consist the moulds of Growth [45] . From above ,

$\to$ **The Light velocity vector** $\bar{\mathbf{v}} = \bar{\mathbf{c}}$ is **Acting on cave** , $\mathbf{r = L_P}$, and finding **Impedance** , $\mathbf{m_g}$, **becomes the Centrifugal-Force** $\mathbf{F_g}$ **of Cave** and becomes the **Gravity g** $\leftarrow$ as ,

$\mathbf{F_g} = \mathrm{m_g}\,[\dfrac{c^2}{r}] = \mathrm{J\,w}^2\,.\,\dfrac{c^2}{r}\,.\,\mathrm{g_Z} = [\dfrac{\pi\mathrm{r}^4}{2}].[\dfrac{c}{r}]^2.\,[\dfrac{c^2}{r}].\{\ 2^3.\ln(3).\ \pi\sqrt{3}\ \} = \mathbf{4\sqrt{3}\ \ln(3)\ .\pi^2\ r\ c^4}$, or

Gravity $\to$ $\bar{\mathbf{g}} = \mathbf{4\,\sqrt{3}\,.\ln(3)\,.\ \pi^2\ L_P\,c^4}$ $\leftarrow$ **i.e.** $\to$ For the **In-Planck`s-length It is the Centripetal-Force ,** $\mathrm{F_g} = \bar{\mathrm{g}}$, **of The Pointy-Spinning** Material-Points $\mathbf{S_{pg}} = \overline{\mathbf{B}} =$

$= 4.\sqrt{3}\ .1{,}0986122886681.\pi^2.1{,}616199.\,10^{-35}.\,[2.99819938]^4 = \mathbf{9\ ,\ 8076754\ .}$

For the **Out-Planck`s-length** Photon-velocity equation $\bar{\mathrm{v}}_\mathrm{m} = \mathbf{n.\,\bar{c}\ .\{}\ \boxed{\bar{\mathrm{f}}_\mathrm{n}}\ + \mathbf{f_n}\ \}$ and from

$\bar{\mathrm{v}}_\mathrm{m} = \mathrm{w\,r} = \mathbf{n.\pi.c}$, $\mathrm{f} = [\dfrac{\mathrm{n.c}}{2\mathrm{r}}]$ **,** then $\to \bar{\mathbf{v}}_\mathbf{m} = \mathbf{n.\,\bar{c}\ .\{\ [}\ \boxed{\bar{\mathrm{f}}_\mathrm{n}}\ + \mathbf{f_n}\ \} \leftarrow$ **which is velocity-Out** $\mathbf{L_P}$.

Photon was proved to be a Material-Point in cave , **r** , where its **Inner Storage** is *the Stationary-Standing-wave* the Electromagnetic-Wave $[\mathrm{E}^2+\mathrm{H}^2] = 2(2\mathrm{r}).\mathrm{c}.\sin 2\varphi$ with **n** Lobes representing the ***Normal mode vibration*** with frequencies $f_n = n\,.\,f_1 = \dfrac{\mathrm{E}}{\mathrm{h}} = \dfrac{\mathrm{n.v}}{4\mathrm{r}} = \dfrac{\mathrm{n}\sigma}{2\pi\mathrm{r}}[1+\sqrt{5}\,]$, on Two or more Possible nodes the , $\oplus\ \lambda/2\ \ominus$. Space $\oplus$ and Anti-Space $\ominus$

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Exist on the Two opposite-nodes of the Standing wave-wavelength λ and **Outward Storage** *is the Propagating Electromagnetic- Wave.* $\rightarrow$ {$[\varepsilon E^2 + \mu B^2] = 2.\lambda c.\sin 2\varphi$} $\leftarrow$ *where* **Particle** $2r = n\,\lambda = $**n. $\bar{c}$.{ $\boxed{\bar{\bar{f}}_n}$ }**, **Cave** r , is the *Electromagnetic-Energy-Storage* , and = **n. $\bar{c}$.{ $f_n = \frac{E}{h}$ }**

Electromagnetic-Radiation E , B , **is** *the* **Wave Conveyer of Cave , r , with** frequency

f = Energy E / Planck-constant h , or f = E / h . From relation   Stress $\sigma = \frac{c}{\Phi} = \frac{2\pi rf}{(n)\Phi} = \frac{2\pi rf}{1.\Phi} = $

$\frac{2\pi.1,616199.10^{-35}.2,93949410^{42}}{1,6180339}$ = 1,84456315.10^{8}t/m2 = 1,84456315.10^{11} Kg/m2 in P-length.

Stress σ_{PL} = **n**.1,84456315.10^{11} Kg/m2 , and is for the **Outside-Planck`s-Length-caves.**

  Remarks :

a.. The Stresses become from a Force and a Surface as equation $\sigma = \frac{F}{A}$, and in the case of
  Gravitational constant G and a cave , **r** , then $\rightarrow \sigma = \frac{G}{4\pi r^2} = \frac{G}{\pi(2r)^2} = \frac{G}{\pi s^2}$, or vector **s** .
  Above relation means that Force **G** needs a Vector-surface $\pi.s^2$ to be spread as Stress
  σ , which is the case of Constant-light-velocity , **c ,** as the *first Surface* .

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

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

d.. Since the Nutation-Frequency $f_N = \frac{r_e.Q_e}{2\pi.J_3\,w} = 2,8398447.\,10^{10}\,s^{-1}$, then $f_N = \frac{r^2_e.\Phi.Q_e}{2\pi.J_3\,G}$
  i.e. the effect of gravity is in caves and is related to G as Nutation force .
  The Golden-ratio-frequency $f_P = \frac{\sigma.r}{\pi.\bar{B}} = \frac{n\sigma.\Phi}{2r}$, exists in nature from the micro to the macro
  scale and is a **Pressure , σ , everywhere** in all the Energy structures .

e.. 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$_c$ $\bar{c}$**
  $r_H = \frac{h}{c.Z_c} = \frac{[6,62606957.10^{-34}]}{2,99798\,.10^8\,1,0460975.10^{-31}} = \mathbf{2,1127839.10^{-11}}$ m , which is the Hydrogen cave.

f.. Atoms Bonding happens on , **Slit-Vectors { Bracket-Orbit-Hook }** which occupy the
  Unit-Energy-Space frequency in order that the Electron-Hook $\ominus$, to Joint with the
  Bracket-Proton $\oplus$. For this to happen is needed a common equation for the *different*
  [**Bracket-Orbit-Hook $\equiv$ 2r] as** $\rightarrow$ $\ddot{r} + w^2\,r = 0$ where $w = 2\pi f_1$ as above frequency ,
  $2\,r = \Delta$ is the amplitude of vibration , and then $T = 2\pi\sqrt[2]{\frac{m}{k}}$, Natural $f_1 = T^{-1} = \frac{1}{2\pi}\sqrt[2]{\frac{k}{m}}$
  $= \frac{1}{2\pi}\sqrt[2]{\frac{g}{\Delta}}$ in cave $2r = \Delta = \frac{g}{k}$, i.e. an Energy loop.

g.. From Gravity-Force $DE \equiv [\bar{c}.\nabla i] \equiv \bar{c}\,[\nabla i] \equiv$ The Travelling-Energy-cave , $\bar{c}$, with the
  velocity-vector , $\bar{c}$, Gravity **g** , does dominate over the other forces and thus has a long
  range . The Strong and Weak nuclear forces are very short ranged in the nuclei of atoms.
  Electron-Nutation occurs because   Gravity acts on the electron mass and thus Energy is
  created and overflows as Photons .For Planets issues the Volume-Spherical effect 3/4πr³,

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because of the mass dominating ,while Atom-Range-action follows that ofElectric-Dipole h.. For a circular motion in *Neutrino-caves*, *dominates* ,velocity is proportional to the inverse square of radius r , and *Newton-Force acceleration* the fifth , where $C = \frac{\pi ab}{T} = \frac{\pi a}{T}[\frac{1}{r^2}] = \frac{\pi a}{T\,r^2}$

From relation $r = 2a.\cos\varphi$ is , $\cos\varphi = \frac{r}{2a}$, $\frac{1}{r} = \frac{1}{2a\cos\varphi}$ and $\frac{d1/r}{d\varphi} = \frac{1}{r}\tan\varphi$ and from

Central-motion-e $\rightarrow v^2 = 4C^2.[\frac{e^2\sin^2\varphi}{p} + \frac{1}{r^2}]$ is $v^2 = 4C^2.[\tan^2\varphi + 1] = \frac{4C^2}{r^2}\frac{1}{\cos^2\varphi} = \frac{16C^2a^2}{r^4}$

and *velocity* $v = \frac{4Ca}{r^2}$. The Centripetal-acceleration $a_p = \frac{v^2}{r} = -\frac{16C^2a^2}{r^4} \cdot \frac{1}{a} = -[\frac{16\,C^2a}{r^4}]$

and equal to $\frac{a_p}{\cos\varphi}$, therefore , *Centripetal-acceleration* $a_p = -\frac{32C^2a^2}{r^5} = -\frac{32\pi a^4[\,1\,]}{T^2\,r^4\,[\,r^5\,]}$

and for r = a then $\rightarrow a_p = -[\frac{32\,\pi}{T^2\,r^5}]$, i.e. Newton-Force in a **Neutrino-cave** 10^{-18} m exhibits **five attractions** of different Strengths. These attractions are from the Strong forces $\{\oplus \leftrightarrow \oplus\}$ which differ in color , Quantum Chromodynamics , as is the change of Phase $\varphi= 180\,^{o}$ in Photoelasticity . Gravitational-Force , for multiple close-together masses , follows the Electric , **Parallel Connections Resistors** inverse law and not the additive . [83-89] .
The old perception for Negative-mass was a transient description of General-Relativity which tells that gravity is not a real force but is a warping of Spacetime . The answer is that there is NOT Negative-Mass   NOT Spacetime , **But** Reaction to velocity-change and Space-Energy.
Concerning Gravity-Force DE $\equiv [\bar{c}\,[\nabla i]$ is an Travelling-Energy-cave , c , with vector , $\bar{c}$. and goes away on the scales larger than Galaxy-Groups until that of generation predicted by Force

as Voltage equation $V_C = r . F_C$ and , Spin $S = [\frac{amc}{\pi}] = \bar{B} = \frac{2L}{\bar{w}} = \frac{2L}{2\pi f} = \frac{\pi^2 r^4.f}{2}$.

On *Scales Smaller* than Planck`s Scale , **Space-Energy** as above **acts** , dominantly like the Newtonian gravity , while for *Scales Larger than Galaxy-Groups ,* acts dominantly like The travelling Gravity-Force **DE $\equiv [\bar{c}\,[\nabla i]$** . [72]

3.. Electromagnetic-Forces   :

Electricity is the motion of the Material-Points , and their relation.

The **Three Elements** $\equiv$ Digits of Material-Geometry are $\rightarrow \{\oplus , [\oplus \leftrightarrow \ominus] , \ominus\} \equiv [+, 0 , -]\leftarrow$
The **Permutation** , *arrangement* , of the Two-Elements $P_1^2 = \mathbf{2}$, i.e. are $\rightarrow [\oplus,\ominus] - [\ominus,\oplus]\leftarrow$
The Three-Elements in Space need $P_1^3 = 3.(3-1).(3-2) = 6$ Positions and the same for the 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
$b = 36.10^{-20}$, and $\rightarrow \bar{v} = \frac{F\,\Phi}{A} = [\frac{G\,\Phi}{A}] = [\frac{6,673692\,.10^{-11}.1,6180339887}{36\,.10^{-20}\,.}] = 2.9995163.\,10^8$ m/s
i.e. **Ubiquity of Material-Geometry in Electromagnetism** is ,$\bar{v}$, Instantly-Everywhere .
For Charges issues **Coulomb law** of Forces between Charges as $\rightarrow F_c = C\frac{q_1.q_2}{r^2}$, and the United Newton-Coulomb **Electro-Mechanical** Equation , $q\,\bar{B}_L = 2\pi\,m\,f$, for masses as the

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

Q_T = Charges creates a constant Magnetic-field with **Magnetic-field-Strength** $\overline{B}_F = |\frac{2\pi.M_T}{Q_T}|f$

Energy in cave is $E_K = \frac{k}{r} + \frac{L^2}{2m\,r^2} = \frac{k}{r} + \frac{L^2}{2(\frac{S}{r^2.w})\,r^2} = \frac{\pi}{r} + \{\frac{Sw}{2} = \frac{cS}{2r}\} = \frac{\pi}{r} + \frac{cS}{2r}$, related to Spin ,cave.

<u>Dual-Photon</u> $\overline{v} = \overline{c}.[\,\boxed{f_n}+f_n] $, is **Particle + Wave $\equiv$ Energy** moving with light-velocity and its Duality exists in frequency . The Material-Points travel with velocities $\mathbf{n.\overline{c}}$, and are as $\overline{v}_m = n.\overline{c}.\{\,\boxed{f_n} + f_n \} \equiv [\frac{G}{\Phi^3 L_P}]\{\,\boxed{f_n} + f_n \}$, where $\boxed{f_n}$ is the Stationary Storage and [f_n] Travels as an Propagating Electromagnetic-Radiation where motion $\equiv$ Energy $\equiv$ Wave as Electric-Force and is altered to the , **Space $\equiv$ Magnetic force** as $\overline{E} = \overline{B}$ c .

The Propagating-Photon follows the Dual-Property $\overline{v} = \lambda_n.f_n = \overline{c}.[\,\frac{\sigma}{2\pi r} + \frac{\sigma\Phi}{2\pi r}\,]$.

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

Remarks : On the **Duality-Photon** $\{\,\overline{c}.\boxed{f_n} + \overline{c}.f_n\,\} \equiv \rightarrow$ Particle + Wave $\leftarrow$

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

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

c.. **Photon** in the Microcosm of Hydrogen - Cave can-**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.. **Electric-Force** *is the Dominant where Particles are responding to the* **Constructive** $[\oplus\rightarrow(+)\leftarrow\oplus]$ or $[\ominus\rightarrow(+)\leftarrow\ominus]$ **,** and to **Destructive** $[\oplus\rightarrow(-)\rightarrow\ominus]$ **Interference as** ,

Constructive_ $[\oplus\rightarrow\oplus = \oplus\oplus]\equiv CI_{=+1}^{+,+}\equiv$ $\mathbf{W^+}$,,,, $[\ominus\rightarrow\ominus = \ominus\ominus] \equiv CI_{=0\,-}^{-,-} \equiv \mathbf{W^-},$
Interference $\rightarrow [\oplus\rightarrow = \oplus] \equiv CI_{=+n}^{+\rightarrow} \equiv \mathbf{W^{++}}$ ….3-Types of **CI**-Forces .

Destructive _ $[\oplus\rightarrow\ominus = 0_+] \equiv DI_{=0+}^{+,-}\equiv \mathbf{Z^+}$, $[\oplus\rightarrow\ominus = 0] \equiv DI_{=0}^{+,-} \equiv \mathbf{Z^o}$,
Interference $\rightarrow [\oplus\rightarrow\ominus = 0_-] \equiv DI_{=0\,-}^{+,-}\equiv \mathbf{Z^-}$ ......3-Types of **DI**-Forces .

With the above Mould are Originated all Types of Forces Strong and Weak. From equality $G \equiv \sigma.\Phi^3$, is seen the Quantum-Chromodynamics and Quantum-Electrodynamics Origin.

Because Force *can`t exist by itself* , there must always be an equal and opposite reaction force acting on the Opposite Position or Direction .**Coulomb-Force** acting between two Particles is $F_c = C\,\frac{q_1.q_2}{r^2}$,while the *Voltage* is $V_r = C\,\frac{q_1.q_2}{r}$ of cave , r , and is $\rightarrow V_r = F_c\,.\,r \leftarrow$ …(v)
i.e. when Two Particles are in a cave , **r** , where $-\infty < r < 0$ then exists an Interaction between the two Particles .

4.. Strong-Forces :

a). Strong forces are created on , **Markos-STPL** , in Pascal`s and Desargues`s Six-Points.

BOSONS are formed **Axially** to Common-circle in Sub-Space A_E , B_E , C_E , such for Space , A , B , C , as for Anti-Space K_A , K_B , K_C , and thus acquire their Spin and ,

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Instead of a Charge , an **Voltage-Force** $\equiv$ **Motion-in-Magnet** $\equiv$ **Material-Point** from their Conductors , AP_A , AD_A , when the $\oplus$ Breakage **Attacks** $=\gg$ to , $\varnothing$ **Zero**-Charge , as

$$\oplus =\gg \varnothing =\gg \quad Q_+ = \frac{g.S}{2\pi r^2}$$ and are Launched with $Q_{\overrightarrow{AK_A}}$, $Q_{\overrightarrow{A_E K_A}}$ Quantities at P_A , D_A

Points of the STPL line with the Linear-relation $\overline{B}_F = \frac{\overline{v.S}}{q.r^2}$ as below .

From $\overline{B}_F = \frac{m.2\pi}{q}.f = [\frac{2\pi.m}{Q_+}].f$, so , $F = \overline{q}\ \overline{v}x[\frac{2\pi.m}{Q_+}f] = 2\pi.\overline{q}\overline{v}.[\frac{m}{mg}].f \equiv \frac{\overline{v.S}}{r^2}$ or $\rightarrow \frac{2\pi\overline{q}}{g}\ f = \frac{v.S}{r^2}$

and **M-Force** $\overline{B} = \frac{\overline{v.S}}{q.r^2}$ or $\rightarrow \overline{B} = \frac{3.10^8\ 5,691952.10^{-34}}{1,602.10^{-19}[10^{-19}]^2}$ =1,065127.10^{32}T , half Plank-M-Field

Nutation-Force F_N= q c B = $1,602.10^{-19}.[2,9978.10^8].1,065.10^{32} \equiv$ **5,1146.10^{21}** N .

Above relates the Inside existing force , **F** , which becomes from Charge Q_+ only , from Spin **S** , and of from **r ,** cave , and in STPL Mechanism creates the **Six-Forces** of Nature , i.e.

In the same cave , **r** , Charge $\overline{Q}_+$, creates the Magnetic field $\overline{B}_F$, following Coulomb law and in where the Gravity , **g ,** acts on Charge mass **m $_+$** and creates the Nutation-frequency **f $_N$** , and the Inertial-Force **F** . This Useful-Property allows MRI-**Photos** from the Surface of caves . The Hydrogen cave $L_H = \textbf{r} = \frac{\textbf{h}}{\textbf{c.Z}_c}$ = 2,1127839.10^{-11} m is the min-cave in Planck`s-cave with max-Energy **h** . The cave with [**Anti-Space + Space-Positions**] is 0,707106781.10^{-20} m and is the **Border-line** between the , **Weak and Strong Forces** , because in cave exist the maximum Space-Positions . Placing the above **r** , Nucleus-Cave in charge Q_+ then .

$$\overline{q}_{W-S} = \frac{g.\overline{S}}{2\pi r^2} = \frac{9,8076754.[5,691952.10^{-34}]}{2.\pi.[10^{-20}]^2} = 8,8850576.10^1 J/1,602.10^{-19} eV = 5,546.10^{25} \text{ eV}$$

or it is the E-**Border-line** between the S-W Forces $\rightarrow \overline{q}_{Weak-Strong} \equiv$ **5,546 .10^{16} GeV** $\leftarrow$

All Particles and Forces End in STPL , Pascal`s , $P_A$ , and Desargues`s Points , D_A .

AK $_C$, Creating the , **+ Force $G^+ = \oplus\rightarrow\varnothing$** , and **AK $_C$** $=\oplus\leftarrow\varnothing$, Creating the , **– Force G^-.**

It was shown that Newton-Force in a **Neutrino-cave** 10^{-18} m exhibits **five attractions** of different Strengths. These attractions are from the Strong forces as $\{\oplus\leftrightarrow\oplus\}$, $\{\ominus\leftrightarrow\ominus\}$.

For 3-Combinations $\rightarrow$ [s s s] $\equiv$ [-$\frac{1}{3}$ - $\frac{1}{3}\frac{1}{3}$ +W^-] $\equiv (-2/3\ |W^{-[-1/3]}W^-) \equiv (-1\ |W^{--})$ and because of the 3-Negative (-) elements exists Strong -**Repulsion** , But Final-Interaction becomes as **Attraction** , and this because of the **NEW Equilibrium** on the vertices of the Equilateral formation , **the New-Positions** , of the Space and Anti-Space , forming the Strong forces $\{\ominus\leftrightarrow\oplus\leftrightarrow\ominus\}$ which differ in color , **Quantum Chromodynamics** , [91].

For 3-Combinations $\rightarrow$ [$\overline{s}$ $\overline{s}$ $\overline{s}$] $\equiv$ [$\frac{1}{3}$ +$\frac{1}{3}$+$\frac{1}{3}$+W^+] $\equiv$ $(2/3\ |W^{+[+1/3]}W^+) \equiv (+1\ |W^{++})$ and because of the 3-Positive (+) elements exists Strong -**Repulsion ,** But Final-Interaction becomes as **Attraction** , and this because of the **NEW Equilibrium** on the vertices of the Equilateral-formation , **the New-Positions** , of the Space and Anti-Space , forming the Strong forces $\{\oplus \leftrightarrow\ominus\leftrightarrow\oplus\}$ which differ in color , **Quantum Chromodynamics** , [91].

i.e.. as Photoelasticity describes the changes in Stresses and Strain in a material , so QCD

Determines the **Stresses and Strain** { Energy - Space } , in **Cosmic-Caves** Subjected to Coulomb –Forces . This **Light-Wave** is seen as Screen of , Fringe-Pattern ,Tension-lines.

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5.. Weak-Forces :

1.. Weak-Forces are created on , **Markos-STPL** , in Pascal`s and Desargues`s Six-Points .

2..The $\oplus$ Breakage being alternative at Space-Points **A , B , C** → **Attacks** to the $\ominus$ **Charges** at Anti-Space-Points K_A ,K_B ,K_C , and forms **Leptons** { e^-, μ^+, τ^+, ν_e , ν_μ , ν_τ } and **Quarks** { d , s , b , u , c , t } , **on STPL** Points P_A , P_B , P_C--D_A , D_B , D_C respectively.

3..Because the $\oplus$ Breakage **Attacks =≫** to $\ominus$ **Charge** thus Anti-Particles are Generated only from the Opposite-motion , *opposite   direction* , in their Conductors . D,P → I ← P,D

4.. From [91] The Geometry of STPL line allows Six Quantities on the three Loads as The **Artificial   3-Phase-Star**-Circuit and The-**Physical 6-Phase-Delta**-Circuit for $Q_{\overrightarrow{AK_A}}$, and $Q_{\overrightarrow{A\,_E K_A}}$, Elementary -Particles are all-launched at P_A and D_A Points of STPL .

5.. Primary Particles occupying mass **m** , exert Gravitational attraction on each other .

For the **Repulsion-Strong**-Forces $[\oplus \rightarrow = \oplus] \equiv CI^{+\rightarrow}_{\equiv +n} \equiv W^{++}$, and because in each

Phase $\varphi = 180°$ the Energy increases , is presented < **color** > as in Photoelasticity and thus exert **Attraction** via the Strong –Nuclear-force which is the **Stress** → $\sigma \equiv G / \Phi^3$. For the case of Two Protons in Hydrogen-cave , these become bound , forming the Helium Nucleus and because the Dynamic-Strip-Polygon doesn`t close , a neutron is also needed to keep the Helium Nucleus Stable .   A wide analysis in [91-92]

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