PHOTON-PARTICLE , PHOTON-WAVE

OR   DUALITY - PHOTON   ?

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Abstract

Distance is the Quantum of E-Geometry, while **Material-point** is the Quantum in **Physics** and **Material-Geometry** which is the composition of opposites and are the Elements in **Chemistry and Physics** . **As in Algebra** Zero ,0, is the *Master-key* number for all Positive and Negative numbers , because their sum and multiplication is zero , *and the same* on coordinate-system $\pm$ axes pass from zero , The Rolling of Positive $\oplus$, constituent on the Negative $\ominus$, constituent , creates the Neutral Material point which Equilibrium . *Spin* $\overline{\mathbf{B}}$, is Its Angular momentum and the **First-Discrete-Energy-monad** which occupies *Discrete-Value and Direction* , in contradiction to the Point which is nothing , *Dimensionless* and *without any Direction* .
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$\equiv$ motion $\equiv$ Force x Displacement as $[℧℧$ or $\uparrow\leftrightarrow\downarrow] \equiv$ Box $\mathbf{B_Q} \equiv$ An Material Point which carries the Principal Stress σ between A(+) , B(-) , and σ is *Centripetal-acceleration* of minimum Energy becoming from the in-storage AB acceleration and which is **equal to the** *Gravity* **g** .
From Quaternion Quantum-Mould $[r + \overline{v} \nabla i]^{1/w} = e^{-i.(\pi/2+2k\pi).w}$ is created the **min-cave** $\mathbf{r = 1,07.10^{-7}}$ m and the **min-energy** $\overline{v} = w\, r = 2\pi r\, \mathbf{f}$, The frequency $\mathbf{f_m= 2,839844. 10^{10} H}$. Gravitational-force **G** effecting on light velocity $\overline{c}$ creates Electron-charge $\overline{\mathbf{q}}$ and Electron $\overline{\mathbf{e}}$, while acting on Planck`s-cave the Gravity $\mathbf{g} \equiv \pm \sigma$, as $\mathbf{G} = g\, k = \mathbf{k_E}\, g = \mathbf{k_L}\, \sigma = g.g_L\, k_L$, and **g** effecting on the min-Planck-cave L_P formulates Hydrogen-cave **H** with its electron H_e .
Constant G is effecting on **Gravity g** and in turn **g ,** effects on Electron $\overline{\mathbf{e}}$ of *Hydrogen-cave,* **Originates Nutation-motion** in Precession as Resonance-frequency $\mathbf{f_N} \equiv \mathbf{f_R} \equiv$ **Work $\equiv$ Energy**, and is stored in the [Nucleus-Electron] **Orbit** , as the $\mathbf{w_L}$ Larmor – frequency.   Moreover
A…The **Link** between **G** and all above is the 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… **The United Coulomb-Newton-Law** of   **Interactions** is the Extreme case of any two Touched Charges in Field **E** , as $k[q_1.q_2] = g\, E$ **,** producing the Nutation of Orbit-Electrons .
C... **Atom is** a cave containing a **Heap of masses and Charges** . This configuration **forms a Harmonic Oscillator** which creates an **Electromagnetic Wave** ,the **Quantum of Energy and of Space ,** which are the **Natural-frequency of Atom f_1 ,** and the **Storage** Magnetic-field $\overline{\mathbf{B}}_L$.

Keywords :   The Duality of Photon , Origination of Nutation-motion .

CONTENT

The Duality of Photon And   Origination   of the Nutation motion

A.. :   GENERAL

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

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

3…The Solution of all the Unsolved-Ancient-Greek-Problems [50] opened the way to **Material-Geometry** [54]   which Incorporates the Motion In-Space $(\oplus \leftrightarrow \ominus)$, [61] . **The Space exists** in Energy-Caves as *Energy-Quantum-Quantities* [39] while Motion or **Energy exist** inCaves as an *Confined-Stationary-wave* which is either Static or an moving Energy-Storage or an Energy-Box [68] . The Two Opposites (+) , (-) exist in Nature and are found everywhere from $\rightarrow$ Zero-Point (0) $\equiv$ [+= -] or (+A)+(-A) = 0   in E-Geometry and $\rightarrow$ [0] = [$\oplus \leftrightarrow \ominus$] $\equiv$ ds , [$\oplus \leftarrow$ds$\rightarrow \ominus$] in Material- Geometry , to the aperon , $\pm \infty$, where , **in The Space $\equiv$ ds** , the motion **exist as Vibration**   [52] .

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

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** the Gravity **g** and Electron $\overline{e}$ [72] .

6…The Rotation of the Two Elements ,[$\oplus \cup \cup \ominus$], Up or Down in the Material-Point-circles Originates the Spins , $\pm \frac{1}{2}$, ± 1 , $\pm \frac{1}{2}$, for All-Particles Fermions or Bosons which become from above Three-States of motions , just by Adding the Spins [36] . Linear Motion [$\oplus \leftrightarrow \ominus$] of Breakage [$\pm \bar{c}. s^2_m$] in cave { M-Point = d $s_m = e^{i.(\frac{N\pi}{2})b=10^- N = \pm\infty} m$} as $\rightarrow$ v = w r =2πr. 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 $\overline{B} = \frac{2L}{\overline{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   g .a ^{3}. f^2_p = 1 and   E = h f_p .

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

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

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

10…This Resonance - frequency f_R is Independent of the Electron`s speed and radius so allows Bonding between Atom-caves which contain a Formation ,a Heap of Masses and of Charges . In a Proper- Stationary-Magnet on which 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 $\overline{e}$ in the Hydrogen-cave , Originates the Nutation-motion in Precession as Cyclotron-Resonance - frequency $\mathbf{f_R} = \sqrt[4]{\dfrac{1}{4\pi^2 m_e \cdot r^3}}$ of cave ,r, and the produced-Energy is stored in the Orbit as a New Uniform-Magnetic-field $\overline{B}_F = |\dfrac{2\pi \cdot M_T}{Q_T}| f_R$ which becomes the **Bond** between the Atoms to be Molecules .i.e. Bonds are the Magnetic-lines of the Uniform-field . [80]

12..During Nutation of Electron-SPIN , and because of the Eternal-Varying-Velocity motion in Orbit Precesses , **the Produced-Work** of [$\oplus$ = Proton , $\ominus$ = Electron] is Conserved in the **Nucleus-Orbit-Magnet** , as the Nucleus-Magnetic-Moment , which is influenced by Any External-Magnetic-field . The continually Conserved Energy becomes the frequency $f_N = f_R$ and is **Resonated to the Electron-Spin** , OR to the Set External-Magnetic-Field-moment . [N] Articles IN - GOOGLE → 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 $\overline{c}$, with Derivatives the Photon-Charge $\overline{q}_{Photon}$ in Material Point cave **r** , Gravity Constant **g** , and Planck constant $\mathbf{L_P}$, 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 → [$\pm s^2$] = [MFMF] ≡ ***The Chaos*** , as base for all motions , and Gravity as force [∇i] , while the clashed with the constant velocity , $\overline{c}$, consist the Dark matter [$\pm \overline{c} \cdot s^2$] and the Dark energy [$\overline{c} \cdot \nabla i$] , ***Declaring that*** → Antimatter-Galaxies and Antimatter-Asteroids can exist only as Dark-matter or and Dark-Energy and **NOT** as Antimatter light , (**- c**) ,alone , or from → 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** ≡ $\boxed{[\oplus \leftarrow \ \mathbf{r} \rightarrow \ominus]}$ + **Motion M** ≡ $\boxed{\overline{v} - \mathbf{Vector}}$ as [87].

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From vibration in Material-Points become ,

A → Particles , with Inherent Vibration occupying distance r = ds = $|AA_E|$,
B → Gravity-Field-Energy without Vibration , the only Stationary-Rotating
     Photon-Spinning-Material-points .
C → Dark-matter-Energy constituents as below ,

A.. [$\pm\bar{v}.s^2$] → Fermions , *Quarks and Leptons* , and → [$\pm\bar{v}.\nabla i$] → Bosons ,
B.. [$\pm s^2$] → [MFMF] *Neutral* Field ≡ ***The Equilibrium Energy - Chaos*** , with the
      Negative-Energy binder Field [∇i] → The Gravity force G_f
C.. [$\pm\bar{c}.s^2$] → Dark-matter , and the binder Gravity-force [∇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 →
      {[**(∇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 [∇i] → G_f ≡ Gravity-Force in DM-DE Stationary Field .

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

      → Gravity Force DE ≡ [$\bar{c}.\nabla i$] = $\bar{c}$ [∇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 , and one for the Energy-motion-monad .
      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***
      Energy - Geometrical - Shapes , of the motion which shapes are the Conic – sections .
      The Interior motion is kept in its Wavelength-Tank 2r = nλ , as well as the Outer-Linear
      motion as an Propagating Electromagnetic-Wave , which carries the Energy-conveyer,
i.e. The stored energy in the loop is → $W_1 = v^2 [\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 = π g .
      For Photon is proved that ,

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

2.. Energy-Motion M ≡ $\boxed{\bar{v} - \textbf{Vector}}$ ≡ **Wave** [$\bar{v}$. f_n] ≡ [f_1= (E^2+H^2) = $n\frac{(1+\sqrt{5})\sigma}{4\pi r}$ →

   = $\frac{\bar{B}}{\pi^2 r^4}$] **a Propagating Wave** {W≡ EM-R ≡ [$\varepsilon E^2 + \mu B^2$] = 2.$\lambda$c.sin.2$\varphi$}.

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

The Total - Energy of Elementary-particle $\equiv$ Intrinsic Rotational + Kinetic Energy ,

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

Preliminaries :

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

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

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

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

Work done (W) by Impulse (P) on a Virtual displacement (ds > 0) is zero , or
$W = \int A\text{-}B = [P.ds] = 0 \rightarrow [ds.(P_A + P_B) = 0] \rightarrow P_A \equiv$ **Points** i**n Space [S]**
   and $P_B \equiv$ 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* $\rightarrow$ *ds = 0 and P $= \infty$*) . **[70]**
It was shown that **in PNS , $v = \infty$, T= 0 , meaning that velocity is infinite and Time is not existing and thus any length |AB| in [PNS] is constant ,** because AB = ds = Constant = v . 0 $= \infty. 0$. **Straight line AB is discontinuous (** *discrete***) with dimensional Units ds = AB / n** where **n $= 1 \rightarrow \infty$** , **and continuous with points [ds = 0] , (** *This is the Dual Nature of lines in ,* *geometry ,* *as discrete and continuous*) . From definition work **W** = Force **x** D= Displacement $\equiv$ Momentum [mv] **x** Distance [r] $\equiv$ **mv. r** or **W $\equiv$ mv. r** , exists Work where
1…$\rightarrow$ r Becomes from Material-Geometry where the Quantization of Space for **the Rotated Energy case (s = 0 and cos φ = 0), In-Primary-Quaternion $[s + \bar{v} \nabla i]^{1/w} = e^{-i.(\pi/2+2k\pi).w}$**
{for angle $\varphi = \pi/2$,dimension power **w=b=10** and **k = 0**} exists the **minimum-Energy-Cave** r.
For base e = 2,71828 and base b = 10 then e^ - (16,1181) = 1 . 10^{-7} or **r = 1,07.10^{-7}** m
$r_{min} = 1,07.10^{-7}$ m $\rightarrow$ i.e. **$r_{min} \equiv$** The minimum Energy-Space-Cave $\equiv$ **Space-Quantum** .
Placing the$\rightarrow$ **r_{min}** in the Dynamic-**Space-Energy** relation , g .r ^{3}.f^2_p= 1 , *when g=1* , then ,
$f^2_p = \frac{1}{r^3} = 8,0647139.10^{20}$ m , or **f_{min}=2,839844.10^{10} H** ,is the minimum Energy in Cave ,
2…$\rightarrow$ f =f_{min}=2,839844.10^{10} H $\equiv$ The minimum Energy in Cave $\equiv$ The-Energy-Quantum

From wavelength-relation n λ = 2r = n v/f , exists v = λ f or $\rightarrow$ $\bar{v} = \bar{c} = \lambda$ 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.$\rightarrow$ **The Quantum of velocity is constant c.**

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From Constant-Energy Orbit-relation $\mathbf{k} = [\bar{v} \times \bar{v}] \cdot \bar{r} = v^2 r = (w\,r)^2 \cdot r = [\frac{2\pi}{T} r]^2 \cdot r = \frac{4\pi^2 r^2}{T^2} r = \frac{4\pi^2 r^3}{T^2} =$

$4\pi^2 r^3 f^2{}_{min} = [2\pi f . r]^2 . r = [\, \mathbf{n.\pi.c}\,]^2 . r \equiv$ **Kepler Universal Laws for** *macrocosm and microcosm* .

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

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

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

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

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

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

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

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

From [70] the velocity of Elementary particles is the light velocity-vector . $\bar{c} = \bar{v} = 2\pi r. f_e$

and the frequency $f_e = \frac{\bar{c}}{2\pi.r}$ ....(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 $2\bar{c} = [1 + \sqrt{5}]\sigma$,and A- momentum

$\bar{B} = \frac{[1+\sqrt{5}].\sigma.\pi.r^3}{4} = \frac{\pi r^3 \Phi.\sigma}{2}$ …(3) , 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 $\rightarrow E_R = \bar{B} . \bar{w} = 2L = J.w^2 = J\frac{c^2}{r^2} = [\frac{\pi r^4}{2}]\frac{c^2}{r^2} = \frac{\pi c^2}{2} r^2$ ....…(4)

Mass is the Reaction to any motion or change and is measured by the cave-moment of Inertia **J**.

Energy and frequency of Elementary particles can be found from cave r only since , c , is

constant .**Total-Energy** $\rightarrow \mathbf{E_T} = E_R + E_K = \frac{\pi c^2}{2} r^2 + \frac{1}{2} m.v^2 = \mathbf{1{,}4118323.10^{16}.r^2} + \frac{1}{2} \mathbf{m.v^2}$ ….(5)

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 $\bar{B} = m\,r\,v = m\,r^2 w = m\,r^2(2\pi f) = \frac{J.w}{2} = [\frac{\pi r^4}{4}].[2\pi f]$, 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 $r = 10^{-62} \ m$, then **Material-Points mass** $\rightarrow \mathbf{m} = \frac{\pi.10^{-124}}{2} = 1{,}570796.10^{-124}$ 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 $L = \frac{B_1{}^2}{2 J_1} + \frac{B_2{}^2}{2 J_2} + \frac{B_3{}^2}{2 J_3}$, 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 $B^2 = 2LJ = 2LJ = 2L\frac{\pi r^4}{2} = \pi L.r^4$ and $\pi L = B^2.r^4$.

2b.. In Planck`s Scale , length $r = L_p = 1{,}616199.10^{-35} \ m$ 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 $\mathbf{c} = w\,r = 2\pi r\,f$, frequency $\mathbf{f} = \dfrac{c}{2\pi r} = \dfrac{2{,}998\ 10^8}{2\pi.1{,}616199.10^{-35}} = 2{,}95236210^{42}$H

and Period $\mathbf{T} = \dfrac{2\pi r}{c} = 3{,}3871185.\,10^{-43}$ s . **From Angular momentum** $\overline{\mathbf{B}} = r\,m\,v = \dfrac{\pi^2 r^4}{1}\,f$

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

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

$= 2{,}997999.\,10^8$ t/m2 $= 2{,}997999.\,10^{10}$ Kg/m2 , and Angular velocity $|w| = \dfrac{\sigma}{2r}\,[\,1+\sqrt{5}\,\,] =$

$(\dfrac{2{,}997999.10^7}{2.1{,}616199.10^{-35}}).\,1{,}6180339 = 1.5007013.10^{42}$, or $|\mathbf{w}| = 1{,}5.10^{42}$ rad/sec , and the constant

figure of Energy is that of Stress $\boldsymbol{\sigma} = 2{,}997999.\,10^{10}$ Kg/m2 $= 2{,}997999.10^{10}$ Joule .

Velocities in caves become from equation $\mathbf{v^2} = \dfrac{2}{m}\,[E - \{\dfrac{k}{r} + \dfrac{L^2}{2m\,r^2}\}] = [4\pi^2.\mathbf{k}]\ .\ [\dfrac{1+e}{r}]$ 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 $E = \dfrac{mv^2}{2} + \{\dfrac{k}{r} + \dfrac{L^2}{2m\,r^2}\}$ where $\mathbf{L} = \mathbf{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 , $w^2 = [\,k/m\,]$ the equation , $m\,\ddot{x} + w^2\,x = 0$, with solution $\rightarrow$ the Period

$\mathbf{T} = 2\pi\ .\sqrt[2]{\dfrac{m}{k}}$, 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 $\overline{\mathbf{v}} = \sqrt{\dfrac{2}{m}\,[E - \{\dfrac{k}{r} + \dfrac{S^2}{2m\,r^2}\}]}$ and for $v = c$ then , $\mathbf{E} = \dfrac{mc^2}{2} + \dfrac{k}{r} + \dfrac{L^2}{2m\,r^2} = hf_R$.

From Hydrogen Orbit-motion , $r = \sqrt[3]{\dfrac{1}{k\,.f^2}}$, or $\mathbf{k}.f^2.r^3 = 1$ 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 $L = \overline{B}\,\overline{w} = \dfrac{J.w}{2}\,w = \dfrac{\pi r^4}{2}\,[2\pi f]^2 = \mathbf{2\pi^3 r^4 f^2} = r\,mv = r\,m\,.wr$

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

$= \dfrac{\pi\,r^2}{2}\mathbf{v^2} = \dfrac{\pi r^3}{2}\,[n.\pi.c]^2 = \dfrac{\pi^3\,r^3}{2}\,\mathbf{c^2}$, 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 , r^3 , and Energy w^2 times of light velocity**.

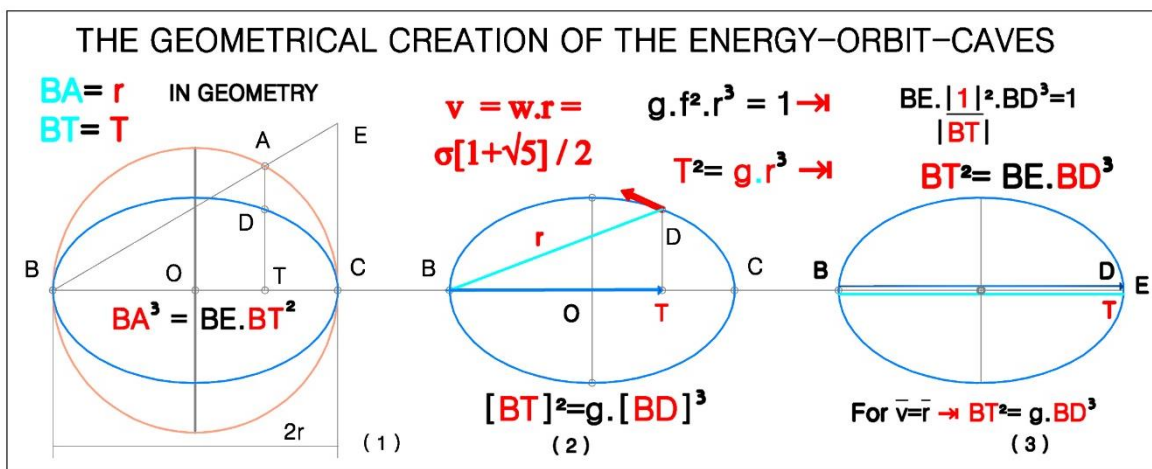## C... THE ENERGY CAVES , AND E - GEOMETRY :

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

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

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

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

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

$BA^4 = BT^2. BA.BE$, or → $\mathbf{BA^3 = BT^2 . BE}$ or → $|\frac{1}{BE}|.BA^3.|\frac{1}{BT}|^2 = 1$ **o.ε.δ**   …...(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 .

4.. Linear -Vibrations [$\ddot{x} + w^2 x = 0$]   of **Two-masses** In Orbit-Caves , **Occur on Line Vectors** or on Straight-lines in the **x , y** Plane .

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_φ = 90⁰ emission is → The Eight-Shapes   ∞ .

   b.. Difference of Phase d_φ = 0⁰   emission is → The Ellipse-Shapes ∝ .

   c.. Difference of Phase d_φ = 45⁰ emission is → The Double-Saddle-Shapes . ꒐ , ꒑ .

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

   $e^{-i.(\pi/2+2k\pi).w} = e^{-i.(\pi/2+2k\pi).b} = e^{-i.(5\pi/2).b} = e^{-i.(5\pi/2).10}$ …..…….. (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 → $z^{1/w} = (s + \bar{v} \nabla i)^{1/w} = |zo|^{-w}.[\cos.(\varphi + k\pi)/w + i.\sin.(\varphi + k\pi)/w]$

$= |zo|^{-w} . e^{-i.(\varphi+k\pi).w}$ 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 , $z^{1/w} = |zo|^{-w}. e^{i.(\varphi+k\pi)/w} = e^{-i.\left(\frac{\pi}{2}+k\pi\right).10}$ 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} m^4, Angular velocity $w_e = \frac{v}{r_N} = \frac{c}{1836} = \frac{3.10^8}{1836}$ = 1,633.10^5 m/s because of

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

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

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** $[\frac{s.m_e.}{2\pi.J_3 w}]$which passes through atoms structure and **as Energy-Spring in Magnetic-field ,** Strengthen and manifested , **as The Images in MRI** .

This Property of Electron-Nutation is Probably very Interested in Medicine , MRI and in

many other Media as **Mobiles** and Others , because of → ⟨r_{min} | ʊʊ |f_m⟩↔[f_N] ←

It is proved in [90] that this Energy-Spring of Electron-Nutation creates the Energy-

Bonds in Atoms so that these bond Originate-Molecules .

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

1. The **Unit-Quantization** of Planet-Focus line **r** , sweeping **r .mv =k**= Constant-Area
2. The **Unit-Cave-Energy Quantization** as Work 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 = $\frac{1}{a^3}[\frac{4\pi^2}{c^2}+\frac{S^2}{2m}]$ **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) is the 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... Hydrogen-Circular-radius a = $\sqrt[3]{\frac{1}{g.f^2}}$ = 2,1145016. 10^{-11} m , is from f_1 = E/h =13,6 eV/h

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

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Electron-Nutation is measured as → k = $\frac{2,1145016.10^{-11}(2,998.10^8)^2}{4\pi^2}$ = $4,81406.10^4$ m³/ s²

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 .

D..   THE PHOTONS   :

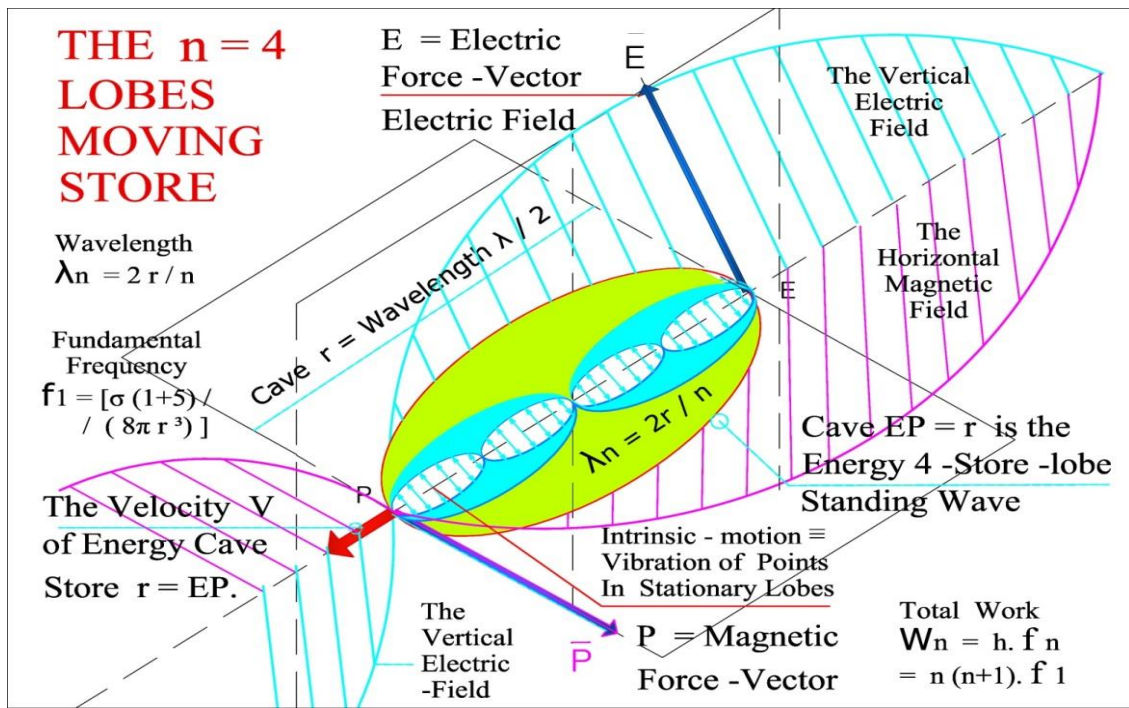**Figure - 2 - :** The Propagation of Photon-Electromagnetic-Field-Storage EP :
In figure   r =λ/2 = EP is the **Energy-Storage-monad** [S≡EM-R ≡ $f_{1=N}$, f_2 , f_3 , f_D ,, f_n= w²]
with wavelength $\lambda_N = \frac{\sigma.(1+\sqrt5)}{4\pi r} = \frac{2n.\bar{B}}{\Phi\pi^2 r^5}$ = $\frac{f}{c\Phi}$, **as Particle** , where velocity $\bar{v}$ = w.r , follows
the **Breakage-Principle** which is Quaternion $\bar{z}$ = [s + $\bar{v}$ ∇i   or → s² - $|\bar{s}|^2$ +2|s|².∇i ← ≡
[εE² +µB²]   ≡ **The Energy-monad , EP , and as a Wave** as ,

       Matter   (+)   ≡   Magnetic-field → [µB²] ≡ The Storage-Basket
       Antimatter (-)   ≡   Electric-field   → [εE²] ≡ The Moving-Basket
Energy (+↔ -) ≡ Motion in **n** lobes → as [∂E/ ∂t , ∂H/ ∂t]   i.e.

The Stationary-Cave-lobes , consist the **Particle-Photon** as the Inside **motion , in the cave**

r = n [λ/2] Energy-Storage , and [E² + H²] = 2.(2r).c.sin 2[φ ≡ $\frac{\bar{B}}{\Phi}$] , the **Wave-Photon** .
Energy-Storage-monads are consisted of the above **Three-constituents** all-together ,

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

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

$$\text{for} \quad \lambda_n = 2r \text{ , then } v_n = v_1 \text{ , and then } \quad n . \lambda_n = 2.r \quad \textbf{or}$$

The Work , W , Produced *from the Wave-Energy-Pattern , with wavelengths λ_n , and* Created *from all Points of the Periodic Oscillation in any Cave , r , is Stored into the , n , Integer and Energy - Lobes of this cave r ,* where $E^2 + H^2 = B^2$.

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 $2\lambda = r = h/p$ $\equiv [f_1 , f_2, f_n = w^2 \equiv \textbf{n}$ 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-2 In Electromagnetic field , EM-field , **Magnetic-field is the Store in which Energy $\equiv$ motion is Stored , and Electric-field is the Force ,** *The Energy* **, which Pushes the [Energy-Store- Basket $\equiv$ 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 $\lambda_4 = \frac{2r}{4}$,

$f_4 = \frac{4v}{2r} = 4f_o$, 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 $W = \frac{80.\pi r^2 f1}{3}$, $v_4 = \lambda_4 . f_4 = 4.\lambda_4 . f_o$, 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 $f_n = n. f_o$, **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 $f = \frac{n.\bar{v}}{2\pi.r}$ 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 ,** $x = v_o .\sin wt = A .\sin [\sqrt{(a/Am).t} + \pi/2]$ ……..(1) where

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

b.. Angular velocity $\rightarrow |\bar{w}| = \frac{\sigma}{2r} [1 + \sqrt{5}]$, 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** $E \rightarrow \partial E/\partial t \rightarrow H \rightarrow /\partial t \rightarrow H$.

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

$$[E^2 + H^2] = 2.(2r).c.\textbf{sin 2φ} \quad ….. (2)$$ on-where exists the **Skin-effect . [68-70]**

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

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

The-Particle ≡ [E² + H²] = 2(2r).c.sin 2[φ ≡ $\frac{\overline{B}}{\overline{Φ}}$] , of wavelength $λ$, *Outward* $λ$, as **The Outer Electromagnetic-Wave** → {**The-Wave ≡ [εE² + μB²] = 2.λc.sin.2φ**} ← and allows all the   **Energy-Wave-Storages** to Propagate any Distance   in Vacuum without any dissipation .

This Inner-motion   **≡**   Work W , from the Wave-Energy-Pattern   with Wavelengths $λ_n$, is created from all $±$ Points of the Periodic Oscillation in any cave **r** , and is stored in the **n**   lobes as motion .This motion is conserved and is transported through vacuum at the speed of light **c** . Since the **Medium-Field- is the   Material-Fragment → [± s²] = [MFMF] ≡ *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 $\overline{v}$, 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 ≡ cave , so exists in **Vectors** the **Quantum-Constant-Work**   →   **k = $\overline{v}x\overline{v}$. $\overline{r}$ = v².r ,** and becomes from relation $n λ = 2r$, issuing $2r = n v / f$,   and is $v = λ f$ or   → $\overline{v} = \overline{c} = λ f$.

Constant-Work $k = v^2. r = (w r)^2.r = [\frac{2π}{T}r]^2.r = \frac{4π^2 r^2}{T^2}. r = \frac{4π^2 r^3}{T^2} = 4π^2. \frac{r^3}{T^2} = 4π^2.r^3.f^2_p$ →

which are the universal ***Kepler Laws for macrocosm*** .

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

The mechanism of **Energy-transport through a Medium** involves the ***Absorption and the Reemission*** of the wave-energy by the Atoms of the material . Since   Quanta of Energy occupy a finite space $λ = 2r$, 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 ≡ 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 → Electromagnetic-wave ≡ motion ← .

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*** .

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   λ = 2r / n** ,

[+] Electric-field as Space-motion , and   [-] Magnetic-field as Anti-space-Store . [70]

The Duality of Photon And   Origination   of the Nutation motion

The Electric force $\mathbf{F}$, originated in , *Energy-field* $\mathbf{E}$, by any two charges q_1, q_2 and Spread in a Fixed distance , $\mathbf{r}$,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]
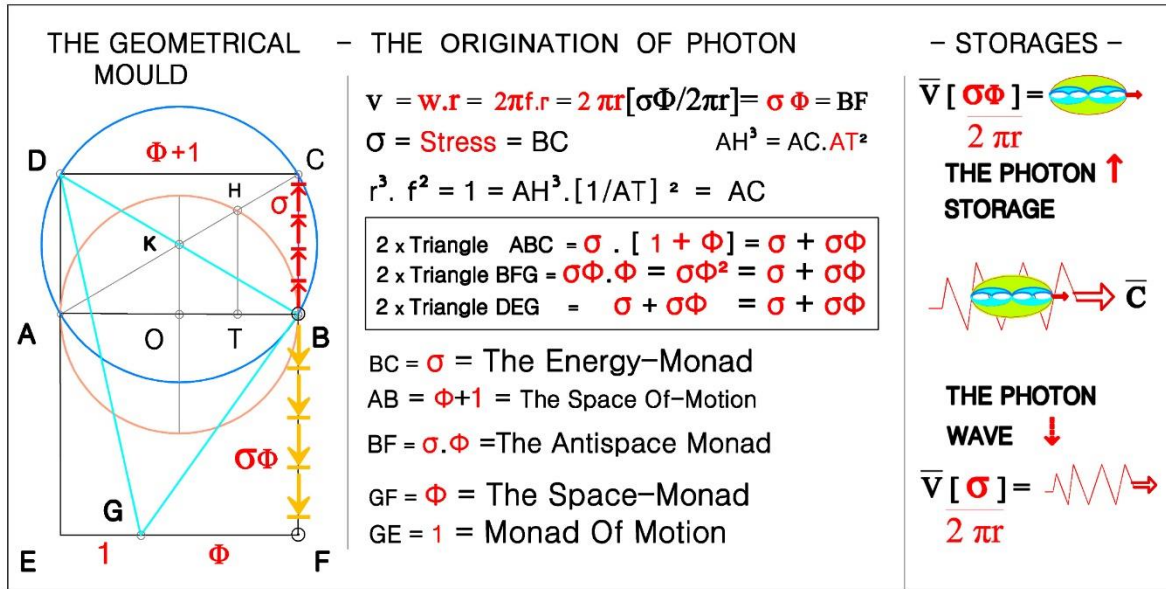
1d...   The Duality   Of Isochronous Photons :

Figure – 3 - : The Material-Geometry **Mechanism-of-motion** in Photons-Cave   :
In Material-Point the Cycloidal-acceleration g_{cyc} is transformed as Centrifugal acceleration $\mathbf{g_{cyc}} = \frac{(2\sigma)^2}{r}$, and frequency $w^2 = \frac{g}{4r} = \frac{(2\sigma)^2}{r.4r} =$ constant , and so Angular-velocity w ,becomes $w^2 = \frac{(2\sigma)^2}{4r^2} = [2\pi f]^2$, or   **frequency of Photon** $\mathbf{f_p} = \frac{\sigma = [\sigma\Phi]}{2\pi r} = \frac{(1+\sqrt{5})\sigma}{4\pi r} = \frac{\sigma.\Phi}{2\pi r}$ …(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 = $\frac{J.w}{2}$ w = $\frac{J.w^2}{2}$ then 2L = J.w² ,and $\overline{B}$ = r.mv = r$\frac{\pi.r^4}{2}$2πf r = $\boldsymbol{\pi^2.r^4.f}$

From momentum relation $\overline{B}$ = m r v = m r² w = m r² (2πf) = $\frac{J.w}{2}$ = $[\frac{\pi r^4}{2}].[2\pi f]$ then Spin S ≡

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

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

BC = |σ| =   The **Glue-Bond** 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 = |Φ.σ| =   **The Anti-Space** , and   FG = |Φ| = The **Space** magnitude .

From Kepler 2nd Orbit laws the Unit-Quantized-Area , or Unit Quantized Energy is that per /sec → r dφ , and as equation 1 = k .f ^2_u r³ , and expresses the area of triangles .

Triangle 2(ABC) = BC.BA= σ.[Φ+1] ≡ σ.Φ + σ = [**Stress-In-Storage]** + [**Moving-Stress]**

The Duality of Photon And   Origination   of the Nutation motion

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

Triangle 2(BFG) = FB.FG = σ.Φ[Φ] = σ.Φ² = σ.[Φ+1] ≡ σ.Φ + σ ≡ **S + M**

Triangle 2(DEG) = EG.ED = σ +σ Φ   =   σ.[1+ Φ] ≡ σ.Φ + σ ≡ **S + M**   and

Energy = motion / T $\equiv (\frac{v}{2\pi r})$. [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-Storages** , That travelling ,

as Particle   [$\bar{v}.\boxed{\bar{f_n}}$] → [$\bar{v} = \bar{c} = \lambda\frac{f}{\Phi}$] →   [S≡EM-R ≡ $f_{1=N}$, f_2 , f_3 , f_D ,,f_n= w²]   and ,

as Wave   [f_1= (E²+H²) = n $\frac{(1+\sqrt{5})\sigma}{4\pi r}$ = $\frac{\bar{B}}{\pi^2 r^4}$] → {W≡EM-R ≡ [εE² + μB²] = 2.λc.sin.2φ}

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

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

1.. Energy-Storage   S $\equiv \boxed{[\oplus \leftarrow \; r \; \rightarrow \ominus]}$ ≡ **Particle** [$\bar{v}$. $\boxed{\bar{f_n}}$] → [$\bar{v} = \bar{c} = \lambda\frac{f}{\Phi}$] → i.e.
  a Stationary Standing - Wave →   [S≡ EM-R ≡ $f_{1=N}$, f_2 , f_3 , f_D ,,f_n= w²] .

2.. Energy-Motion M $\equiv \boxed{\bar{v} - Vector}$ ≡ **Wave** [$\bar{v}$. f_n] ≡ [f_1= (E²+H²) = n $\frac{(1+\sqrt{5})\sigma}{4\pi r}$ =

= $\frac{\bar{B}}{\pi^2 r^4}$] → i.e. **a Propagating Wave** {W≡ EM-R ≡ [εE² + μB²] = 2.λc.sin.2φ} .

The Physical-Interpretation of f Photon   :

Using the Material-Geometry-Vectors   then ,

From Frequency f_{Photon} = $\overline{AB}$ x $\overline{BC}$ = [Φ+1] x [$\bar{\sigma}$ ≡|$\bar{\sigma}$|.Φ ≡ σ.Φ] = Φ² .σΦ = σ.Φ³ or

f_P ≡ $\overline{AB}$ x $\overline{BC}$ ≡ σ.Φ³ ≡ $\boxed{\bar{\sigma} - Stress}$ $\boxed{[\oplus \leftarrow \; \Phi \; \rightarrow \ominus]}$ $\boxed{[\oplus \leftarrow \; \Phi \; \rightarrow \ominus]}$ $\boxed{[\oplus \leftarrow \; \Phi \; \rightarrow \ominus]}$

and →→→ **Primary-Energy ≡ G / f_P ≡ 1   OR G^{-1}x σ x Φ³ ≡ 1** ←←← *where*

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

σ ≡ The Glue-Bond-Stress in Material-Points   σ = $\frac{2\pi r f}{\Phi}$ = $1,85.10^{11}$ Kg/m2   and , f
  from Material-Point-frequency **f** = $\frac{c}{2\pi r}$ = $2,95236210^{42}$ H , in **r** = L_p= $e^{-i.(5\pi/2).10}$
  Planck`s Length L_p= $e^{-i.(5\pi/2).10}$ = { $\sqrt{3}.\pi.$ **1,616199**$.10^{-35}$ m }

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

i.e. Universe is a Monad , Becoming from a **HUGE-MAGNET** of Opposites ⊕ , ⊖ which
  Forms >→ The **3-Dimentional SPACES Φ** , **ANTI-SPACES** |Φ.σ|, and >→ The
  ENERGY ≡ MOTION through the **G -** Force and Stress - **σ** becoming from Photon.

  Ubiquity of Material-Geometry in Electromagnetism is Everywhere .   15/3/2020
                                                            A wide Analysis in [90].
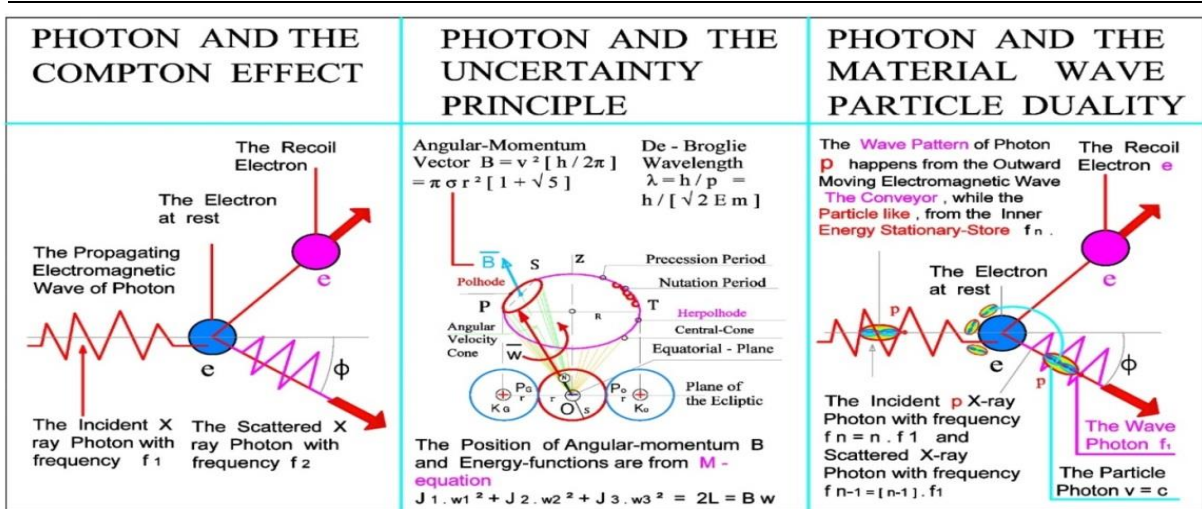
2d... Applications   :

    The Duality of Photon And   Origination   of the Nutation motion

PHOTON AND THE COMPTON EFFECT	PHOTON AND THE UNCERTAINTY PRINCIPLE	PHOTON AND THE MATERIAL WAVE PARTICLE DUALITY

Figure – 4- : The Wave-Particle Duality of Photon as .

The **Wave** [$f_1 = (E^2 + H^2) = n \frac{(1+\sqrt{5})\sigma}{4\pi r} = \frac{2.\overline{B}}{\pi^2 r^4}$] - **Particle** [$\overline{v} = \overline{c} = \lambda \frac{f}{\Phi}$] → Duality

In Revolving or Rotational motion , which is the opposite of prior , in the **Moving Photon-Tank** - B_R , and because of Stress σ , is created the Centrifugal-Force F_f .
Photon is a Material-point ,a Box B_P with fix-ends and an **Inward-cave** , r , which is the **Energy-Storage B_P** , and **Outward cave** , r , as **an Electromagnetic - Radiation** of wavelength $\lambda = c T = c / f_P$ **which carries** , Pushes , the Storage B_P .
The Electromagnetic Radiation follows the **Golden-ratio-frequency f_P** ,of the **Photon** which is **produced in Box** from the **Centripetal-Centrifugal-forces** equal to the main **Stresses $\pm \sigma$** . This is the Why Golden-ratio-frequency $f_P = \frac{\sigma.r}{\pi.\overline{B}} = \frac{n\sigma.\Phi}{2\pi r}$ exists in nature from the micro to the macro scale and is a **Pressure everywhere** in all 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 ≡ Force x Space** , and which is conserved as motion in Space-Boxes.
Potential-Energy ≡ P_E **stored** in Material-point is the Electric-Field $E = g \pi$ **,** in where [$\oplus$ moves to $\ominus$] and thus from Geometry-Shape are created the two opposite Angular momentum vectors and from Dipole the Spin $S = ½$ 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 $\pm$ **Spin S .** Material Points , Segments etc. consisting the Physical Structures . In the finite-Space of Material-point , *cave **r** , is stored the Work as frequencies ,* Because Stress $\sigma > 0$, Spin ≡Angular momentum $\overline{B}$, is equal to AM /Unit-Area = AM / π ,and

frequency $f_n = \frac{\overline{B}}{\pi^2 r^4}$ so **Spin is either Positive or Negative** and equal to the Electric-Charge

$\overline{E} = \pm AM / \pi$. 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 f_1 of equation $W = [\frac{4\pi r^3}{3}].f_1 = \frac{(1+\sqrt{5}).\sigma.r^2}{3} = 2L = \overline{B}.\overline{w} = J.w^2$.

The Duality of Photon And   Origination   of the Nutation motion

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

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

$$\mathbf{F_{photon}} = \frac{[\oplus<\rightarrow\leftarrow\ominus]}{r^2} = \frac{[\sigma.\sigma]}{r^2} = \left|\frac{\sigma.}{r}\right|^2 = \left|\frac{2\pi f.}{\Phi}\right|^2 = \left|\frac{w}{\Phi}\right|^2 = \left|\frac{2B}{\pi r^3\Phi}\right|^2 = \left|\frac{\bar{c}}{r.\Phi}\right|^2\ \text{ , in the same Box } B_e\text{ , since}$$

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

Above relation agrees with *Laplace-equations* for Incompressibility and Irrotationality where $\nabla x\bar{q} = \bar{r}_x + \bar{v}_y = 0$,and $\nabla x\bar{v} = \bar{v}_x - \bar{r}_y = 0$, meaning that Space , $\bar{r}$, and Energy ,$\bar{v}$ = motion , are Interchanged $\rightarrow$ Because from the first relation the *Magnetic-field-Space* $\bar{r}_x$ creates the *Electric-field-Energy* $\bar{v}_y$, and from the second $\rightarrow$ *Energy* $\bar{v}_x$ Pushes the *Space* $\bar{r}_x$. From Electron-Orbit-equation $4\pi^2 f^2_e.m_e = k = \pi g$ 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 $\{\mathbf{f_1} = \frac{(1+\sqrt{5}\,).\sigma}{4\pi r}\}$ x $\bar{B} = [\,\sigma\,\Phi\pi\,r^3]$ $\mathbf{f} = \frac{\bar{B}^2}{\pi^2.r^4} = |\frac{\sigma^2\Phi^2}{2\pi.c}|\bar{B}$, filling up the entire universe .

Stationary-Electron-Charge q $\equiv \ominus$, with **Orbit-Velocity-Vector** $\bar{v} = \sqrt{\frac{2}{m}[E - \{\frac{k}{r} + \frac{L^2}{2m\,r^2}\}]}$

occupies Zero Kinetic energy between $Q_{1.}, Q_2$ therefore , $K_E = \frac{mv^2}{2} = E - \{\frac{k}{r} + \frac{L^2}{2m\,r^2}\} = 0$

or $\mathbf{E} = \{\frac{k}{r} + \frac{L^2}{2m\,r^2}\} = \frac{\pi g}{r} + \frac{S^2}{2(g/4\pi f^2)\,r^2} = \frac{2\pi}{g\,r^2}[\,\mathbf{g^2 r + S^2.f^2}\,]\ldots$(s) Equation (s) issues for Spinning

Points , and Atoms-Stationary-nucleus and is **the Strong-Force between Nucleus-Protons**.

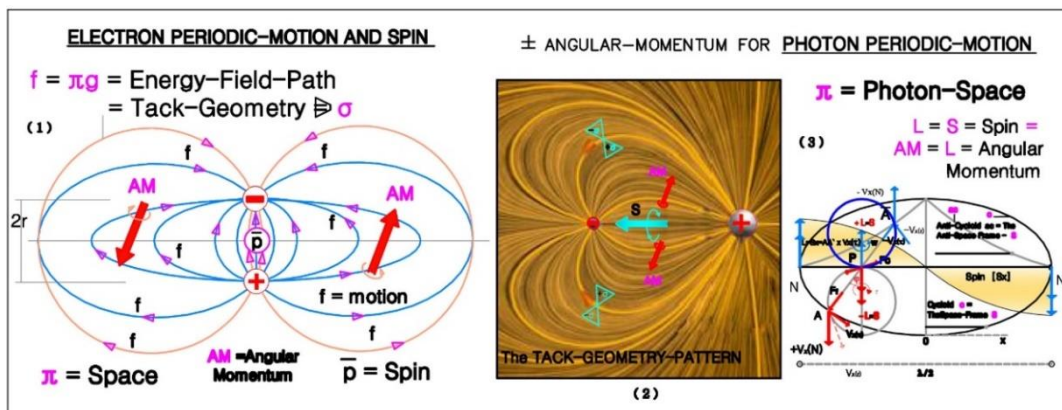**3d... The Periodic motion in all Displacements :**

Figure – 5- : The Two Possible motions in caves , **The Periodic** and **The Rotational** .

The Duality of Photon And Origination of the Nutation motion

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

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

then f = 3,28393.10^{15}/s , in cave a = 2,11450164.10^{-11}m . From Linear-Periodic-motion

$\dfrac{w_n}{2\pi} = f_e = \dfrac{1}{2\pi} \sqrt{\dfrac{k}{m}}$, or $4\pi^2 f^2_e \cdot m_e = k = \pi g$, 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 $\overline{\textbf{B}} = \textbf{a m v} = 2,11450164.10^{-11}$ m $.7,2373149.10^{-32}$ kg. $2,99798 . 10^8$ =
4,5879026.10^{-34} / π , and $\to$ **S/2 = 1,4603748. 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** $[\oplus\cup\circledR\cup\ominus]$directed to $[\oplus\to\ominus]$ as is in ***Tack-Geometry.***

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

the corresponding cave **a** is for Energy-monads ,

In (**2**). Is formatted the Energy-Space of M-P vibration of opposites which creates a
wave which has an Electric , **E** , and an Magnetic component , **H** , perpendicular each other
and is as [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 ,***Tack-Geometry*** .This Property of the Periodic
motion in M-P conserves **The Inner-Magnetic-Wave** , into the Centre of mass-Charges
with a changeable Spin ,S, between ,- S, to + S, resulting to a Stationary-State. i.e. it is
a continuous – S + S = 0 , torsional equilibrium ,where Charge is equal to the Angular
Momentum-vector per Unit-Plane or S =AM/ π = r m v= [a m c] / π $\to$ Spin S =[$\dfrac{amc}{\pi}$]

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 $\sin\dfrac{2rw}{v} = 0$, or $w_n \dfrac{2r}{v} = n \dfrac{4\pi r}{\lambda} = \dfrac{4\pi r f}{v}$, where n =1, 0, $\lambda = \dfrac{c}{f}$ is

the wavelength and , **f** , is the frequency of oscillation , *i.e.*   The , **n = 1** ,defines

a Normal mode vibration with **natural frequency** as $\to$ $f_n = \dfrac{v}{2\pi r} = \dfrac{\sigma}{4\pi r}$ **[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 $\overline{v} = \sqrt{r^2 + m^2\overline{v}^2}$, 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 $\to \nabla^2 E =$

The Duality of Photon And   Origination   of the Nutation motion

$- \nabla E = - \nabla \overline{B} = - \nabla \sqrt{\overline{r}^2 + m^2 \overline{v}^2}$ and squaring $- \nabla \overline{r}^2 + [2\pi m f \overline{a}]^2 = 0$ issues $\overline{\mathbf{r}} = \mathbf{-\ 2\pi m f.\overline{a}}$ ….(**1**)

The condition for *Irrotational Energy* is → $\nabla x \overline{B} = \nabla x \overline{S} = 0$, or $\nabla x \overline{B} = \nabla \overline{r} + 2\pi m f.\overline{a} = 0$,

and vector $\overline{\mathbf{r}} = \mathbf{2\pi m f.\overline{a}}$ …..(**2**) .   Relations (1) , (2) , $+ \overline{\mathbf{a}}$ and $- \overline{\mathbf{a}}$, denote the

Alternative-Positions of Magnetic Field in the **Two-transverse-Positions** as in Fig 5 - (2) .

For Photons which force is $F_{photon} = \frac{[\oplus < \rightarrow \leftarrow \ominus]}{r^2} = \frac{[\sigma.\sigma]}{r^2} = \left|\frac{\sigma.}{r}\right|^2 = \left|\frac{2\pi f.}{\Phi}\right|^2 = \left|\frac{2\overline{B}.}{\pi.r^4\Phi}\right|^2$, issue above .

Since for Electron $4\pi^2 f^2{}_e .m_e = \mathbf{k} = \mathbf{\pi\ g}$, then for Gravity issues $- \nabla E = - \nabla g = 4\pi.m_e f^2{}_e$.

4d..   What is Electron e , and   e-Charge   :

Electron is created through the vibration , $\mathbf{f_n}$, in the *Energy-Space* , $\mathbf{g}$ - $\mathbf{\pi}$, *meters* .

Electron follows both Rotational and Linear motion so **Constant-Energy k** is the same .

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

The **Spring-like central-force** from a fix point , *the Source* , on an attached , *probe* ,

mass is $F = - k\ r = - k\ r.\overline{r}$ 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 $x = [\dot{x}(0) /w_n]. \sin w_n t + x(0). \cos w_n t$ …..(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 ,

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

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

From Planck`s equation $f_e = E / h = [- 13,6 \times 1,6.10^{-19} = 2,176.10^{-18}$ Joule] /

$[6,626.10^{-34}$ J.s $] = \mathbf{3,283998.10^{15}}$/s , where min-energy -13,6 eV is Hydrogen-atom

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

$\mathbf{m_e} = \frac{\mathbf{g}}{4\ \pi\ f^2{}_e} = \frac{9,808238}{4.\pi.[3,28399.10^{15}\ ]^2}$ $= \mathbf{-\ 7,2373149.10^{-32}}$ kg ……… (2b)

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

Equations becomes from relation   → $\mathbf{4\pi.f^2{}_e .m_e = g}$ ←   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 → $\overline{q} \equiv \frac{m_e\ c^2}{2} = \frac{g\ c^2}{8\pi f^2}$. From Gravitation

$\mathbf{G = k_e .g}$, and Voltage $\overline{V} \equiv V_P \equiv \frac{c.\overline{q}}{h}$, Spin = B / π , where Electrons-equation of

motion in $\oplus < \rightarrow \ominus$ is $\ddot{r} + w^2 r = 0$ and equation`s Solution → $\mathbf{4\pi.f^2{}_e .m_e = g}$ ←

which is the *Electron* , and   *Charges* , $\overline{\mathbf{q}}$.

Electron Charge $\overline{\mathbf{q}}$ Becomes from Magnetic Field **M** which creates the Electric-Field

E ,which is acting on Charge $\overline{\mathbf{q}}$, and the acting Force per second creates Work which is

conserved and coincide with the Planck`s constant **h** .This is because $\mathbf{h} \rightarrow$ J s = N m s =

Power ,where from, *Energy = Power* x *Time* , issues the Beyond Planck`s length $\mathbf{L_P}$, &

Voltage **V** as → $\overline{q} \equiv \frac{K_E}{V_P = 1} = \frac{m_e\ c^2}{2} = \frac{g\ c^2}{8\pi f^2.1}$ and $\overline{V} \equiv V_P \equiv \frac{c.\text{Charge}}{\text{Total} - \text{Energy} = h} = \frac{c.\overline{q}}{h}$ ...(1)

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

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$a = \sqrt[3]{\dfrac{1}{k.f^2}}$, for **Unit-Energy-Space-frequency** k = g , a = π , then → **g .f ². π ³ = 1**   ...(2)

Frequency $f_n = \sqrt[2]{\dfrac{1}{g.\pi^3}} = \sqrt[2]{\dfrac{1}{9,808238.\pi^3}} = 1,8133418.10^{-3}$, 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
Material-point , therefore and for Hydrogen-cave is equal to → $\bar{q}$.Φ ,
Because Gravitational Force is equal to → the Geometric-Resultant of light-velocity

c , acting on **Electron-Unit-Charge** $\bar{q}$ ← or , **G = c $\sqrt{2}$ $\bar{q}$** , then Electron-Charge is

$\bar{q}$ Electron $= \dfrac{G}{c\sqrt{2}} = \dfrac{6,680561 .10^{-11}}{1,41429.2,9979346.10^8} = 1,58.10^{-19}$ C .

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

$\bar{q}$ Photon $= \dfrac{G}{\sqrt{2}.f} = \dfrac{G.h}{\sqrt{2}.E} = \dfrac{[6,680561 .10^{-11}].[6,62606957.10^{-34}]}{\sqrt{2}.E=1} = 3,13 \ 10^{-44}$ C .

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

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

$f_n = n \dfrac{(1+\sqrt{5})\sigma}{4\pi r} = \dfrac{n.\bar{B}}{\pi^2 r^4}$ and for a damping-cave → r(t) = r(t +w) with min-Damping= 1

and Unit-Energy-Quantity W_u , (**critical-energy unit**) in-min , r , which is *Gravity* **g** .
From , **Orbital-Periodic-motion** is formatted the Energy-Space of the [$\oplus$<→ to $\ominus$]
in **Tack-Geometry-Pattern** and formulation ,where for minimum Planck **L $_P$** $\equiv$ **a** cave

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

= 3,28393.10^{15}/s , and is in Planck **L $_P$** , minimum $\equiv$ **a** cave = 2,11459164.10^{-11} m .
The Cave-Spin is equal to The Moment of couple from two ↑↔↓Angular-momentum
vectors $\bar{B}$ = a m v = 2,11450164.10^{-11} m .7, 2373149.10^{-32} kg. 2,99798 . 10^8 =
4,5878294.10^{-34} / π , and → **S/2 = 1,4603514. 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 $\equiv$ ↑ is the *Produced Work and stored in Magnetic-field* as motion while left-vector
AM $\equiv$ ↓ is the Produced Work and stored in the opposite Magnetic field as motion and
both consist the Dipole [$\oplus$↻®↺$\ominus$] vector directed as [$\oplus$<→$\ominus$] of **Tack-Geometry.**
The equation of a Circular-Magnetic-field $B_F = \dfrac{mw}{q} = \dfrac{2\pi.m}{T.q} = \dfrac{2\pi m f_m}{Q_m}$ for mass-charges.

For RLC circuit issues the frequency $f_{RLC} = \dfrac{1}{2\pi}\sqrt[2]{\dfrac{1}{LC}}$, where **L ,** is the Electric field as
Inductance and **C** , the Magnetic field Capacitance . For Material-Point , the chains of
Spins due to Periodic excitation [<↔] is created in a Magnetic field due to LRC-circuit
and which is tuning to the critical Quantum and critical-State **g_G** . The *chains of Spins*

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are Pointy vibrating with their frequencies $f_S = \frac{(1+\sqrt{5}\,).\sigma}{4\pi r}\left[\frac{\overline{B}}{\pi^2 r^4}\right]$, as in Stationary-Photon.

The monads < charges > become from the Under –Planck`s cave $L_P = \mathbf{1,616199}.10^{-35}$ m
Where , $\mathbf{g}$, is not existing , therefore , charges , are not related with $\mathbf{g}$. The opposite happens
for masses where for definition *mass ≡ The Reaction to the change of motion ,* then since
$\mathbf{G}$ is acting on the Vibrating-monads $\mathbf{f_n}$ through $\mathbf{g}$, and for lack g is acting on velocity $\mathbf{c}$ as
$\overline{\mathbf{q}}$ Electron $= \frac{G}{c\sqrt{2}} = 1,58.10^{-19}$ C and for charges → Coulomb`s law is $\overline{\mathbf{F}}$ Coulomb$= k\,\frac{q.Q}{r^2}$.

  For Newton`s law $\overline{\mathbf{F}}$ Newton $= G[m\,M]\,/\,r^2$ is analogous to Coulomb`s and so ,
 1.. Electron is a Vibrating **Charge** , and issues the Parallel Gravity-Electrostatics.
 2.. Electron-Charge is the **Quantized-motion in light-velocity cave .**
 3.. Mass in Gravity g , is the meter of the **Reaction to the changes of motion** in g .

5d.. 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 .
$\mathbf{G} \equiv g.k_E \equiv g\,.[g_L\,k_L] \equiv [\frac{T_P^2}{a^3}].[g_L\,k_L\,] \equiv 9,8078925* 6,8116.10^{-12} \equiv 6,68056.10^{-11}\,\frac{\mathbf{m}^3}{\mathbf{Ns}^2}$
Electron being in Hydrogen-cave **Precesses** *because of the different axis of rotation* and
Nutation`s , *from the immense-communication to gravity* , g . Electron-Spin is the
Angular-momentum-vector $\overline{B}$ 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 →
$\frac{dB}{dt} = u = \frac{sQ}{B} = \frac{sQ}{J_3.w_3.}$ 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 ***Frequency*** $f_N = \frac{sQ}{2\pi.J_3 w}$ ....(1)
With Total Energy of Nutation [70] , $E_N = \frac{J_1}{2}[w_1{}^2 + w_2{}^2] + \frac{J_3}{2}\,w_3{}^2$ ....(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 $\mathbf{g_G}$ .The **chains of Spins** for the ONE-WAY Pointy vibrating is frequency

$f = \frac{(1+\sqrt{5}\,).\sigma}{4\pi r}$ x $\overline{B}$, and is as the Stationary-Photon where $\overline{B} \equiv \overline{S} \equiv$ Spin .

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

Since **Work** is **Produced** during motion , and **Conservation exist in Orbit** [p↔e] , so
the *Orbit occupies Energy as frequency quite differing that of those of Energy-levels .*
Since frequency $\mathbf{f_N} = \mathbf{f_R} = \mathbf{2,8398447.10^{10}}$ 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**.

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Energy from equation $\mathbf{E = h.f_N} = 6.62607.10^{-34} .2,8398447.10^{10} = 18,817009. 10^{-24}$ 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 $\mathbf{E_P = 20}$ 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. 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 , $U = E = h\, f = 6,62606957.10^{-34} .1,4199223.10^{10} =$
$\qquad 9,4.10^{-24}$ J $= 5,8722.10^{10}$ eV , which agree with Bohr-Magneton .

The Produced-Work in Orbit as Frequency $f_N = \dfrac{sQ}{2\pi.J_3 w} = \mathbf{2,8398447.10^{10}}$ 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** $\mathbf{w_0 = \gamma. \beta_0 / 2\pi}$, and for Hydrogen at 1,5 T Magnet , $\gamma = \mathbf{2,675.} 10^8$ / sT , $\beta_0 = 1,5$ T then $w = 63,864$ MHz $= 63,864.10^8$ Hz and frequency $\mathbf{f_N = 2\pi.w = 4,012575. 10^{10}}$ **s^{-1}**.

Remarks :

1.. Since the frequency created from Electron-Nutation is the 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 $\mathbf{f_N}$ **, 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 $\mathbf{E = B\, c}$.
3.. Since Resonance-frequency is IN the first Orbit of Atoms ,therefore allows Electromagnetic Wave , **to get out the Atoms-cave** , with Energy $E = h\, f_N$ or $E = 2\mu B$.
4.. Since Electron is rotating in Orbit then 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.

6d.. 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 $\mathbf{A} = \pi r^2$.
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 $\mathbf{A} = \pi r^2$.
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 ,
$\qquad$ Magnetic – moment . $\qquad \bar{\mu} = I . A \qquad$ …..……(a)
From material point ([86].p-48) $\quad 2L \equiv \overline{B}\overline{w} \equiv h . f$, $|w| = \dfrac{\sigma}{2r} [1+ \sqrt{5}]$, and $\quad f = \dfrac{(1+ \sqrt{5}) .\sigma}{4\pi r}$

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

From (a) , (b) the Angular – velocity - Ellipsoid $\overline{w}$, is the analogous to circular current ,I,

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and Angular - Momentum-Ellipsoid $\overline{B}$, is the analogous to the Torque , $\overline{\mu}$, on this circular

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

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

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

The effect of Magnetic-moment on an **External** magnetic **field** $\overline{P}$ is the Torque acting on the
Dipole $\overline{\tau} = \overline{\mu} \text{ x } \overline{P}$, representing the lowest Energy configuration , and has a Potential energy
$U = - \overline{\mu} \cdot \overline{P}$ with force in the loop $\rightarrow F_{loop} = \nabla(\overline{\mu} \cdot \overline{P})$ and for Dipole $\rightarrow F_{dipole} = (\overline{\mu} \cdot \nabla).\overline{P}$) or
$$F_{loop} = F_{dipole} + \overline{\mu} \cdot [\nabla x \overline{P}] .$$
The Potential energy associated with the magnetic moment is $U = - \overline{\mu} \cdot \overline{P}$ so that the difference
in energy aligned and anti-aligned is $\Delta U = 2\,\overline{\mu} \cdot \overline{P}$. From Physics ,The intrinsic magnetic

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

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

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

equivalent to angular velocity vector , $\overline{w}$, then $g_s = 2 \cdot (\dfrac{m.\overline{\mu}}{\overline{w}.S}) = 2 \cdot [\dfrac{m.(\overline{\mu}=2L`)}{\overline{w}.S=2L}]$ ....(d)

i.e. Dimensionless quantity g_s , is related to $\rightarrow$ mass **m** , charge **q** , Spin **S** , and Intrinsic
magnetic moment $\overline{\mu}$, or $\rightarrow$ 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*
anticlockwise in Left-Small-circle , [S = -1] , by rotation Up or Down to the circles , *or* .(c)
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** , $-\dfrac{1}{2}$, 1 , $+\dfrac{1}{2}$, **or** $+\dfrac{1}{2}$, -1 , $-\dfrac{1}{2}$ **only** .

The specific rotational velocity $\textbf{v} = w\,r = |w|\,r = \dfrac{\sigma}{2r}[1+\sqrt{5}].r = \dfrac{\sigma}{2}[1+\sqrt{5}] = \sigma\,\Phi$, 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 , (⊕) ,
(⊖) , 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

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Force , $\overline{B}$, is originated from the Glue-bond , $\pm\sigma$,of any two opposite constituents in Energy - caves . Since current , I , is the net outward current through a closed surface and , $\overline{q}$, 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** , $a_a = \dfrac{\overline{B}x\overline{w}}{J}$, where $J = \dfrac{\pi r4}{2}$ = The

Polar moment of inertia and from Newton equation $2E = m.a_a$ then , $\mathbf{m} = \dfrac{2E}{a_a} = [\dfrac{\overline{B}.\overline{w}}{\overline{B}x\overline{w}}]$. **J**

is the reaction to Angular-velocity changes in direction , a Scalar magnitude , and since Inertial mass is equal to Gravitational mass then , Mass of Material - point equals to ,

$\mathbf{m} = \dfrac{2E}{a_a} = [\dfrac{\overline{B}.\overline{w}}{\overline{B}x\overline{w}}]$ **. J** $\equiv$ *a number measuring Energy-quantities in caves* .

For an inclination of 45° then the Dot Product of $\overline{B}.\overline{w}$ is $\rightarrow |\overline{B}|. |\overline{w}| = |\overline{B}|. |\overline{w}|.\cos 45^o$ and the Cross Product of $\overline{B}x\overline{w}$ is $\rightarrow |\overline{B}|x|\overline{w}| = |\overline{B}|x|\overline{w}|.\sin 45^o$ equal to Dot Product , and In Planck`s – length - cave $r = 4,453. 10^{-35}$ then mass becomes $\rightarrow$

$$m = \dfrac{1}{1} . J = \dfrac{\pi r4}{2} = 617,63.10^{-140} = 6,1763. 10^{-138} \text{ Kg , and}$$

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

Since also $w = \dfrac{v}{r}$, 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 $\overline{B} = r m v = m r wr = m.w.r^2$, *mass* $\mathbf{m} = \dfrac{\overline{B}}{wr^2} = \dfrac{4\pi B}{\sigma.r^2(1+\sqrt{5}\,)} = [\dfrac{1}{2\pi f}]\dfrac{\overline{B}}{r^2} = \dfrac{B^2}{r^2E}$

$= \dfrac{2\overline{E}}{c^2}$ or $\rightarrow E^2 = \dfrac{(Bc)^2}{(2r)^2}$, and $E = \dfrac{Bc}{2r.}$ ...[m] *denoting the Unification of Energy and Mass* .
[m] is **The mass of Material-Point related to Any cave ,r,** and $\pm \sigma$ its Principal Stresses.
All Energy-levels follow the Space-Grainy-relation $f^2_n a^3 = k$ = **motion-Quantum** .

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

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

7d.. The Orbital-motion of Euler-Analysis : Figure -6- 1,2,3 :

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

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

J_1 , J_2 , J_3 $\rightarrow$ Are the Moments of Inertia of Ellipsoid related to Principal axis .

$\bar{w}$ $[w_1 , w_2 , w_3] \rightarrow$ Is the constant Angular-Velocity-Vector with respect to changes in

$\bar{i}$, $\bar{j}$, $\bar{k}$ $\rightarrow$ The Unit constant-vector of the moving Body-System . { the Origin}.

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

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

φ , θ , ψ $\rightarrow$ The Three axial angles of vectors $\bar{i}`$, $\bar{s_o}$ - $\bar{i}$ , $\bar{s_o}$ - $\bar{k}$ $\bar{k}`$

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

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

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

Energy Relations :

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

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

$\overline{Bw}$ = $Jw^2 (= 2L) = J_1{}^2 w_1{}^2 + J_2{}^2 w_2{}^2 + J_3{}^2 w_3{}^2$ $\rightarrow$ 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 $\bar{w}$-vector exists another radius of $\bar{B}$ $-$vector Perpendicular
to , The $\bar{w}$-edge Tangential-Plane of the Angular-Vector-Ellipsoid , and The $\bar{w}$-vector
is Perpendicular to the $\bar{B}$-edge Tangential-Plane of the Angular - Momentum-Vector
Ellipsoid . In case of Zero-Moment , related to the equilibrium Point O , then ,

**The motion of a Solid Body is Identical to the Rolling of the PO-$\bar{w}$-vector-Ellipsoid
[OP] in E tangential to [$\bar{B}$ = OT$\perp$ E] vector .** [70]

8d.. The Atoms Precession :
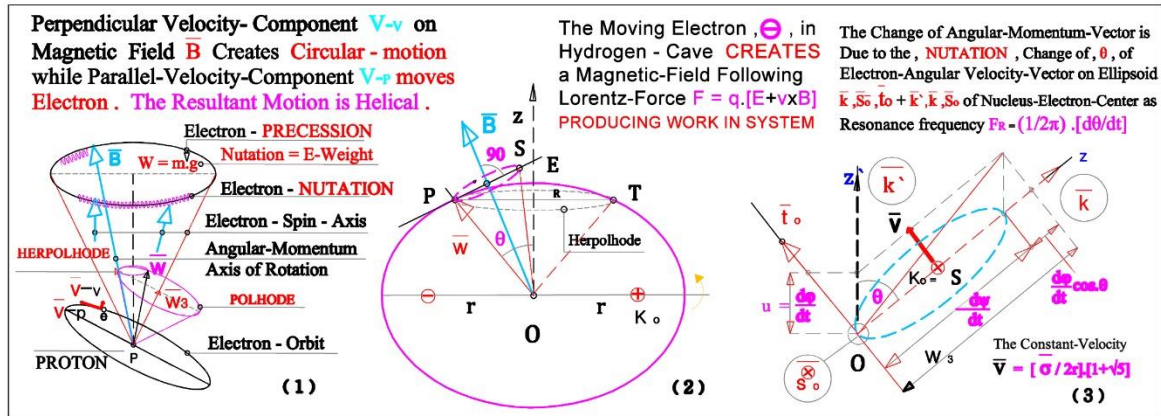
Figure – 6 - : The Electron`s Nutation in Precession :

In (**1**) **The Electron-motion creates a Magnetic-Field** $\bar{B}$ **, in which is Stored Work .**
{Velocity vector V_e is composed of the V_{-V} Perpendicular- constituent which
stores motion in circular-Helix-paths and the Parallel- constituent V_{-P} constituent
which is Pushing the energy-circles along a straight line }.

In (**2**) **The Angular Momentum-Vector** $\bar{B}$ **, and the Angular-Velocity-Vectors** $\bar{w}$ **,** of
Electron at Point P and Proton at Point O, are Perpendicular each other and are forming
the Herpolhode , OPT$\perp$OB , and Polhode , PS $\perp$OP , Ellipsoid.

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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 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 ,

$$J_1.\mathbf{u}^2.\cos\theta - J_3.w_3.\mathbf{u} + s\,Q = 0 \qquad ..... (18) \quad \text{where } \mathbf{u} = \frac{d\varphi}{dt} = \frac{dB}{dt}$$

with solution $\mathbf{u} = \frac{J_3.w_3}{2J_1.\cos\theta} \pm \sqrt{\left[\frac{J_3.w_3}{2J_1.\cos\theta}\right]^2 - \frac{sQ}{J_1..\cos\theta}}$ ...... (19) Displacement , $\mathbf{u}$,

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

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 $d\overline{B} = M.dt = [\overline{s_0}.Q]dt = s\,Q.[\overline{k}\ \overline{k}`]dt$ ......(20) 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 , $\ddot{\mathbf{u}} + w^2\,\mathbf{u} = 0$, then

Period of Nutation $T = \frac{2\pi}{u} = \frac{2\pi.J_3 w}{sQ}$, and *Frequency* $f_N = \frac{sQ}{2\pi.J_3 w}$ .... (21)

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

An Example : $\qquad E_N = \frac{J_1}{2}[\dot{\vartheta}^2 + \dot{\varphi}^2\sin^2\theta] + \frac{J_3}{2}[\dot{\psi} + \dot{\varphi}\cos\theta]^2$ ...(22)

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

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

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

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

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

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*].

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The moving Electron-vector is $\overline{V_e} = \overline{V_{e\uparrow}} + \overline{V_{e\rightarrow}}$ +, and is composed of Two-velocity components , the one is the Perpendicular ↑ and the other is the Parallel → , **to Motion Box ,** where the **First CARRIES Motion Into the** [Motion-Box] , and the **Second PUSHES** the **Motion-Box** , Figure -7-   as

1.. The [Motion Box] which carries ,**This Motion v ≡ ṙ** , are **The Magnetic-field-lines** which are circles in field , filled with motion ≡ transportation ≡ Spinning . The velocity-component , $\overline{V_{e\uparrow}}$,being Perpendicular to the Magnetic-lines creates Energy-Circles and thus , Motion ≡ Work ≡ Energy , is **Carried in this Magnet-Box** .

2.. **The Pushing velocity-Force** on this [**Magnet-Box**] ≡ **The Velocity-Vector-Force** which is Perpendicular to the Magnetic-field-lines-**Plane** , and which carries the [**Magnet-Box**] along a straight line with horizontal distance , *the pitches* , between two consecutive circles . The Resulting motion is Helical and thus Energy is Propagated . The difference between the Potential-Energy of the Orbit and that of the Electron Nutation in Precession with the *Lowest-Potential-Energy*, is the Resonance-Frequency ≡ Energy . The analogous is in Electrical Circuits where *A circuit is Driven to Oscillate at its natural frequency* f_N , either by storing in it Electrical Energy , or by Charging its Capacitor , Figure -9- . In Fig-7- is shown the Electromagnetic-Wave Propagation .

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

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

$\overline{w} = 2\pi f = \frac{S_p}{m}$, issuing that Tangent of Ellipsoid → $\overline{B} \perp \overline{w}$ Vector , and Tangent of Ellipsoid → $\overline{w} \perp \overline{B}$ Vector .It is a relation between ,Angular and Momentum Ellipsoid.
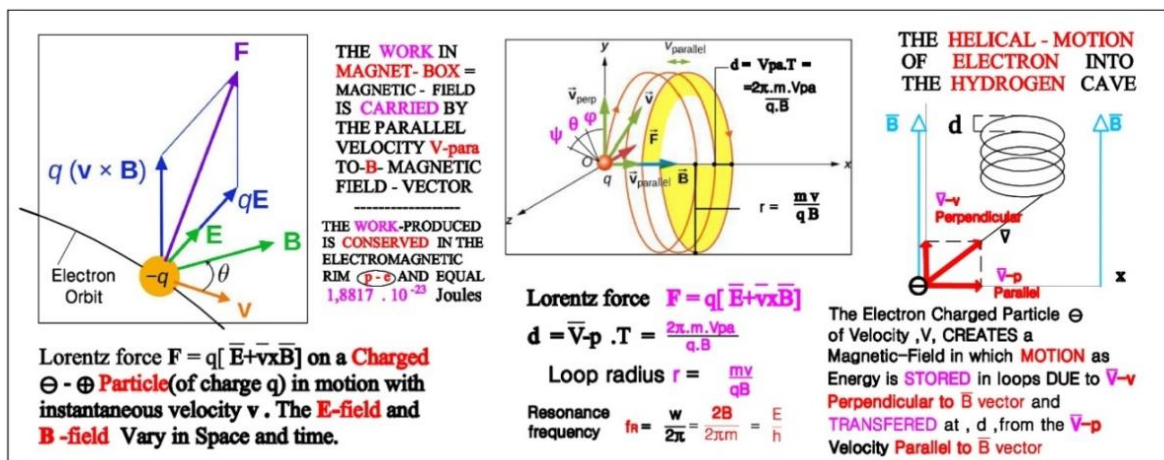
Figure -7- :   The How moving-Electrons create Electromagnetic-Wave and Propagate.

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⊥B** , and V_v , Parallel to the Magnetic-field-Vector B tending to , L ≡ S ≡ 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

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Perpendicular Magnetic-Field $\overline{\textbf{B}}$, which Magnetic-lines are the Energy circles **O** in **B** , *Due to the velocity-constituent* $\textbf{V}_\textbf{p}$, which is Perpendicular to Magnetic lines **O** . The velocity - constituent $\textbf{V}_\textbf{v}$ 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 $\overline{\textbf{B}}$, **Property** answers the **Zeeman effect** .

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

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

ORBIT , r , the Perpendicular Magnetic-Field $\overline{\textbf{B}}$, which Magnetic-lines are the Energy circles **O** in **B** , *Due to the velocity-constituent* $\textbf{V}_\textbf{p}$, Perpendicular to Magnetic-circles **O** . The velocity - constituent $\textbf{V}_\textbf{v}$ 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** $\overline{\textbf{B}}$ which is the Box , and as **Electric-Field** $\overline{\textbf{E}}$ which is **The Thrust** of the Box.

Since this frequency $\textbf{f}_\textbf{N} = \textbf{f}_\textbf{R} = \textbf{2,8398447.10}^{\textbf{10}} \, \textbf{s}^{-\textbf{1}}$ **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 , $\textbf{U} = \textbf{E} = \textbf{h f} = 6,62606957.10^{-34}.1,4199223.10^{10} = 9,4.10^{-24}$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 ,** $\textbf{w}_0 = \gamma. \boldsymbol{\beta}_0 / \textbf{2}\boldsymbol{\pi}$ **,** and for the Hydrogen at 1,5 T Magnet , $\gamma = \textbf{2,675}. 10^8$ /sT , $\boldsymbol{\beta}_0 = 1,5$ T , then $\textbf{w}_0 = 63,864$ MHz $= 63,864.10^9$ Hz , frequency $\textbf{f}_\textbf{N} = \textbf{w/2}\boldsymbol{\pi} = \textbf{1,016457.} \textbf{10}^{\textbf{10}} \, \textbf{s}^{-\textbf{1}}$ or is , **The Communication-Tool** , *The Identity-Card* between all Atoms relations.

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

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

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

Energy≡ motion is transported in caves ,and **Spin-Position** defines the Identity of Orbits.
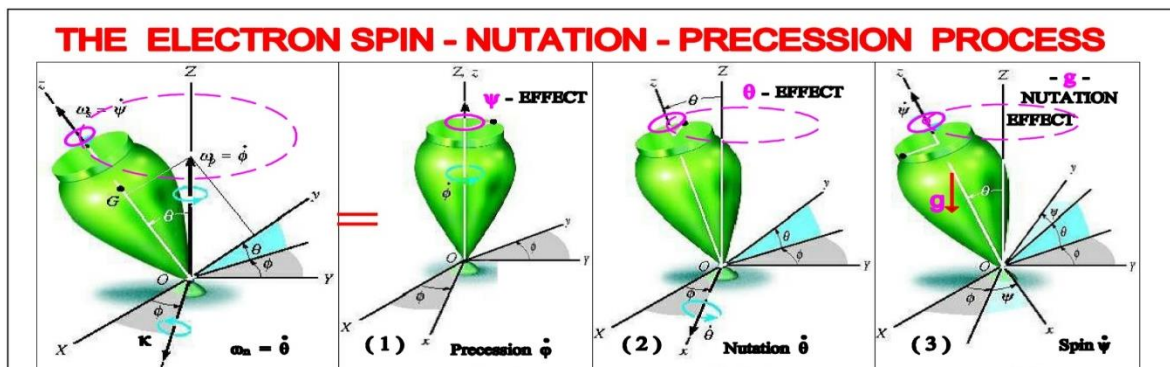

THE ELECTRON SPIN - NUTATION - PRECESSION PROCESS

The Duality of Photon And Origination of the Nutation motion

Figure - 8 - : 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 On-Site :
a).. **Spin** is a **Couple of Forces** [+ F , - F] following the Vectors Rules .
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 , $d\psi$. At **Nutation-Period** , M_O **is Swinging** in circular-Magnetic field and angle , ϑ , **Decreases** , so the **Diagonal Spin-Resultant** $M_T = S_N + S_O$ **Increases** and the Produced Energy is supplied into the nearest Precession-frequency-System which is the classical Current-loop of masses , as [The , m_N , m_O *Current-loop*] $\equiv$ The **Energy-Proton-Cantilever-Vector** or the **Hydrogen-Bracket N-O .**
d).. Gravitation-Force through Gravity is continually acting on Orbit-Electron-Spin. The tilted axis of **Electron-Spin precesses** by changing the Direction of N-O lever arm , *from the Nutation of Precession in the Magnetic-field due to* the *Negative ,–, Charge ,* **and** from **the tilted** axis of **Nucleus-Spin** which **continually precesses in** the Magnetic field . ***The produced Energy as Resonance frequency*** f_R ***is added in*** N-O *loop or in* $\rightarrow$ [The m_N , m_O *Current-Potential-loop* E = U(x)] as before .
e).. **In Hydrogen-Atom`s case ,** *The transferred-Energy in Current-loop* **N-O** , is that of **Electron-motion** with light velocity in the **circular-Magnetic-field-lines** which are **Perpendicular to the Orbit .** This Magnetic-field is related to **m , q , f** .units .
The Direction x-x , **of the two Couples of Oscillation is that of the two masses** 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** , **then the 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.

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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 Work which is Conserved** as **Electron-Magnetic-Field , magnetic moment** , $\bar{\mu}$, 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 $\rightarrow$ $E_{loop} = E_{dipole} + \bar{\mu} \cdot [\nabla x \overline{P}] \equiv E_{dipole} + \overline{B} \cdot [\nabla x \overline{P}]$ …(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**.

The Produced-Work is as Frequency $f_N = \dfrac{sQ}{2\pi.J_3 w} \equiv f_R = 2{,}8398447.10^{10} \, s^{-1}$.

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 , $f_N = \dfrac{sQ}{2\pi.J_3 w}$, and Happens in the **Maximum Potential cave** $E = - U(x)$, and which is needed for any **Two Atoms to Joint** and create **the molecules** .   A brief analysis at [90].

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 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** $\overline{S}$ in the axis of cone as **Angular-Momentum-Vector ,** *the Polhode* , at a fixed Point of the **Central-Cone-circle .** Because of Gravity , **g** , SPIN ψ is under **NUTATION** 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 ,** $|\overline{R}| \equiv |M_T| = |M_N| + |M_O|$ and the Work produced is **Conserved** in $\rightarrow$ Nucleus-Orbit **[p ↔ e]** $\equiv$ the [Energy-Box]. **The Angular-velocity-cone ,** $\overline{w}$ **, is Rolling with Spin-Vector** $\overline{B}$ **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 8, is shown the **Magnetic-Dipole-moment** of nucleus which is associated with the Orbital angular momentum $|\overline{B}|$, *the Spin* . When an external **Static-Magnetic-field** is present then the → **Spectral-lines** *Split into* **Multiple-closely-Spaced-lines** because of the released energy in field ← For a Brief Analysis in [90] .

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As was calculated for the **Strength of an Magnetic-field** of 1 Tesla is 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 Nucleus - Magnetic Field $\overline{B}_L$. **The Kinetic Rotational – Energy of a monad ,** which is the Work in monad **, is the Scalar Quantity L = E ,** while *The Vector Angular Momentum* $\overline{B}$ *, The Quantity* $\overline{S}$ *,* and the *Vector Angular - Velocity quantity* is *,* $\overline{w}$ *,* which Three monads are related *as* $\overline{B} . \overline{w} = 2L = J . w^2$

E.. : THE ORIGIN OF SPIN AND ENERGY :

It is an Application to Material-Points $[\oplus\leftrightarrow\ominus]$, by considering the Positive-constituent with angular velocity $\overline{w} = \overline{v}/r = \frac{\sigma}{2r} [1+ \sqrt{5}]$ ...(1) [70] and for an angle 45° from , **x** ,axis , 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 , $w_1^2 + w_2^2 + w_3^2 = \frac{2E}{J^2} = \frac{4 E}{(\pi r^4)^2} = \frac{B^2}{J^2}$.

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 $w_1= w_2= w_3=w$, and 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** $\equiv | \overline{B} | \equiv \pi^2 r^4 f$ .... (s)
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 (s) then $\rightarrow$ **Planck-cave-Stress** $\sigma = \frac{\overline{B}}{r.\Phi} = 1$, **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

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and in cave $r_P = 8,79455.10^{-35}$ 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 $\sigma 1,2 = \sigma 1/2 \pm (½).\sqrt{\sigma 1^2 + 4.\sigma 1^2} = \sigma_1.[1\pm(\sqrt{5})]/2 = \boldsymbol{\sigma}\,\boldsymbol{\Phi}$,

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

d).. From Orbit vibration $f_n = \frac{(1+\sqrt{5})\sigma}{4\pi r} = \frac{\sigma}{2\pi r}\,\Phi$, $f^2{}_n = \frac{\sigma^2}{4\pi^2 r^2}\,\Phi^2 = \frac{1}{g.a^3}$ 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 $W = 2E = B w = J.w^2$, or $2E = 2\pi f.B$ and $\overline{B}f = \frac{E}{\pi}$, then Energy

in Planck-scale-cave is $2E = \overline{B}f_n = [\frac{(1+\sqrt{5})\sigma}{4\pi r}].\overline{B} = [\frac{\sigma}{2\pi r}].\overline{B}\,\Phi$, or $\mathbf{E = [\Phi\frac{\sigma}{4\pi r}].\overline{B} = \frac{|B|^2}{2}}$ i.e.

Energy in Planck-cave-Particles is dependent on their Spin only , and for Electron with

cave $r = a_e = 1,6819781.10^{-17}$ m , and Principal-stress $\sigma = 1$, then ,

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

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

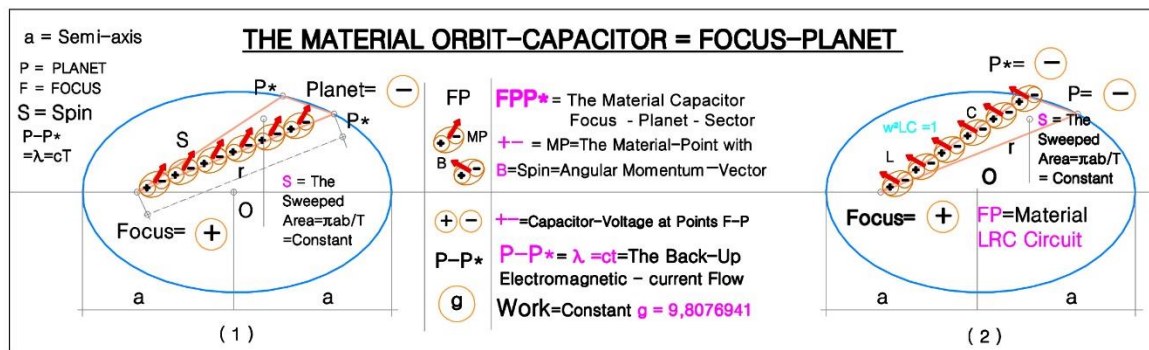**1e...   The Focus and the Signals in Orbits   :**

Figure -9- : The Material , **LRC Circuit** on **Orbit** , on Focus-Planet-Sector |F↔P| :

In the Undamped **Planck`s** -Conservative -**System** , the Total-Energy is , - 13,6 eV , in the
Hydrogen-cave ,corresponds to the Natural-frequency of the *Primary-Particle* with the less
Negative-Charge-frequency , which is **The electron** and which mass m_e , and frequency f_e
follow the minimum energy **g** .Electrons-equation of motion is $\ddot{x} + w^2 x = 0$ 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 → $\mathbf{w^2{}_e . m_e = \pi g = constant}$ ← ..… (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 $ka = \frac{1}{a^2 f^2}$, and from velocity $c = w a = 2\pi f a$ is , $f^2 a^2 = \frac{c^2}{4\pi^2}$
or $ka = \frac{4\pi^2}{c^2}$ and **Resonance - Energy** → $\mathbf{E = \frac{ka}{aa} + \frac{L^2}{2m\,a^2} = \frac{1}{a^3}[\frac{4\pi^2}{c^2} + \frac{S^2}{2m}]}$ …..(re)

A… The Gravity-System ,It is Another Infinite ± Equilibrium-Rotating vectors $\overline{r}$, where

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for Stability $\uparrow \bar{r} \downarrow \bar{r} = 0$ **,** and which *Gravity-System* interacts with *Hydrogen-Cave-System*.
The condition for *Irrotational Energy* is $\rightarrow \nabla x \overline{B} = \nabla x \overline{S} = 0$, or $\nabla x \overline{B} = \nabla \bar{r} + 2\pi$ 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 $\bar{r} = \pm \overline{B} \equiv \overline{S_n} = 2\pi mf_n$,and $f_n = \dfrac{B}{2\pi\, m_e} = \dfrac{E}{h}$, **is the Stationary-Filling-Ocean**
of the Spinning-Gravity-Material Point , in the called Empty-Space ,with frequency that
of Material-Point $\rightarrow f_n = n.f_1 = \dfrac{E}{h} = \dfrac{n.v}{2\pi r} = \dfrac{n\sigma}{4\pi r}$ $[1+\sqrt{5}\,]$, and from $v = w\, r = 2\pi f\, r$ then ,

$f_n = v/2\pi r = \dfrac{(1+\sqrt{5})\sigma}{4\pi r} = \dfrac{\sigma.\Phi}{2\pi.r_n}$, where $v = \sigma . \Phi$, and Spin $S_n = \overline{B} = J\, w = \pi^2.\, r^4.\, f_{n=e}$

B… The Hydrogen-Cave-System . From the **Nucleus -Planet** velocity equations $K_E = \dfrac{mv^2}{2} =$

$E - \{\dfrac{k}{r} + \dfrac{L^2}{2m\, r^2}\} = 0$, $4\pi f^2_{\ e} .m_e = g$, and for $E = \dfrac{\pi g}{r} + \dfrac{L^2}{2(g/4\pi f^2)\, r^2} = \dfrac{\pi}{g\, r^2} \cdot [g^2\, r + 2.\, S^2.f^2] = 0$,

then issues $g^2\, r + 2.\, S^2.f^2] = 0$ or $f^2 = \dfrac{r.g^2}{2L^2} = \dfrac{r.g^2}{2B^2 w^2} = \dfrac{r.g^2}{2B^2(2\pi f)^2} = \dfrac{r.g^2}{8B^2\pi^2.f^2}$, since $2L = B\, w$,

and then the **Cave-Resonance-frequency** $\rightarrow$ $f_c^{\ 4} = \dfrac{r_c\, .g^2}{8\pi^2 S_c^{\ 2}}$, 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 $f_n^{\ 4} =| \dfrac{\sigma.\Phi}{2\pi.r_n}|^4 = \dfrac{r_c\, .g^2}{8\pi^2 S_c^{\ 2}}$ 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 $|\dfrac{\sigma.}{r_n}|^{\, 4} = \dfrac{2.\pi^2.r_c\, .g^2}{\Phi^4.S_c^{\ 2}} = \dfrac{2.\pi^2..g^2}{\Phi^4}[\dfrac{r_c}{S_c^{\ 2}}] = \dfrac{16.\pi^4.f^{\, 4}_{\ n}}{\Phi^4}$, and Resonanse

frequency $f^2_{\ Resonanse} = \dfrac{2\, g^2}{\Phi^4 r_c^{\ 3}} = \dfrac{2\, g^2}{r^3_{\ c}}[\dfrac{1}{\Phi^4}] = \dfrac{g^2\pi^4\sigma^4 r^{12}}{|B^2|}$, and or $f_{\ Resonanse} = \dfrac{g\pi^2\overline{\sigma}^2 r^6}{|B|}$ ..(f.r)

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

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

 The total Kinetic Energy is $\rightarrow E = \dfrac{1}{2}.m_1.v_1^{\ 2} + \dfrac{1}{2}.m_2.v_2^{\ 2}$, and because $v_1 = v_2 = v$,

 then $E = \dfrac{v^2}{2}[m_1 + m_2]$ **,** and since $m_1 = \dfrac{F}{g1}$, $m_2 = \dfrac{F}{g2}$, $\bar{v} = \bar{r}$, and Unit Work $E = 1$,

 becomes ,

$E = \dfrac{v^2}{2}[m_1 + m_2] = \dfrac{r^2}{2}[\dfrac{F}{g1} + \dfrac{F}{g2}] = \dfrac{F.r^2}{2}[\dfrac{1}{g1} + \dfrac{1}{g2}] = \dfrac{F.r^2}{2}[\dfrac{g1+g2}{g1*g2}] = \dfrac{F.r^2}{2}[\dfrac{2.g}{g^2}] = \dfrac{F.r_c^{\ 2}}{g} = 1$, 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
inverse square to the distance as $F = \dfrac{g}{r_c^{\ 2}}$ .... **(r)** $\rightarrow$ **Newton`s and Coulomb Laws** $\leftarrow$
Gravitational-Constant **Force** $\equiv$ **G** , is Spread -over *a minimum - Surface , the Layer or*
Conductor or , **a-Surface ,** *or* **The-Permissible-Path** , in-where exists this Reaction and
called the **mass** .The Surface-force **,** g_G **,** *becoming from the inner acceleration* f_n *of the*
Material-Points as Vector , $\bar{r} = \pm \overline{B} \equiv \overline{S_n}$, is acting on Spins $\overline{B}$ **,** *and all the masses of*
the universe , or is Action of $G \rightarrow$ on $\bar{g} \rightarrow$ on $\overline{B} \equiv \overline{S} \rightarrow$ on g_G , through $f_{\ Resonanace}$.
Since $f_{\ Resonanace.} = \sigma\, \Phi^{\ 3} = G$, then $\sigma = \dfrac{G}{\Phi^3} = \dfrac{G.\sigma^3}{c^3}$, and $\sigma^2 = G\, c^3$ **,** where σ , is the
Stress $\sigma_{\ Resonanace}$ between all frequencies . A clear Magnetic-Resonance-Imaging is
Possible in [MRI] and to the other Media-MB under a Common-Detector-Frequency.
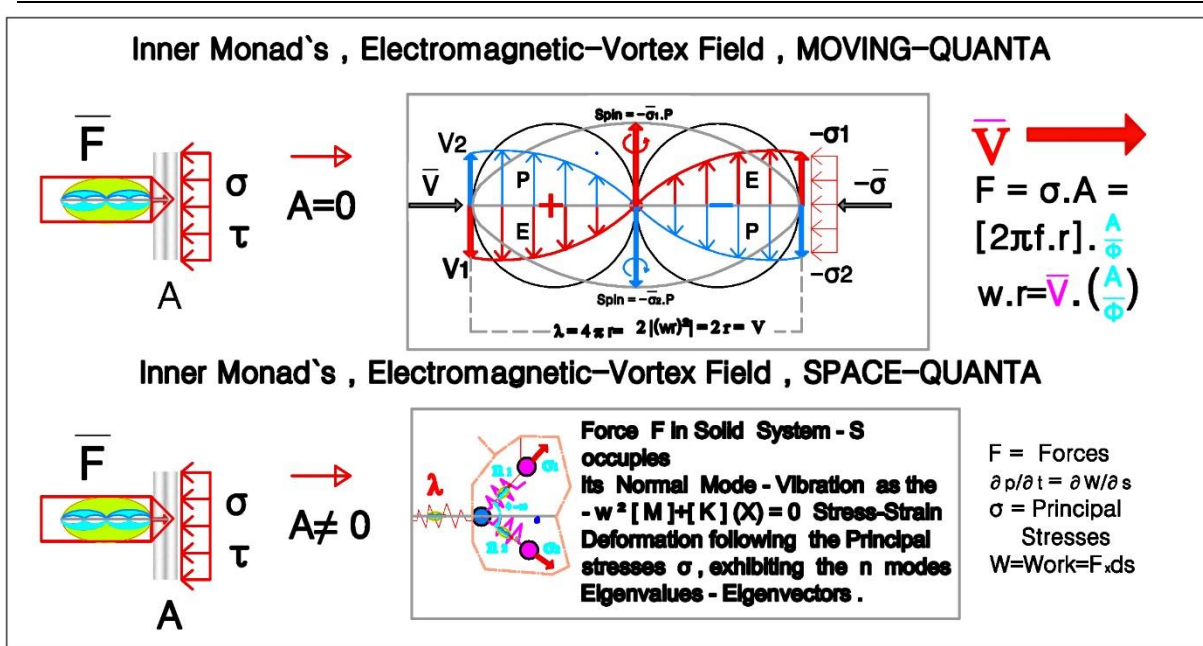
2e.. Forces , Stresses and Orientation of Spin :

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Inner Monad`s , Electromagnetic–Vortex Field , MOVING–QUANTA

Inner Monad`s , Electromagnetic–Vortex Field , SPACE–QUANTA

Force F in Solid System - S occupies
its Normal Mode - Vibration as the
- w²[M]+[K] (X) = 0 Stress-Strain
Deformation following the Principal
stresses σ , exhibiting the n modes
Eigenvalues - Eigenvectors .

F = Forces
$\partial p/\partial t = \partial W/\partial s$
σ = Principal Stresses
W=Work=F×ds

Figure -10- : The Energy-Space , *Stress-Strain* in wavelength $\lambda = 2\pi r$, of a moving Photon :

1.. For area $A = 0$, *the Force* **F** *which is an Energy-Space-cave* and is manifested into the Transverse-Principal stresses , **σ** , **τ** , and then as ***an Moving-Storage*** (1)-(2) is transported as Velocity-Vector $\bar{v}$, and 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** $\rightarrow$ *becomes a Velocity-Vector* $\bar{v}$, or **, Force as Stress** σ **enters in Space** Φ as $[\sigma\Phi]$ and **becomes frequency** $\bar{f} = \frac{\sigma.\Phi.r}{2\pi.r_n}$ and is ,
   Force $F = \boldsymbol{\sigma} .A = [\frac{2\pi r f}{\Phi}].A = w\, r.[\frac{A}{\Phi}] = \bar{v} [\frac{A}{\Phi}]$, 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 $\sigma 2 = 0$ and τ_{12} are very small *it is the equation of stresses* $\sigma 1,2$, or
   $\sigma 1 / 2 = \pm (\frac{1}{2}) .\sqrt{\sigma 1^2 + 4.\sigma 1^2} = \boldsymbol{\sigma}_1 .[1\pm (\sqrt{5})] / 2$, which is the ***Golden-ratio-Pattern***
of the Material-Point as type of a vanishing-shear due to layers laterally shifted .
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 $S_{PA}.r^4$ .The Proof $\rightarrow$
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 4πr³/3 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 $\sigma = \frac{F}{A} = \frac{2\pi r f}{\Phi} = \frac{w\,r}{\Phi} = \frac{v}{\Phi}$, velocity vector in a Unit-Space **Φ**. It was shown that the first Path is Gravity **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 ,**B̄** , and 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.π.c } which is the minimum Number relating Lines and Surfaces .

   Analogous happens in equation (c) when v = c , and → r = c .
   From Inner-velocity equation $v = w.r = (2\pi / T).r = 2\pi.f_1. r$, of fundamental
   frequency f_1 , of wavelength $\lambda = c.T = c / f_1$, and cave $r = n.[\lambda/2]$, then
   $r = n.(c /2f_1)$ and $v = 2\pi.f_1 . [n.c / 2f_1] = \mathbf{n.\pi.c}$ 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.π.**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] .

3e.. Summary Of Priors :

1.. Gravitational-Constant-Force **G , becomes as Stress** ≡ Force/Area ≡ **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** , $\mathbf{g} \equiv 9,8076925$ **Stress** $\frac{Kg}{cm^2}$

2.. The Angular-Momentum of Photon $\overline{B} = \frac{2L}{\overline{w}} = \frac{2L}{2\pi f} = [\frac{2L}{f}].[\frac{1}{2\pi}] = \frac{Constant}{2\pi} = [\frac{h}{2\pi}] = $ SPIN
   From Centripetal force $mv^2/r = \sigma$, then $m = \frac{\sigma r}{w^2 r^2} = \frac{\sigma}{w^2.r} = \frac{\sigma}{w.c}$ ...(1) , and → **m w c = σ**

   From Angular-Momentum-Vector $|\overline{\mathbf{B}}| \equiv \overline{B} = mrv = m\,r^2.w$ then $m = \frac{\overline{B}}{r^2.w} = \frac{\overline{B}}{r.c}$ .....(2) .

   Equating 1, 2 then $m = \frac{\sigma}{w.c} = \frac{\overline{B}}{r.c} = \frac{\sigma}{2\pi.f.c}$ and then $\mathbf{f} = \frac{\sigma.r}{2\pi.\overline{B}}$, $\sigma\,r = \overline{B}\,w$, $\overline{B} = \frac{\sigma.r}{2\pi.f} = \frac{r^2}{n.\Phi} =$

   $= \frac{2,r^2}{n.(1+\sqrt{5})}$, depended on **r** only . Equating , **σ** , from (1),(2) then $\sigma = m\,w\,c = \frac{\overline{B}}{r.c}$ and

   $\overline{B} = mc^2wr = mc^3$ or , $\mathbf{m} = \frac{\overline{B}}{c^3}$ and $B_P \equiv [$ **EM-R** $\equiv f_{1=N}$,f_2 ,f_3, f_D ,,$f_n = w^2 \equiv n \frac{(1+\sqrt{5})\sigma}{4\pi r} \equiv$
   $[\frac{(\pi r^2)^2 \sigma}{4}] = \frac{\pi r^3 \sigma}{4} \Phi$. Entering in minimum-Energy cave $\mathbf{a} = 2,1145016.10^{-11}$ m then **creates**
   the Hydrogen cave = - 13,6 eV , and from Unit-Orbit equation , $\ddot{x} + w^2 x = 0$,

   the Quantum relation $\mathbf{k} = \mathbf{g}\,[f^2.\pi^3] = 1$ and the Energy **Orbits f**$_n$. Vector $\overline{c} = [1 + \sqrt{5}]\sigma$.

   From Photon-charge –relation then , $\overline{\mathbf{q}}_{Photon} = \frac{G}{\sqrt{2}.f} = \frac{G.h}{\sqrt{2}.E} = 3,13\ 10^{-44}$ C .

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3.. Gravity g $\cong$ $\boldsymbol{\sigma} = \frac{\text{Force}}{\text{Area}} = \frac{\text{Mass}}{\text{Area}} = \frac{G}{k}$, while **Gravity force** $[\nabla i] \equiv F_G \equiv m_G g = g.\nabla[\frac{\sigma}{c^2}]^2. r$

$= m_G \frac{v^2}{r} = Jw^2.g_G = [\frac{\pi r^4}{2}] w^2. \frac{v^2}{r} = \frac{v^2}{r}[\frac{\pi r^4}{2}]\frac{v^2}{r^2} = [\frac{\pi r v^4}{2}]$ and from Spin-Momentum relation

$S = \overline{B} = \frac{E}{w} = \frac{E}{2\pi f} = \frac{Er}{\sigma\Phi} = \frac{rG}{\sigma\Phi}$, then $\overline{B}^2 = \frac{J^2\sigma^2}{r^2}\Phi^2$, and $\rightarrow$ $[\overline{B}]^2 = [\frac{\Phi J\sigma}{r}]^2$ $\leftarrow$ while as

centripetal$\rightarrow$ **Gravity-force** $F_G \equiv m_G g = g.\nabla[\sigma c]. r = m_G \frac{c^2}{r} = Jw^2.g_G = \frac{v^2}{r}[\frac{\pi r^4}{2}]\frac{v^2}{r^2} = \frac{\pi r v^4}{2}$ and is

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

Gravity-Acceleration is $g_G = s[\frac{\pi r v^4}{2}] = [\frac{3,1415926([\sqrt{5}+1].\sqrt[4]{2}.10^{-35}).(299793458)^4}{2}].e^3 =$

$6,044981.10^{-35}.80,776078.10^{32}.20,085536 = g_G = $ **9,8076925** .

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

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

4.. The Unit-Hydrogen-frequency f_e , in Stress g , Originate Electron-mass m_e from

equation $4\pi f^2{}_e . m_e = \mathbf{g}$, and from **G** , Electron-Charge $\overline{q}_E = \frac{G}{c\sqrt{2}} = 1,58.10^{-19}$ C

5.. Strong-Force $S_F = |\frac{g}{r^2}| \overline{E} = |\frac{g}{r^2}|\frac{\pi}{g r^2}[g^2 r + 2.L^2.f^2] = \frac{\pi}{r^4}[g^2 r + 2.L^2.f^2]$ depend on $\overline{E}$,

found in our Sun, for Proton-Bonding as frequency $f^5 = \frac{g}{[2\pi a]^3}$, $f^2 = \frac{\pi.g}{[n.\pi.c]^3}$

6.. From Orbit-equation $g[f^2 \pi^3] = 1$, **Electron-charge** $\overline{q}_E = g[k_E/c\sqrt{2}]$, Nutation

Energy $E = g[\frac{M.m^2}{2 S^2}].[2k+Mm] \equiv g\frac{k_o}{2 S^2}$, Nut-Frequency $f_N = f_R = g[\frac{s.m_e.}{2\pi.J_3 w}]$ is Seen

7.. The Strong-close-Energy $E = \{\frac{k}{r} + \frac{L^2}{2m r^2}\} = \frac{\pi}{g r^2}[g^2 r + 2L f^2]$ is for Force $S_F = |\frac{g}{r^2}|\overline{E}$ i.e.

The effect of Gravity , g , Is on All Energy-structures and it is the Resonance frequency f_R **of , ELECTRON Charge ,** $\overleftrightarrow{e}$ **, and of Spin** $\overleftrightarrow{S}$ **.The Produced Work as frequency** f_R **is Conserved in the Caves .** The difference **between Potential-Energy** of the **Orbit** and that of the **Electron-Nutation in Electron-Precession-motion** is the lowest **Potential-Energy , Resonance-Energy as Resonance–Frequency** f_R **.** [82]
R-F $\rightarrow$ f_R **, IS the Energy in [Bracket-Orbit-Hook] which Joints the Atoms** .

8.. For **Detectors ,** or a Wave Detector which needs to be **about the same size as the wavelength** of the *Other Waves it is to Detect* , so it is from wavelength-equation $\lambda = c / f$ which occupies the fundamental frequency in Photon-Cave , and for Electron-Nutation frequency $f_R = 2,8398447.10^{10}$ s^{-1} , then λ , required is

$\lambda = \frac{2,998 .10^8 \, m/s}{2,839844710^{10} \, 1/s.} = 1,0556915 .10^{-2} = 0,010556915$ m $= 1,0556915$ cm

9.. It has been proved in [70] that the Frequency of Photon is $f_n = \frac{[(1+\sqrt{5})\sigma]}{4\pi r} = \frac{\sigma\Phi}{2\pi r}$,

and in [90] that is occupies the Dual-Property of Particle and Wave as ,

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

2.. **Energy-Motion M** $\equiv \boxed{\overline{v} - \textbf{Vector}} \equiv$ **Wave** [$\overline{v}. f_n$] $\equiv$ [$f_1 = (E^2 + H^2) = n \frac{(1+\sqrt{5})\sigma}{4\pi r}$

$\rightarrow = \frac{\overline{B}}{\pi^2 r^4}$] a **Propagating Wave** {W$\equiv$ EM-R $\equiv [\varepsilon E^2 + \mu B^2] = 2.\lambda c.\sin.2\varphi$}.

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