

The newtonian constant of Gravitation & Gravity constant

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Abstract: One of the most important concept in geometry is, **distance**, which is the *Quanta* in geometry, while in Material-Geometry the composition of opposite, **the Material-point** which is the *Quanta* in Chemistry and Physics. As in Algebra Zero, 0, is the **Master-key** number for all Positive and Negative numbers and this because their sum and multiplication becomes zero, and the same on any coordinate-system where \pm axes pass from zero, The Rolling of Positive \oplus , constituent on the Negative \ominus , constituent, creates the Neutral Material point which Equilibrium. Angular momentum is identical with **Spin** and consists the **First-Discrete-Energy-monad** which occupies, **Discrete Value and Direction**, in contradiction to the point which is nothing, Dimensionless and without any Direction. **Quaternion** $[(+) \cup \mathcal{C}(-)] \equiv \text{Box } \mathbf{B}_R$ carries the Principal stress σ between A(+), B(-), which σ , as **Centripetal-acceleration** is the minimum energy becoming from the in-storage AB acceleration and is **equal to the Gravity** g . Because of the two different motions, Revolving and Periodic, acceleration of Gravity $g \equiv \pm \sigma$ exists in the First Box- \mathbf{B}_R , while in the Second \mathbf{B}_P is followed **the Local-Extreme-case** this acceleration of Gravity $g \equiv \pm \sigma$ is altered Locally by changing the Principal-stress σ with an Local-uniform-Pressure $\mathbf{g}_L \equiv g k = g \cdot [\text{Force/Area}] = G$, i.e. the minimum Local- Energy acceleration is the known, **Universal Gravitational-constant** $G = gk = k_E g = k_L \sigma$, for Macrocosm and Microcosm, Obeying Newton's Laws of motion. In article is proved that, **Constant G, is the mechanism for the First-kick-Starton Granular-Energy-monad**, g , in the lightest and less-mass particle which is Hydrogen.
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I. Introduction

1.. It was shown [33-36] that Un-clashed Fragments through center, O, consist the Medium-Field Material-Fragment $\rightarrow [\pm s^2] = [\text{MFMF}] \equiv \text{The Chaos}$, as base for all motions, and Gravity as force $[\nabla i]$, while the clashed with the constant velocity, \bar{c} , consist the Dark matter $[\pm \bar{c} \cdot s]$ and the Dark energy $[\bar{c} \cdot \nabla i]$, **declaring that** \rightarrow Antimatter-Galaxies and Antimatter-Asteroids can exist only as Dark-matter or and Dark-Energy and **Not** as Antimatter light, $-c$, alone, or from \rightarrow velocity - Breakages, $[\pm s^2 = \pm (wr)^2]$ and $[\nabla i = 2(wr)^2]$, where then become Waves $\{ \text{The distance } ds = |AA_E| \text{ is the Work embedded in monads and it is what is vibrated} \}$ with the Vibrating equations of motion, to become,

A \rightarrow Particles, with Inherent Vibration occupying distance $r = ds = |AA_E|$,

B \rightarrow Gravity-Field-Energy without Vibration, the only Stationary-rotating material-points.

C \rightarrow Dark-matter-Energy constituents as below,

A.. $[\pm \bar{v} \cdot s^2] \rightarrow$ Fermions, *Quarks and Leptons*, and $\rightarrow [\bar{v} \cdot \nabla i] \rightarrow$ Bosons,

B.. $[\pm s^2] \rightarrow [\text{MFMF}] \text{ Neutral Field} \equiv \text{The Energy - Chaos}$, and the *Negative-Energy* binder Field is $[\nabla i] \rightarrow$ Gravity force,

C.. $[\pm \bar{c} \cdot s^2] \rightarrow$ Dark matter, and the binder Gravity force $[\nabla i]$, $[\bar{c} \cdot \nabla i] \rightarrow$

The Expanding Dark Energy, *Positive-Energy*, which both are moving with light velocity, c , causing the universe to grow.

From above in, A, and, C, case \rightarrow Energy as velocity, \bar{v} , exists in the Discrete monads, $\pm \bar{v} \cdot s^2$ and $\pm \bar{c} \cdot s^2$.

B, case is the transportation of Energy, from Chaos to stationary Material points.

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

$\{ (\nabla i), (+s^2), (-s^2), (+cs^2), (-cs^2) \}$ gives

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

$[\pm \bar{v}.s^2] \rightarrow$ Fermions $[\nabla i] \rightarrow G_f \equiv$ Gravity-Force in DM-DE Stationary Field .
 $[\bar{v}.\nabla i] \rightarrow$ Bosons , $[\bar{c}.\nabla i] \equiv$ DE \rightarrow Dark Energy $c \times (\odot)[\nabla i]$
 \rightarrow Gravity Force DE $\equiv [\bar{c}.\nabla i] = \bar{c}[\nabla i] =$ The Travelling-Energy with , c ,
 velocity.

In all above issue Kepler-laws , denoting that **Macrocosm and Microcosm**
 Obey Newton`s Laws of motion in all Scales , as was proofed .

A.. In [68] is shown that Motion may be **Linear or Rotational** for any displacement r , so exists a constant-work during these motions as ,

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

A 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 $2r = n\lambda$ while the Linear motion is continued by the Propagating Electromagnetic-Wave \rightarrow the Energy-conveyer ,

i.e. The stored energy in the loop is $\rightarrow W_1 = v^2 \left[\frac{h}{2\pi}\right] = 4\pi^2.r^3.f_p^2$, it is **The Particle** and dependent on velocity , v , and Planck`s constant h , **oron loop , r , and frequency** , f_p , which is **The Wave** . It is proved that this minimum wave - constant $\rightarrow k = g$.

B.. Kinetic Energy , motion , in Orbits becomes from the , **Piezoelectric-effect** , where

$$\text{Orbit is subjected to a Mechanical-stress , } \sigma = \pm \frac{4\pi r}{(1+\sqrt{5})} . f_p, \text{ becoming from the}$$

Centripetal-acceleration \bar{a}_p of the **Planet** and thus is appeared a Positive charge at the **Nucleus** and a Negative-charge at the **Planet** , so is created an electric-signal with a given frequency f_p . The two faces at **N** and **P** are connected by the in-between

$$\text{Energy-Vectors } \bar{B} = \frac{\pi r^3 \sigma}{8} [1+\sqrt{5}] \text{ of Gravity-field-Pointy MP } [\nabla i] = [\oplus \cup \cup \ominus] .$$

C.. Orbit or , Negative - Energy - Rim in monad Atom , is the Stable and Stationary

Granular - lattice - Energy-Disk , which is kept in the Plane-Orbit of motion , **Ellipse area , πab , in Gravity - field** , and in a way is **Opposite** to that which Follows the Central motion , i.e. the Gravity-Force-Point-Vectors \bar{B} , is the Spin $[\oplus \cup \cup \ominus]$ of the Material-points . *These are packets into the Orbit-Rim as the Energy - Granular-Conveyers* for the interactions between , **Nucleus N** and the orbiting object, **the Planet P** , and consists the quanta and which is , **the minimum constant energy** , of the Rotational motion $\rightarrow [\oplus \cup \cup \ominus] \leftarrow$ and is equal to g .

D.. Black Holes Follow Kepler laws where , *On any moving Particle when is Tangentially-colliding or under any angle ϕ with a Material-Point executing Circular motion* , then the Total Energy is Negative , the Particle follows constant Elliptical-Energy-Orbits on the same semi major axis as , $1 = c . f_n^2 . a^3$, and of the same constant Energy . Semi major axis , a , is related to energy as $\rightarrow a = GMm / 2E$, i.e.

for very large Energies , semi major axis tents to a **Negative-Energy-Point** , which is the beginning of the Black hole such as in microcosm and macrocosm. **For axis** $a \rightarrow 0$, **then** $f_n \rightarrow \infty$, which is a Black-hole .

E.. The {n} Energy - Storages of The Moving - Monads . Figure-1

In Store , r , Wavelength $\lambda_n = \frac{2r}{n}$, Fundamental-frequency $f_1 = \left[\frac{\sigma(1+\sqrt{5})}{4\pi r}\right]$, Work = $h.f_1$

The Energy-Storage length $E-P = \lambda/2$, and is composed of 4 Lobes with wavelength

$$\lambda_4 = \frac{2r}{4} , f_4 = \frac{4v}{2r} = 4f_0 , W_4 = \frac{h}{2r} v_4 \quad \text{and for } \rightarrow \text{ Total-Work}$$

$$W = \left[\frac{4\pi r^2 f_1}{3}\right].n.(n+1) \quad \text{or } W = \frac{80.\pi r^2 f_1}{3} , \quad v_4 = \lambda_4.f_4 = 4.\lambda_4.f_0$$

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

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

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

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

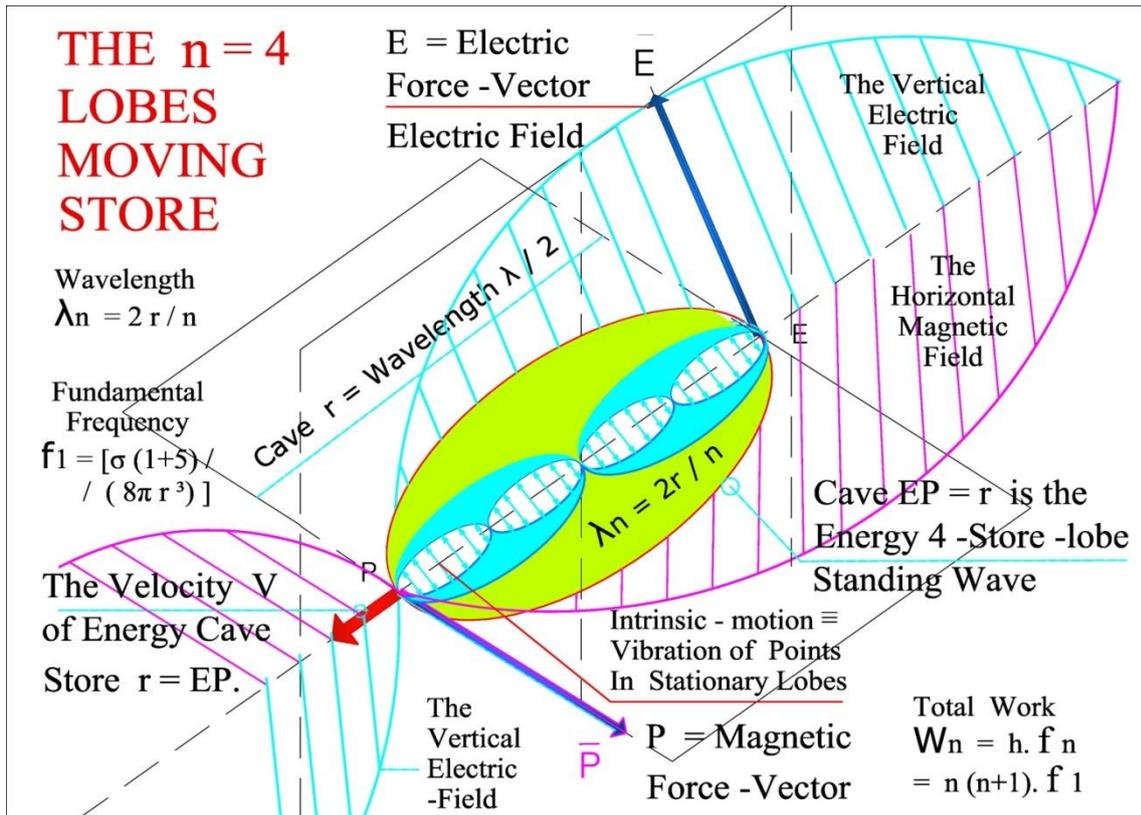


Figure-1.

In figure $r = \lambda/2 = EP$ is the **Energy-Storage-monad** $[S \equiv EM-R \equiv f_{1=N}, f_2, f_3, f_D, f_n]$

with wavelength $\lambda_n = \frac{\sigma(1+\sqrt{5})}{4\pi r} \frac{n \cdot \bar{B}}{4\pi r^2}$, **Particle**, where velocity $\bar{v} = w.r$, follows the

Breakage-Principle which is Quaternion $\bar{z} = [s + \bar{v}Vi]$ or $\rightarrow s^2 - |\bar{s}|^2 + 2|\bar{s}|^2 Vi \leftarrow$
 $\equiv [\epsilon E^2 + \mu B^2] \equiv$ **The Energy-monad EP**, **The Wave**, as,

Matter (+) \equiv Magnetic-field $\rightarrow [\mu B^2]$

Antimatter (-) \equiv Electric-field $\rightarrow [\epsilon E^2]$

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

The stationary-cave-lobes, consist the **Particle-Photon** as the Inside motion, in the $r = n [\lambda/2]$ Energy-Storage, and $[E^2 + H^2] = 2.(2r).c.\sin 2\phi$, the **Wave Photon**.

Energy-Storage-monads are consisted of the above **three-constituents** all-together,

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

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

for $\lambda_n = 2r$, $v_n = v_1$, then $n \cdot \lambda_n = 2r$

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**.

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 Store $2\lambda = r = h/p \equiv [f_1, f_2, f_n \equiv n \text{ lobes}]$ follows the **Stationary-Wave-Nodes-Principle**, i.e.

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

B..THE PHOTON :

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 $\bar{v} = f \times \lambda$. The frequency is $f = \frac{n \cdot \bar{v}}{2r}$ where **n** is a positive integer number .Because in lobes the inner particles are the $[+]$, $[-]$ constituents of Space and of Anti-space, the maximum amplitude of each constituent is related with its position and each

amplitude oscillates periodically as the **wave equation**, $x = v_0 \cdot \sin \omega t = A \cdot \sin [\sqrt{(a/Am)} \cdot t + \pi/2]$,
(1) where

a.. Velocity $\rightarrow |\bar{v}| = w \cdot r/2 = \frac{2\pi}{T} \cdot r = 4\pi r$, and $f_n = \frac{n \cdot v}{4r} = \frac{n\sigma}{8r} [1 + \sqrt{5}]$,

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

in cave , r .and then ,Wave propagate ,as in a magnetic-device the arced pattern ,by travelling from North to the South Pole and thus creating the Inner-Electromagnetic-Displacement-current $\rightarrow \partial E / \partial t$, $\partial H / \partial t \leftarrow$ and when reduced to one line as ,
 $E \rightarrow \partial E / \partial t \rightarrow H \rightarrow \partial H / \partial t \rightarrow H$.

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

$[E^2 + H^2] = 2 \cdot (2r) \cdot c \cdot \sin 2\phi$ (2) where exists the **Skin-effect** .

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

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

The-Particle $\equiv [E^2 + H^2] = 2(2r) \cdot c \cdot \sin 2\phi$, of wavelength λ , **Outward** λ , as

The Outer Electromagnetic-Wave $\rightarrow \{ \text{The-Wave} \equiv [\epsilon E^2 + \mu B^2] = 2 \cdot \lambda \cdot c \cdot \sin 2\phi \} \leftarrow$

and allows all the **Energy-Wave-Storages** to Propagate any Distance in Vacuum without dissipation. This Inner-motion \equiv Work **W** , from the Wave-Energy-Pattern with Wavelengths λ_n , is created from all \pm Points of the Periodic Oscillation in any cave **r** , and is stored in the **n** lobes as motion .This motion is conserved and is transported through vacuum at the speed of light **c** . Since the **Medium-Field-is Material-Fragment** $\rightarrow [\pm s^2] = [\text{MFMF}] \equiv \text{The Chaos} , is the base for all motions$

then it is , the Motion of Photons : All motions create Work which is conserved , Motion presupposes velocity vector \bar{v} which , when it is in motion collides with other velocity vectors , creating a Constant Work **k** .

Motion may be **Linear or Rotational** for any displacement , **r** , in any cave , so exists in vectors the constant- Work $\rightarrow \mathbf{k} = \bar{v} \times \bar{v} \cdot \bar{r} = v^2 \cdot \mathbf{r}$, and is ,

From relation $n\lambda = 2r$ issues $2r = nv/f$, and is $v = \lambda f$ or $\rightarrow \bar{v} = \bar{c} = \lambda f$.

Constant-Work $\mathbf{k} = v^2 \cdot \mathbf{r} = (wr)^2 \cdot \mathbf{r} = \left[\frac{2\pi}{T} r \right]^2 \cdot \mathbf{r} = \frac{4\pi^2 r^2}{T^2} \cdot \mathbf{r} = \frac{4\pi^2 r^3}{T^2} = 4\pi^2 \cdot \frac{r^3}{T^2} = 4\pi^2 \cdot r^3 \cdot f^2 \cdot \mathbf{p}$

\rightarrow 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 -Geometrical - Shapes** , of the motion which are the **Conic-Sections** .

The Interior motion is kept in its Wavelength-Storage $2r = n \lambda$, and the **Linear motion is continued by the Propagating Electromagnetic-Wave - conveyer** .

The mechanism of **Energy-transport through a Medium** involves the **Absorption and the Reemission** of the wave-energy by the atoms of the material . Since Quanta of Energy occupy a finite space $\lambda = 2r$, as motion , then an electromagnetic wave impinging upon the atoms of a material, its energy is absorbed by the atoms of the material , and since Energy \equiv motion then occurs **Resonance** , and electrons within the atoms undergo vibrations . After a short period of vibrational-motion , the vibrating electrons create a **New Electromagnetic wave** with the same frequency as the first one and thus delay motion through the medium.

Because energy is related to wavelength λ , then once the energy of EM-wave is reemitted then it travels through a small region of space 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.

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-store , **r** , in a Stationary-wave of wavelength $n \lambda = 2r$, consisted

of **n** stationary lobes filled in λ with inner motion the Electromagnetic-Displacement-current , while is Outward Propagating with light speed as Energy-store $\lambda = 2r / n$,

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

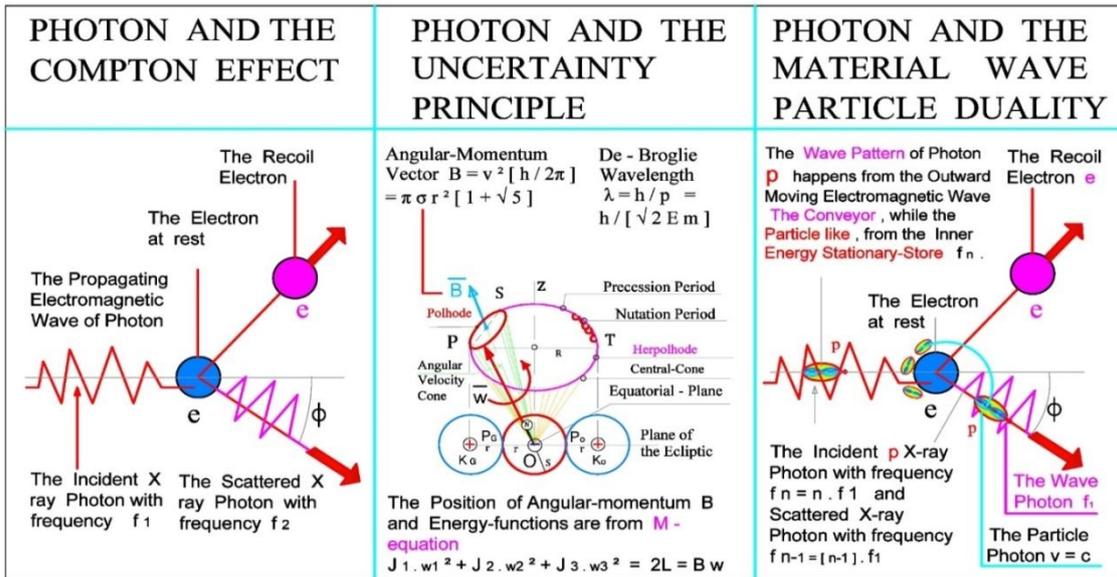


Figure-2.

The Wave $[f_1 = (E^2 + H^2) = n \frac{(1+\sqrt{5})\sigma}{4\pi r} = \frac{n\sigma.B}{8r^2}]$ - Particle $[v = c = \lambda f] \rightarrow$ Duality

1..The experiment of A-Compton, *light behaves as a wave*, is consisted on an X-ray Photon of frequency f_1 which collides with a stationary electron and Scattered with frequency $f_2 < f_1$ which is energy loss.

2..The Uncertainty Principle for the Wave-Particle accepts each particle with a definite momentum can be described by a Wave-function, which created the suspicious of finding a Particle in the biggest envelope of the wave.

Instead of it momentum B rotates into the, Angular - Velocity - cone.

3..The Material Wave-Particle Duality: All moving Energy-Storages are *Standing - Waves*- Particles as *all Quantum - Particles*, and their *Propagating-Energy as Electromagnetic-Wave* is their Conveyor.

In Energy-Storages issues the *Stability of Equilibrium* as this in Energy-Rims \equiv Orbitals, also.

a..Compton Effect :

The moving stores which are the EM-Waves are consisted of three parts,

1.. The Energy-store $r = n \cdot \frac{\lambda}{2}$, is consisted of, n, energy lobes in the Stationary -Wave

of cave, r, as the *Golden-ratio-frequency* $f_n = \frac{n\sigma}{8r} [1 + \sqrt{5}]$, and consists the

Massive-energy-part of Photon, p.

2.. The Vertical Electric-field **E** is perpendicular to r axis of motion and consists the Space Energy-part of Photon.

3.. The Horizontal Magnetic-field **P** perpendicular to r axis and field **E**, both being always in Phase and consists the Anti-space-energy-part of Photon.

b..Wave-Particle duality and Uncertainty Principles:

All quantum objects and Photon, exhibit Wave-like and Particle-like properties such as diffraction and interference on the length scale of their wavelength. Experiments confirm that the Photon is not a short pulse of Electromagnetic radiation because it does not spread-out as it propagates, nor does it divide when it encounters a beam splitter. Because Photon is a *Material-point* is absorbed or emitted as a whole by arbitrary smaller than its wavelength or even point-like electrons or small-systems. It was shown [66] that Photon which is an *Energy-Storage-monad* is consisted of *two-real-constituents*, and *one Energy. That imaginary - constituent which creates the Electromagnetic field, is resulting from the local and Energy - cave*, by launching The Inner-Electromagnetic -Wave of monad $\lambda = 2r / n$ outward the λ .

c..Material Wave-Particle Duality :

The Recoiled-electron position can be resolved to the New position as well as the Scattered Photon of the Energy-storage by its new frequency. Momentum equal to Spin is not changed because issues the law of energy-conservation. Electromagnetic energy is supplemented by the incoming wavelength $\lambda =$

$2\pi/n$, or by angle ϕ . The Storage r , modifies the Intrinsic-radiation and avoids spontaneous emission. [68]

A photon with $E \perp B$ wave when entering a transparent material, Photon is absorbed by an atom and the reemitted, because wave vector would not be preserved, by the material and there would be scattering.

Light Storer $\equiv E \perp H$, using electromagnetically-induced transparency, interaction between photon and an Ensemble of atoms is *tuned*, to the group velocity of the photon reduced to zero and to the remaining EB-Storage-field within the interaction zone.

The excitation is not purely photonic, but instead has been mapped smoothly from a single photon to an ensemble of EB-Storage atoms.

Photon is regenerated by its Intrinsic Electromagnetic wave $E \perp B$ and is indistinguishable from the input one, exactly the same.

The interpretation that the Photon has been stored within the material is false, on the contrary Storage is the E , H , Energy-tank with \mathbf{n} , frequencies, f_n in Photon, and the Electromagnetic Radiation E, B , is the conveyer → the carrier.

C..THE TOTAL – ENERGY IN LOOPS:

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 are not producing Work, from where the dispersion follows Pythagoras theorem and the resultant Quantized linear Space length, r , becomes, as the Resultant of Energy Vectors

$$r = |(\bar{c}.T)| = \sqrt{v^2 + c^2} \text{ and by using Space Vector } \bar{r} = |(\bar{c}.T)| = \sqrt{v^2 + c^2} \text{ then The total Rotating energy is } \rightarrow \pm \bar{\Lambda} =$$

$$\bar{p}.r = (M.c).r = (M.c).\sqrt{v^2 + c^2} \text{ and squaring both sites}$$

$$[\pm \bar{\Lambda}]^2 = p^2.r^2 = M^2.c^2.(v^2+c^2) = (M^2.v^2).c^2 + M^2.c^4 = (p^2.c^2) + M^2.c^4 = [p.c]^2 + [m_0.c^2]^2 \text{ or is } E_T = E_R + E_K \rightarrow \text{i.e.}$$

Total - Energy of Elementary-particle = Intrinsic Rotational + Kinetic Energy,

The velocity of Elementary particles is the light velocity $c = v = 2\pi r.f_e$ and

$$\text{frequency } \rightarrow f_e = \frac{c}{2\pi.r} \dots (a) \text{ Rotational Energy } E_R = \bar{B}.\bar{w} = 2L = J.w^2 \text{ and}$$

$$\rightarrow E_R = \left[\frac{\pi r^4}{8}\right].\left[\frac{c^2}{r}\right] = \frac{\pi c^2}{8} r^2 = 3,535.10^{16}.r^2 \dots (b)$$

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

$$\text{constant, Total-Energy } \rightarrow E_T = E_R + E_K = \frac{\pi c^2}{8} r^2 + \frac{1}{2} m.v^2 = 3,535.10^{16}.r^2 + \frac{1}{2} m.v^2 \dots (c)$$

$$\text{Mass of elementary particles is } m = \frac{E}{2r^2.w^2} = \frac{J.w^2}{2} \cdot \frac{1}{2r^2.w^2} = \frac{J}{4.r^2} = \frac{\pi.r^2}{16}, \text{ i.e. dependent}$$

$$\text{on radius of cave, and for } r = 10^{-62} \text{ mass } \rightarrow m = \frac{\pi.10^{-124}}{16} = 1,935.10^{-125} \text{ kg.}$$

Dot product and Cross product:

The **Dot-product** happens for interactions between Similar dimensions, while the **Cross-product** between Different-dimensions. Cross-product of two vectors \bar{a}, \bar{b}

is $\bar{a} \times \bar{b} = |\bar{a}|.|\bar{b}| \sin \theta.\bar{n}$ and for $\bar{a} = \bar{b}$ and $\theta=90^\circ$ then $\bar{a} \times \bar{a} = \bar{a}^2$, and for Quaternion, s , which performs the Work of rotating the one vector around the other → Work = $\bar{a} \times \bar{a} = \bar{a}^2.\bar{r}$, and for $\bar{a} = \bar{v}$ then, Work = $\bar{v}^2.\bar{r} = |\bar{v}|.|\bar{v}|.\bar{r} = v^2.r.\bar{n}$

$$=(wr)^2r.\bar{n} = (2\pi r/T)^2 \bar{n} = (4\pi^2 r^2/T^2).r.\bar{n} = \frac{4\pi^2 r^3}{T^2}.\bar{n} = (4\pi^2 r^2.f^2).r.\bar{n}, \text{ or } \dots (w)$$

$$W = 4\pi^2 \frac{r^3}{T^2}.\bar{n} = 4\pi^2.r^3.f^2.\bar{n}, \text{ which is the Kepler celestial law for } \textit{microcosm}.$$

Since in Mechanics issues $z^2 = s^2 - s^2 + 2.s.s = 1$, and from Unit-quaternion $s^2 + [iv]^2 = 1$

then is → $s^2 - v^2 = 1 \dots (d)$ Equation (d) is a Cone relation on where Total-energy, Kinetic and Potential is conserved and for Photon, Electromagnetic radiation is the Kinetic-energy and the Velocity-vector–Energy-tank is the Potential. Photon is an Energy-store, r , in a Stationary-wave of wavelength $\lambda = 2r$ consisted of n stationary lobes filled in λ with inner motion the Electromagnetic – Displacement-current and Outward the Propagating, Energy-store $\lambda = 2r/n$, with the light speed, c , the two transverse fields, {the + Electric-field and the -Magnetic-field}. Equation (w) declares the relation between the **Total-Energy** W in caves, and the **Geometry** of the Energy Space cave $r \equiv [EM-R \equiv f_{1=N}, f_2, f_3, f_D, f_n]$ with a binding constant proved is g .

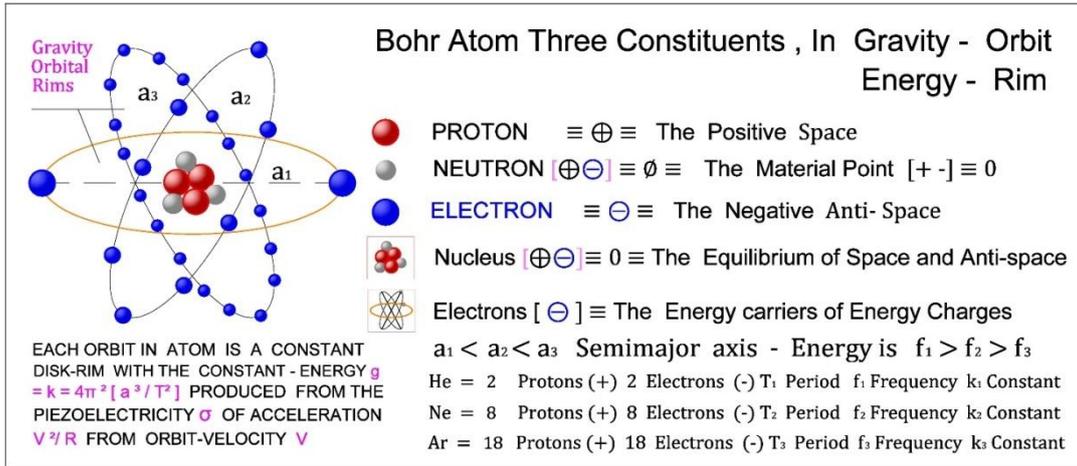


Figure-3.

Proton, in Bohr-model, consists the → Positive Breakage (+) of the three constituents, Electron consists the → Negative Breakage (-) of the three constituents, Neutron consists the → Equilibrium Material Point (+ -) of the Spaces and Anti-spaces.

Nucleus consists the → Equilibrium **Positive** Breakage Store, in Atom-Model.

Electron Orbits are the → Equilibrium **Negative** Breakage Store-Rims in Atom.

Orbital Electron is the → Moving-Charge-carrier of Energy in Atom-Model.

It was prior referred that, when Matter and Antimatter annihilate at rest or when Anti-space comes in contact with its regular Space counterpart, they mutually destroy each other and all of their Energy is converted to the **Three Breakages**

→ s^2 , $-|\vec{v}|^2$, $[2\vec{w}] \cdot |\vec{s}| |\vec{r}| \cdot \nabla_i \leftarrow$ where for, $\vec{v} = s \equiv$ the cave,

$[s^2] \rightarrow$ is the Real part, **Matter**, of the new monad, and is a **Positive Scalar magnitude**

$-[s^2] \rightarrow$ is the always Negative part, **Anti-matter**, which is always a **Negative Scalar-magnitude**.

$2s^2 \cdot \nabla_i \rightarrow$ is the double Angular-Velocity Term, **The Energy Term**, and which is a **Vector magnitude**.

Photon is a Material-point in cave **r**, where its **Inner** is **the Stationary-Standing-wave**

Electromagnetic-Wave $[E^2 + H^2] = 2(2r) \cdot c \cdot \sin 2\phi$ with **n** Lobes representing the

Normal mode vibration with frequencies $f_n = n \cdot f_1 = \frac{E}{h} = \frac{n \cdot v}{4r} = \frac{n\sigma}{8r} [1 + \sqrt{5}]$, its

Outward as the Propagating Electromagnetic-Wave → $\{[\epsilon E^2 + \mu B^2] = 2 \cdot \lambda c \cdot \sin 2\phi\} \leftarrow$

where Particle $2r = n \lambda$, **Cave** **r**, is the **Electromagnetic-Energy-Storage**, and Electromagnetic-Radiation **E**, is the **Wave conveyer**. Following above constituents of Photon then, Since **Energy is motion** and the **Total - Energy of Elementary - Particle** is equal to the → **Intrinsic Rotational + Kinetic Energy from velocity**, then according to the conservation law of Energy, **This Energy is stored into Neutral caves as Stationary Loops consisting the Lobes**, and thus producing the **Space and the Anti -Space Particles with velocity vector the remaining of the Energy Term**. It is proved that Hydrogen cave is the lightest and less-mass element.

The Breakage - Principle, is the way of Energy conservation, where Energy never annihilates and which is always reverted into → the two Opposites $\{(\pm w)$ or the Conveyers \equiv Carriers $\}$ and an Neutral Part $2 \cdot \nabla_i$ which is the Energy-store \equiv Tank

Energy \equiv or as **Matter** (+ w), as **Antimatter** (- w) and as **Energy part**, $2L = \vec{B} \cdot \vec{w}$

i.e. **Energy \equiv Motion \equiv Space + Anti space + Kinetic Energy**,

Vibrations of Systems issues for Orbits as → $\vec{W} = 4\pi^2 \cdot \frac{r^3}{T^2} \cdot \vec{n} = 4\pi^2 \cdot r^3 \cdot f_p^2 \cdot \vec{n} \leftarrow$ and agree, to Kepler celestial law such as for **macrocosm and microcosm**.

H.. **The Permissible Resonance-Path:**

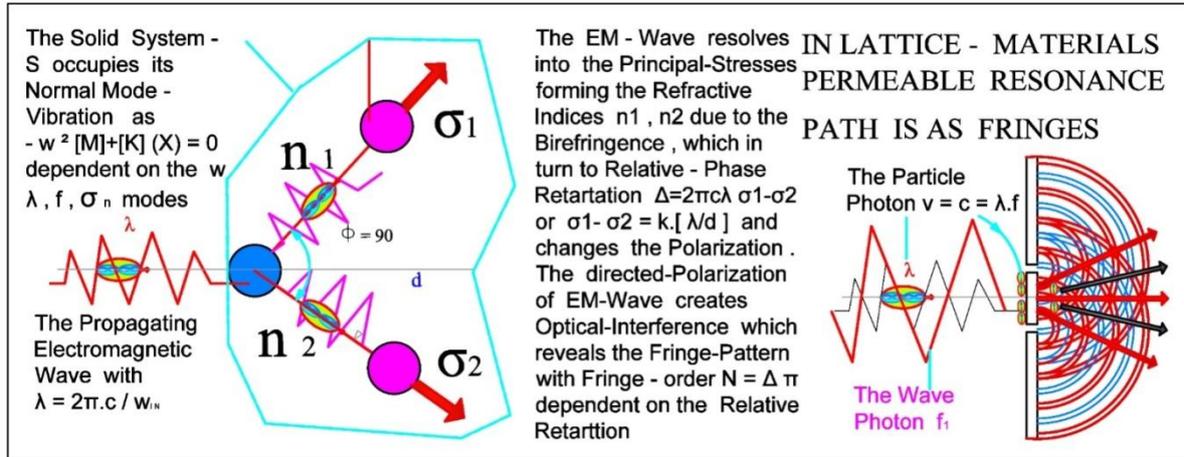


Figure-4.

- a) The Transmitted Electromagnetic Wave of wavelength $\lambda = 2\pi c/w \equiv c/f$ follows the Hook's Elastic deformation and resolves into the Principal Stresses-Pattern σ_1, σ_2 .
- b) The Permeable - Resonance-Path is for ,
- 1) Solids \rightarrow The Normal-mode-Vibration System $\{ -w^2 [M] + [K] (X) \} = 0$
 - 2) Liquids \rightarrow The Cauchy Stress-Tensor as Momentum equation $\nabla \cdot \sigma = -\nabla p + \nabla \cdot \tau$
 - 3) Gases \rightarrow The combined Avogadro's Pressure-law $PV = n RT = n \cdot mv^2/3$
 - 4) Crystals \rightarrow The Cauchy Ellipsoid-Stress-tensor where $E \perp B \perp r \equiv \sigma_1 \perp \sigma_2 \perp \sigma_3$
 - 5) Molecules \rightarrow The Lattice - Crystal -Arrangement
 - 6) Atoms \rightarrow The Chemical Bonds relation
 - 7) Particles \rightarrow The Resultance One-Dimensional-Collision $\bar{v}_{ij} = \bar{v}_j - \bar{v}_i = \bar{w}_{ij} \cdot \bar{r}_{ij}$
 - 8) M-Points \rightarrow The Resonance-frequencies $\mathbf{f}_R [S \equiv f_{1=n}, f_2, f_3, f_R = w^2] = \mathbf{f}_n = n \frac{(1+\sqrt{5})\sigma}{4\pi r} = \frac{n\sigma \cdot \bar{B}}{8r^2}$
- 9) Cave-Orbit \rightarrow The Relation $c \cdot L_s = L_v$,Light-velocity $3 \cdot 10^8 \text{m/s} * 1 \cdot 10^{-42} \text{m}$ cave $= 3 \cdot 10^{-34} \text{m}^2/\text{s}$ are the Cave-Energy-Plane-Rims in Atom's ,Planet orbits

Remarks :

The Path Permeable to a common motion is following one of w, f, σ_n quantities as below procedure ,

- 1.. A transmitted Electromagnetic wave with angular velocity vector $w = 2\pi f = 2\pi c/\lambda$ strikes on a Body .
- 2.. The Electromagnetic wave entering into the Body follows Hook's Elastic deformation , and resolves into the Principal Net-Stresses-Pattern .
- 3.. Because of Principal-Stresses resolving , different Refractive-Indices are experienced on their perpendicular components due to the Birefringence .
- 4.. The difference in the Refractive-Indices leads to a Relative - Phase -Retardation between the components given as $\Delta = (2\pi c/\lambda) \cdot k \cdot (\sigma_1 - \sigma_2)$ or as $\sigma_1 - \sigma_2 = [\frac{\lambda}{d}] \cdot \frac{\Delta}{2\pi c} = k \cdot [\frac{\lambda}{d}] \dots (a)$ where $\Delta =$ The Controlled Phase-Retardation from the transmitted Electromagnetic wave $\lambda = \frac{2\pi c}{w}$, is the vacuum wavelength $d =$ The thickness of the Body or of Specimen
- 5.. The Relative Phase Retardation changes the Polarization of the transmitted EM Wave ,which changes also the Polarization of the Principal stresses , and thus many different waves are so produced .The Optical interference of the Waves Fringe - Pattern are revealed with Fringe-order $N = \Delta/2\pi$ dependent on Relative-Retardation .
- 6.. By Studying the Fringe-Pattern one can determine the State of stress at various points of the material and the General Permeable Paths of the Electromagnetic-State of the body.

In Fig-4.(3) is seen the Energy-Storage p , which is transported by the Electromagnetic

conveyer f_n .

The Energy-Storages $r = n \cdot [\frac{\lambda}{2}] \equiv W_{n(n+1)} = [\frac{4\pi r^2 f_1}{3}] \cdot n \cdot (n+1)$, **are travelling through Bodies and follow, Lamé Stress Ellipsoid** $n_1^2 + n_2^2 + n_3^2 = \frac{T_1^2}{\sigma_1^2} + \frac{T_2^2}{\sigma_2^2} + \frac{T_3^2}{\sigma_3^2} = 1$ on principal stresses $\pm\sigma_1, \pm\sigma_2, \pm\sigma_3$, which **is the Passage** through which Forces

(The EM-Radiation) travel in any Solid either in Motion or at Rest .

Laplace's Orbital Angular-momentum $e^{i \cdot 2\pi n} = 1$ and for $n = 0, \pm 1, \pm 2, \pm 3, \dots, \pm n$, consist the eigenvalues operator L_z which agree with prior Resonance-frequencies f_R [$S \equiv f_{1=N}, f_2, f_3, f_R = w^2$] as wavelengths $\lambda \equiv [f_1, f_2 \dots f_n = w^2] \equiv$ the lobes, or $\rightarrow f_N = n \frac{(1+\sqrt{5})\sigma}{4\pi r} = \frac{n\sigma \cdot B}{8r^2}$, a Principal-Stresses σ , and a Resonance-frequencies f_R

relation, which is the Energy stored in the MP-lobes. [70]

Physical Properties and Crystal-types :

The **Physical properties** of Crystals, depend on the **Kinds and Strengths of the only Attractive forces** that hold the particles together in the Bodies [Solids, Liquids, Gases, Crystals etc.] while the **Types** depend upon the Kinds of Particles located at sites in the lattice-Material-geometry-formation .

An Ion is an Atom or Molecule in which the number of Electrons differs the number of Protons, or $E_n \neq P_n$, and if $E_n > P_n$ or $E_n < P_n$ then is **Negative or Positive Ion**. **Lattice - crystal** is a Regular 3D geometrical arrangement of Atoms, Molecules or Ions in a crystal, which follows the Material-Geometry rules. [70]

Lattice - energy is the Energy required to separate the Ions of an Ionic, with Atoms or Molecules Solid. The mapping of Crystal-types is as below,

Type - Particles at sites - Type of Bounding-Force- Properties- EM-Radiation

Ionic : \oplus, \ominus Ions - Electrostatic $\oplus \leftrightarrow \ominus$ - non-conductors - Infrared

Molecular : Atoms or Molecules - Dipole Attraction-Repulsion - non-conductors - Chemical-Bonds .

Covalent : Atoms - Network-Bonds between Atoms -non-conductors - EM-Spectrum

Metallic : Atoms - Ions and Electrons Attraction - Conductors - E-conduction .

The **Kinetic-Energy** E_K of a moving Material-point, as this is the Photon, is stored as motion in its Storage, $r = [n \cdot \lambda / 2]$ with the, n frequencies $f_n = n \cdot f_1$, with n lobes and fundamental frequency f_1 . From above is seen the **Passage and The-How EM-Radiation can travel in Crystals** and which are the Cauchy-stress-tensor where $E \perp B \perp r \equiv \sigma_1 \perp \sigma_2 \perp \sigma_3$, in-where Energy Propagates along Directions without Birefringence, and carries the Energy-Storager, which radiation is **The conveyer**.

Above procedure can be used in Cells, where cells are cases of an Birefringence material and the Resonance-Passage happens as the Force, **an EM-Radiation in Two directions, can travel in Cell** through Cauchy-stress-tensor where the two Conveyers $E \perp B \perp r \equiv \sigma_1 \perp \sigma_2 \perp \sigma_3$, can carry the Energy-Storage, r , in Cell, and change the Inner-Structure of Cell to another desirable Property.

From Inner-velocity equation $v = wr = (2\pi/T) \cdot r = 2\pi \cdot f_1 \cdot r$, wavelength $\lambda = cT = c / f_1$, cave $r = n \cdot [\lambda / 2]$, then $r = n \cdot (c / 2f_1)$ and $v = 2\pi \cdot f_1 [n \cdot c / 2f_1] = n \cdot \pi \cdot c$ or $v = n \cdot \pi \cdot c \dots (4)$ showing that velocities in lobes are, $n \cdot \pi$, times that of light and for $n = 1$ then $v = \pi \cdot c$ more than three times faster of light velocity.

Because of the above velocity v , an **E** field is produced, which produces the $\partial D / \partial t$ field, which in turn produces the **H** field which produces the $\partial B / \partial t$ field and which again produces the **E** field, i.e. the total **EM**-field regenerates itself as it rotates, and is a Phenomenon happening in a Propagating Plane-wave .

Permeable-Resonance-Path is impossible in an three-times stronger EM-field .

D..THE CONIC-SECTIONS AND PLANAR-CURVES :

Menaechmus came to think of producing curves by cutting a cone from the circle definition which is \rightarrow Since the center O of a circle is of equal distance to all points in Plane of the circumference the same also to all Centers O_n from center O which are on line OO_n and Perpendicular to this Plane \leftarrow

In Figure -5, Line OO_n is the generator axis of a right-angled cone and all the shapes of the curve produced by cutting a right-cone by a plane obliquely inclined to its axis is a conic section. In circle $[O, OP]$ with only one center issues for point P, $OP + PO = 2R$ is constant, while in ellipse $[O_1P, PO_2]$ of two centers O_1, O_2 issues for point P, $PO_1 + PO_2 =$ major-axis, which is constant. This property allows Central-motion to be

seen as a Geometrical problem of Proportionals on Points and lines [44] .

In [70] is $\vec{M} = [\vec{r} \times \vec{p}] = \frac{d\vec{B}}{dt}$ the Theorem of Equal-Areas and Kepler's 1st Law , i.e. Momentum \vec{p} , of a force \vec{P} , to a constant center O , of radius \vec{r} , is equal to the change of the angular -momentum \vec{B} at time t , related to the same center O , and its trajectory lies on the same Plane .

a.. The Geometrical Central motion :Huygens and Johannes Bernoulli came to think of producing the Shortest-Time curve between Two points on a vertical Plane by a point acted only by gravity and which is , \rightarrow To find the Path - curve or surface for which a given variation has a Stationary value , Stationary or Extrema is the maximum or minimum between two points (1) , (2) \leftarrow It was proved the Cycloid. From Geometry Figure -5 , Equality $A_1O = p/e = AP + OP \cdot \cos \varphi = r/e + r \cdot \cos \varphi$ and is $\rightarrow p = r + r \cdot e \cdot \cos \varphi = r (1 + e \cdot \cos \varphi) \dots\dots(1)$ where , p = a constant parameter , r = the orbit radius from O . Inversing (1) then $\rightarrow \frac{1}{r} = \frac{1 + e \cdot \cos \varphi}{p}$ and

$$\text{Derivative} \rightarrow \frac{d^2 1/r}{d\varphi^2} = - \frac{e \cdot \cos \varphi}{p} , \rightarrow \frac{d^2 1/r}{d\varphi^2} + \frac{1}{r} = \frac{1}{p} \dots (2)$$

$$\text{Integrating (2) is the acceleration at point P and equal to} \rightarrow a = - \frac{4A^2}{r^2} \frac{1}{p} \dots (3)$$

where the constant area $O, P, P_1 = A = \frac{1}{2} \cdot r^2 \cdot \frac{d\varphi}{dt}$, and for ellipse the Area = $(\pi \cdot a_e \cdot b_e)$.

For ellipse $a^2_p = p \cdot b_p$, or $\frac{1}{p} = \frac{a_p}{b^2_p}$ and period of rotation T , then the Constant are

for a period , T , is $A = (\pi \cdot a_p \cdot b_p) / T$ and (3) becomes $a = - \frac{4\pi^2}{T^2 r^2} a^2_p b^2_p \frac{a_p}{b^2_p} =$

$$= - \left[\frac{4\pi^2}{T^2} a^3_p \right] \frac{1}{r^2} = - \left[\frac{4\pi^2}{T^2} \right] \frac{a^3_p}{r^2} = - k \frac{1}{r^2} \dots (4) \text{ or acceleration}$$

$$a = - \left[\frac{4\pi^2}{T^2} \right] \frac{a^3_p}{r^2} = - k \frac{1}{r^2} , \text{ where } k = \left[\frac{4\pi^2 a^3_p}{T^2} \right] = 4\pi^2 \cdot a^3_p \cdot f^2 \rightarrow \text{a constant} \dots (4a)$$

Equation (4a) is Kepler second Planetary law, Spotting constant k , to be a function of the Orbit $\equiv a^3_p \equiv$ the Semi-major axis \equiv Space and as a function of Time T , or the frequency f_p of orbiting . This significant property is used also in atom's structure .

For circular motion $a^3_e = r$, then (4a) becomes $k = - \left[\frac{4\pi^2}{T^2} \right] \frac{r^3}{r^2} = - \left[\frac{4\pi^2 r}{T^2} \right] = 4\pi^2 \cdot r^3 \cdot f^2$

$$\text{and } k = \left[\frac{4\pi^2 r^3}{T^2} \right] = 4\pi^2 \cdot r^3 \cdot f_e^2 \text{ i.e.}$$

- 1.. Kepler's First law of Orbits : All Planets move in Elliptical orbits , with the sun at one focus .
- 2.. Kepler's Second law of Areas: A line that connects a Planet to the sun sweeps out equal areas in equal times .
- 3.. Kepler's Third law of Periods : The square of the period of any Planet is proportional to the cube of the semimajor axis of its orbit .
- 4.. Kepler's constant $k = 4\pi^2 r^3 (1/T)^2$: The constant k , is Not-Only constant during the motion of a Planet , because being also $k \cong r^3 \cdot (1/T)^2 = \text{constant}$ for all Planets.
- 5.. Spotting on Kepler's constant k : During the Central-Plane-motion of a Planet \equiv Momentum \vec{B} and a Sun \equiv focus O , the coefficient $r^3 \cdot (1/T)^2 = r^3 \cdot f_p^2$ is Constant. Applying above property to Caves \equiv Energy-Storages \equiv Orbits , then since $r^3 \cdot f_p^2 = C = \text{Constant}$, then change of , r , follows change of f_p , or in cave , Electromagnetic-wave $\mathbf{E}_1 = \left[\frac{4\pi r^2}{3} \right] \cdot \mathbf{f}_1 = C$, constant , is absorbed or emitted.

Remark :

- 1.. Since ,Caves \equiv Energy-Storages \equiv Orbits \equiv Stationary-lobes \equiv Energy-Rims $\equiv r^3 \cdot f_p^2$
 $E_n = n \cdot \left[\frac{4\pi r^2}{3} \right] \cdot \mathbf{f}_1 = C$, therefore , Atoms Wheel-Rim , the Protons-Neutrons in Nucleus and Electrons in Orbits is an Energy - Rim , for each Electron-Energy-Orbit .
- 2.. It was shown that all particles have the same acceleration , g , in our gravitational field with frequency unchanged , and \rightarrow velocity , $d\vec{v}$, with wavelength , λ , to be changed \leftarrow so light being a particle also is deviated in gravity field and , Inertial mass is equal to the Gravitational mass which is the Necessary and Sufficient Condition only in Mass of Material-point where $c \cdot T = \lambda = c / f$, of this Isochronous motion .
- 3.. The Spotting on Kepler's constant k : Question : Since the Central-Plane-motion of point P=Planet \equiv Momentum \vec{B} , and a Sun \equiv Focus O is a Conic-section , to find of producing the Shortest - closed - Surface on any Plane , such that Energy \equiv motion , to be constant \equiv The closed-Surface of the two points , and which is ,

→ To find the Energy -Path-closed-Curve of the two Points which Surface is of Constant-Energy . Constant is not a maximum or minimum magnitude between the two points P and O , instead it is a Fixed sum from rotation $\equiv [\oplus \cup \ominus] \equiv$ motion , trapped in a closed-curve ←

The Energy-quantity k is constant in Planck`s scale cave 10^{-34} m and exists , in Plane Rims , becoming from the continuous Central - Rotation of masses in scales . It is shown in , Kepler`s third law, that this constant is $k = [\frac{4\pi^2 r^3}{T^2}] = 4\pi^2 . r^3 . f_p^2$, where for the Sun-Earth-Rim Semi-major-axis , $r = 15.10^{10}$ m , and the period $T = 1$ year the Energy in this Plane-Sun-Earth Rim is $k = 3.10^{-34} = [3.10^8].10^{-42} y^2/m^3$.

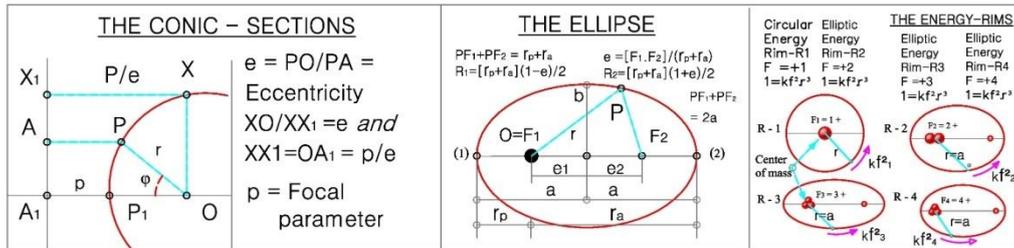


Figure-5.

The Conic-sections as Planar and Atoms-curves under Equilibrium of forces

1.. The generation of the Conic-sections : O = The constant center of rotation , P = The movable Point on Orbit , p = The parameter of the conic , e = the eccentricity of the conic $0 \leq e \leq 1$

2.. The Central Ellipse and Gravity relation for mass $m_p \rightarrow$ Planet , On $-m_s \rightarrow$ Sun.

3.. The Energy-Rim R_1 is circle because focus F_1 is consisted of one center , while the others for Focus F_n is of 2,3,4,.. centers due to \oplus elements are Ellipse for every one \ominus mass m_p . Kepler`s constant Planets relation is $\frac{T^2}{a^3} = k = [\frac{4\pi^2}{G.m}] =$

$2,97.10^{-19} (s^2/m^3)$, where $G = 6,67.10^{-11} (Nm^2/Kg^2)$ becomes from the Light-velocity-Storage \bar{v} , when \bar{v} , is entering the cave $r = 1.10^{-42}$ m , where is produced the Energy Plane-Cave-Rim equal to $R_n = 3.10^{-34} m^2/s$.

Since also exists the relation $k.f_n^2.r^3 = 1$ where r = semi major axis a , then, An Energy - Rim is a Plane-Surface representing a Constant-Energy becoming from the squared frequency f_n^2 , representing the Imaginary -Energy - Part of monad ,and r_n^3 representing the Real-Space-Part of monad $1 = k.f_n^2.r^3$. All these Energy-Rims consist the Quantized-Plane-curves

4.. Central motion and Gravity :

Kepler`s third law of harmonics suggested that , the ratio of the period of orbit squared (T^2) to the mean radius of orbit cubed (R^3) is the same value ,

$k = 2,97.10^{-19} s^2/m^3 = T^2/R^3$, for all the Planets that orbit the sun.

Centripetal force $C_F = m_p v^2 / R$ is the result of the Gravitational force that attracts the Planet towards the Sun and can be represented as Gravity-force →

$G_F = [G.m_p m_s] / R^2$ and is $C_F = G_F$.

Since the mean-velocity of a Planet is $v_p = (2\pi R) / T$ then $v^2 = (4\pi^2 R^2) / T^2$ and substituting to prior , Centripetal force $m_p [4\pi^2 R^2] / RT^2 = [G.m_p m_s] / R^2$ and by cross-multiplication is transformed to $T^2 / R^3 = [m_p 4\pi^2] / [G.m_p m_s]$ and canceling the same from numerator and the denominator then

$T^2/R^3 = [4\pi^2] / [G.m_s]$ or $Gm_s = [4\pi^2.f_p^2] R^3 = w^2 R^3$ where $E_1 = [\frac{4\pi r^2}{3}].f_p$, $k = R^3.f_p^2$

The period $T(s)$ for an elliptical orbit is $T = 2\pi \sqrt{\frac{a^3}{G[M_1+M_2]}}$..(1), which is the same for all ellipse with the same semi-major-axis a .Inversely for calculating the distance in meters ,where a body has to orbit in order to have a given orbital period ,in second,

$a = \sqrt[3]{\frac{G[M_1+M_2]T^2}{4\pi^2}}$ (2) where , $G =$ The gravitational constant = $6,67.10^{-11} Nm^2/Kg^2$, M_1 , M_2 the masses of any two material-points .

From above relation is seen that Energy – Rim - Shapes C , are Discrete-Packets

of Energy – levels i.e.

1.. Attraction of opposite forces $F_o \leftrightarrow F_p$ at points O , P creates the Central motion and Kepler`s laws where Orbits are Plane-curves representing a Constant-Energy becoming from the squared Periods T^2 , or Frequency f_p^2 , representing the Imaginary-Energy-Part of monad and r_n^3 representing the Real - Space -Part of monad $1 = C.f_n^2.r^3$. These constant are the Quantized-Curve-Rims .

2.. Since both semi-major axis \bar{a} , *the Position-vector* , and velocity \bar{v} , *the Velocity-vector* , define the Orbital-Plane , then Angular-momentum-vector \bar{L} , is perpendicular to vectors \bar{a} , \bar{v} , and $\bar{L} \perp \bar{a} \cdot \bar{v}$, or

The magnitude $\bar{L} = \bar{a} \times \bar{v} = \text{constant}$ for all central motions .

For circular orbits gravitational force G_F equals the centripetal force C_F , so $C_F = G_F$ and $m_p v^2 / R = [G.m_p m_s] / R^2$ and velocity $v^2 = GM/R$ (1)

Substituting the expression into the formula for Kinetic energy then ,

$$K_E = \frac{mv^2}{2} = \frac{m.GM}{2.R} = \frac{GMm}{2.R} \dots(2) \quad \text{or} \quad K_E = (1/2) (-P_E) = \frac{P_E}{2} \quad \text{and} \quad -P_E = 2.K_E \dots(3)$$

The Total-energy $E = K_E + P_E = K_E - 2.K_E = -K_E$ (4) i.e.

The Potential - Energy is Always - Negative and Twice the Kinetic-energy

While The Total - Energy of an Central - Orbiting - System is Negative .

5.. Conservation laws in Astronomy :

1.. Newton`s second law tell us that acceleration on an object is proportional to the net-force acting on it so objects move at constant velocity if no force acts on them.

Because of conservation of Momentum the Interacting objects exchange momentum through equal and opposite forces $[\oplus \leftrightarrow \ominus] \equiv [\bar{v} \cdot \bar{v}_i]$, therefore **constant** $C = r^3.f_e^2$, is a **Quantized-Energy-Storage** , a Constant Energy-Plane-Rim , in where Planets move at constant velocities without any force acting on them .

2.. In [70] , the Work produced In Material-Point \bar{AB} is equal to $\rightarrow W = 2L = \bar{B} \cdot \bar{w} = J.w^2 \leftarrow$ consisting the First-Energy-Store which is a Stationary Wave with , n , lobes as , $W_{n(n+1)} = [\frac{4\pi r^2 f_1}{3}] \cdot n \cdot (n+1)$ and

$$\text{wavelength } \lambda_N = \frac{\sigma \cdot (1 + \sqrt{5})}{4\pi r} = \frac{n \cdot \bar{B}}{4\pi r^2} \text{ i.e. ,}$$

that which **Happens in Material point** , Momentum as Work is $W_{n(n+1)} = \text{constant}$ in n-lobe , **Happens to Planets orbiting the Sun** , so Because of conservation of angular momentum in the Constant Energy-Plane-Rim-Orbits , Planets with no twisting forces are continually rotating and orbiting the sun. Energy is concentrated at the Trajectories \equiv Rims \equiv Orbits because there exists the pressure of centripetal force as Fig.-6.

3.. Energy = motion = Work , and makes the matter move. In [70] the Work produced In Material-Point is conserved but can travel from one object to another , or change in form . From figure-1 Energy \equiv motion is kept in the Storages $r = n(\lambda/2)$, and is so conserved and transferred from one object to another , or change in form . The types of energy-forms are , *The Rotational* , the eternal rotation of positive \oplus around the negative \ominus , *The Kinetic* , motion , *The Potential* , stored motion , *The Radioactive* , wave motion , so , objects get their energy = motion from the Primary M-Points in-which motion exists Apriori , and transformed from one type to another.

4.. Angular momentum is the Constant Energy-Plane-Rim-Orbits of the System Sun-Planet. Only friction or atmospheric drag can change the orbit , and if an object gains orbital energy it moves to a more distant orbit with more energy . This is obvious from Planets constant $C = r^3.f_e^2$, since frequency is increased .

The Kepler`s Planar constant Principle :

Planet : Period of Rotation (y) : Frequency (n) : Semi-major axis (m) : T^2 / R^3 (s^2/m^3) : $k.f_n^2.r^3 = 1$

Mercury \rightarrow 0,2410 4,1494 5,79 .10¹⁰ 2,993 1

Earth \rightarrow 1,0000 1,0000 15,00 .10¹⁰ 2,9741

Pluto \rightarrow 248,3000 0,0040 590,00 .10¹⁰ 2,993 10⁻⁴² \equiv 1

Each of the above Orbits consist an Energy-Plane- monad with a Constant –Quantized energy. We will show that above issues for Atom`s structure , where Nucleus at focus is consisted of 1 , 2 , 3 , 4 , n , , , [\oplus] Protons which define the figure of (1) focus to be Circular-Rim and for (2) and more focus to be Ellipse-Rim . Each Proton in Atom creates only one Energy-Rim .

Since Medium-Field Material-Fragment $\rightarrow [\pm s^2] = [MFMF] \equiv$ The Chaos , is the base for all motions , the Scales of The Universe occupy the same Work .

All motions create Work which is conserved . Motion presupposes velocity vector \bar{v} which , when it is in motion collides with other velocity vectors and creates Constant work , k . Motion may be Linear , or Rotational for any displacement , r , so exists The-Constant-Work $\rightarrow k = \bar{v} \times \bar{v} \cdot \bar{r} = v^2 \cdot r$ This

Constant-Work is →

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

Equation (k) is Kepler-third-law, denoting that **Macrocosm and Microcosm Obey Newton's Laws of motion in all Scales**. Photon during Motion in [MFMF] Chaos, collides with other Photons, by means of Vectors-Cross-Product, and produces a constant Work which is stored into the Only-Four Energy-Geometrical-Shapes, of the motion. The Interior motion is kept in its Wavelength-Tank $2r = n\lambda$, and the Linear motion is continued by the innersurplus-produced-energy and which is the outer Propagating - Electromagnetic-Wave, the conveyor of tank $r = n\lambda/2$.

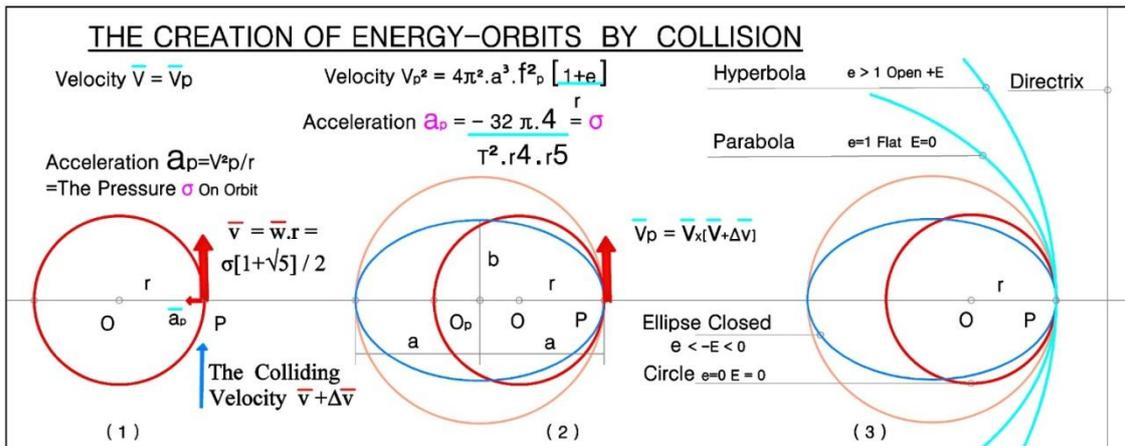


Figure-6.

Velocities and Accelerations on, Planar and Atom, Orbits after Collision.

In (1) is presented the Circular motion where the constant velocity is equal to

$$v = v_p = \omega r \quad \text{and the Centripetal-acceleration } a_p = \frac{v^2}{r}$$

In (2) is presented the Elliptical motion after collision, where the acceleration is increased, the velocity is equal to $v_p^2 = 4\pi^2 a^3 \cdot f_p^2 \cdot \left[\frac{1+e}{r} \right]$ and the Centripetal -

$$\text{acceleration } a_p = - \frac{32C^2 a^2}{r^5} = - \frac{32\pi a^4 [1]}{T^2 r^4 [r^5]}, \quad \text{and for } r = a \rightarrow a_p = - \frac{32\pi}{T^2 r^5},$$

where $C = \frac{dS}{dt} = r^2 d\phi/2 = \text{constant} = \text{Area covered in equal times}$.

In (3) are presented the Circular, Elliptical, Parabola, Hyperbola motion after collision, where acceleration is increased. The velocity is equal to

$$v_p^2 = 4\pi^2 \cdot \frac{a^3}{T^2} \left[\frac{1+e}{r} \right] = 4\pi^2 a^3 f_p^2 \left[\frac{1+e}{r} \right] = k \left[\frac{2 \cdot 1 - e^2}{r} \right] \text{ and the Centripetal-acceleration}$$

$$a_p = \frac{d^2 r}{dt^2} - \frac{4c^2}{z^3}, \text{ where } k = \frac{4C^2}{p} = \text{constant}, \quad \frac{d^2 r}{dt^2} = \text{The Natural acceleration}$$

5.. The Conservative System, Mechanical-energy and Shapes :

Conservative System is that, when the Total energy $E = K_E + P_E$, is constant where

K_E = the Kinetic energy and P_E = the Potential energy and $K_E + P_E = \text{constant}$ or $\frac{d}{dt} [K_E + P_E] = 0$, from the conservation of energy can be written $E = K_1 + P_1 = K_2 + P_2$, where 1, 2, represent two instances of time.

If at time 2, is the time corresponding to the maximum displacement of the mass then velocity of the mass is zero and $K_2 = 0$, where $K_1 + 0 = 0 + P_2$.

If the System is undergoing harmonic motion, the motion is repeated in equal intervals of time t , and $x(t) = x(t + w)$, then K_1 and P_2 are maximum values and issues $K_{\max} = P_{\max}$. Summing the Kinetic and Potential energy we have

$$\dot{x}^2/2 + P(x) = E = \text{constant} \dots (1) \quad \text{and solving for } \dot{x} = y \text{ then } y = \dot{x} =$$

$$\pm \sqrt{2[E - P(x)]} \dots (2) \quad \text{where trajectories must be symmetric about the x-axis,}$$

$$\ddot{x} = f(x) \dots (3) \quad \text{or } \ddot{x} = \dot{x} (d\dot{x}/dt) = f(x) \text{ and (3) is written } \dot{x} \cdot d\dot{x} - f(x) \cdot dx = 0 \dots (4)$$

$$\text{Integrating } \frac{\dot{x}^2}{2} - \int_0^x f(x) dx = E \text{ and by comparison with (1) then } P(x) = -\int_0^x f(x) dx$$

and $f(x) = -dP/dx$ i.e. for a conservative System the Force is equal to the negative gradient of the

Potential-energy, and is $\frac{dy}{dx} = \frac{f(x)}{y}$... (5) Equations note that, at

the equilibrium points the slope of the potential energy curve $P(x) = 0$. It can be shown that the minima of $P(x)$ are stable equilibrium while, positions corresponding

to the maxima of $P(x)$ and are positions of unstable equilibrium. Since the trajectories maybe closed curves as this happens in orbitals, the period associated with them is

$$T = 2 \int_{x_1}^{x_2} dx / \sqrt{2[E - P(x)]}$$

where x_1, x_2 , are extreme points of the trajectory on x-axis

In Figure- 6, mass m , at point P , is orbiting with velocity vector \vec{v} , analyzed into the radial \vec{v}_1 , and the tangential \vec{v}_2 , both perpendicular to PF_1, PF_2 . Since $\sum PF_1 + PF_2 = 2a = \text{constant}$, therefore $v_1 + v_2 = 0$, and $v_1 = -v_2$, i.e. the two velocities are of equal magnitude and opposite sign and, velocity on tangent at P , is

the external bisector of PF_1, PF_2 vectors.

The Kinetic energy breaks into two parts as $K_E = mv_1^2/2 + mv_2^2/2$ (a), and the magnitude of the Angular-momentum $L = r m v_2$, and in terms of L , then

$$K_E = \frac{1}{2} m v_1^2 + \frac{L^2}{2mr^2}$$

and adding the Negative Potential energy $P_E = -G \frac{Mm}{r}$ then Total energy $E = K_E + P_E = \frac{1}{2} m v_1^2 + \frac{L^2}{2mr^2} - G \frac{Mm}{r}$ (b)

Turning points, r_p perihelion, r_a aphelion, are the distances of closest approach and

further recession, where $v_1 = 0, v_2 = 0$, and (b) becomes $\frac{L^2}{2mr^2} - G \frac{Mm}{r} = E$ or $\rightarrow E = r^2 + G \frac{Mm}{r} - \frac{L^2}{2mE} = 0$, an equation with the two roots r_p and r_a , as $(r - r_p) \cdot (r - r_a) = 0$, or $r^2 - (r_p + r_a) \cdot r + (r_p r_a) = 0$ where is the

Sum of roots $[r_p + r_a] = -G \frac{Mm}{E} = 2a$ from where $\frac{2E}{m} = \frac{GM}{a}$, and Product of roots $[r_p \cdot r_a] = \frac{L^2}{2mE}$ from where $L = r \cdot m \cdot v, v = L/r \cdot m, E = \frac{1}{2} m \left[\frac{L}{rm} \right]^2 = \frac{L^2}{2mr^2}$

The turning points are related to the axes of the ellipse by $r_p + r_a = 2a$, and $r_p \cdot r_a = b^2 = -\frac{L^2}{2mE}$ so,

Energy on Orbit $E = \frac{GMm}{2a}$, Angular-momentum $L^2 = -2m \cdot E \cdot b^2$ (c)

From Kepler laws, the area, S , swept out by the line $PF_1 = r$ is $dS = r^2 \cdot d\theta / 2$ and

the rate of swept is $\frac{dS}{dt} = (r^2 / 2) \cdot (d\theta/dt) = \frac{1}{2} r^2 \omega = \frac{1}{2} r (r \omega) = \frac{L}{2m}$, since $r \omega = v$

and $m r^2 \omega = L \cdot f_n^2$. Since also, L is a constant, according to Kepler second law

radius r , sweeps out equal areas during equal intervals of time and for the total area $\rightarrow \pi ab = S = \int \frac{L}{2m} dt = \frac{LT}{2m}$, and T is the period of rotation.

From above $S^2 = \frac{L^2 T^2}{4m^2} = \pi^2 a^2 [b = \pi a (\frac{L^2}{2mE})]$, or $\frac{T^2}{a^3} = \frac{4\pi^2 m}{2E} = \frac{4\pi^2}{2E/m} = \frac{4\pi^2 a}{GM}$ and

$\rightarrow \frac{T^2}{a^3} = \frac{4\pi^2}{GM} = \text{constant}$. From relation $\frac{T^2}{a^3} = \frac{4\pi^2}{GM} = k = \frac{1}{f_n^2 \cdot a^3}$ becomes \rightarrow

$1 = k \cdot f_n^2 \cdot a^3 = [\frac{4\pi^2}{GM}] \cdot f_n^2 \cdot a^3$ (d) **existing in microcosm and macrocosm**.

From Web $r^2(\theta) = [\frac{L^2/m}{E \pm \sqrt{E^2 - kL^2/m} \sin 2(\theta - \theta_0)}]$ (e) which is an ellipse.

Equation (e) denotes Ellipses and circle, having a constant Energy-Shape when are given the Geometrical parameters related to the Physical parameters, Angular momentum (L), Total energy (E).

For a central gravitational force, the Potential-energy $P_E = -GMm/r$ and,

$\theta(r) = \int d\theta = \pm \frac{l}{\sqrt{2m}} \int_0^r \frac{dr/r^2}{\sqrt{E r^2 + GMmr - L^2/2m}}$ (f) Placing,

$a = -L^2/2m, b = GMm, c = E$, then, $\int_0^r \frac{dr/r}{\sqrt{a+br+cr^2}} = \frac{1}{\sqrt{-a}} \sin^{-1}(\frac{br+2a}{r\sqrt{b^2-4ac}})$ (f1)

and $\theta - \theta_0 = \pm \sin^{-1}(\frac{GMm^2 - L^2}{GMm^2 r})$ and eccentricity $e = \sqrt{1 + 2EL^2/G^2 M^2 m^3}$ (f2)

where θ_0 is a constant of integration. Solving for r then $r = \frac{L^2/GMm^2}{1 \pm e \sin(\theta - \theta_0)} = \frac{L^2/GMm^2}{1 + e \cdot \cos \theta}$

at periapsis .. (f3) creates only one Energy-Rim. Velocity Related to the distance $[r]$ of the Planet [the Orbiter], to the Sun [the Focus], is from Figure-6, the velocity

equation in a Central motion is $v^2 = 4C^2 \cdot [\frac{e^2 \sin^2 \phi}{p} + \frac{1}{r^2}]$ (f4) where constant

$C = \frac{\pi ab}{T} = \pi ab f_p = \frac{dS}{dt} = r^2 d\phi / 2 =$ The covered orbiting area per time second,

and $\frac{d(1/r)}{d\phi} = -\frac{e \sin \phi}{p}$. From a(1) $r = \frac{p}{1 + e \cos \phi}$ and velocity is,

$$v^2 = 4C^2 \cdot \left[\frac{e^2 \sin^2 \varphi}{p^2} + \frac{1+e^2 \cos^2 \varphi + 2e \cos \varphi}{p^2} \right] = \frac{4C^2}{p^2} [e^2 + 1 + 2e \cos \varphi] = \frac{4C^2}{p} \left[\frac{e^2 + 1}{p} + \frac{2}{r} - \frac{2}{p} \right] = \frac{4C^2}{p} \left[\frac{2(1-e^2)}{r} \right] \dots (f5), \text{ and for}$$

ellipse issuing $2a = r_{\varphi=0} + r_{\varphi=a} = \frac{p}{1+e} + \frac{p}{1-e} = \frac{2p}{1-e^2}$
 therefore, $v^2 = \frac{4C^2}{p} \left[\frac{2}{r} - \frac{1-e^2}{p} \right] = \frac{4C^2}{p} \left[\frac{2}{r} - \frac{1}{a} \right] \dots (f6)$

From (f6), when Planet is at Perihelion near the Sun $\frac{1}{r} = \frac{1+e}{p}$, then velocity is
 $v^2 = \frac{4C^2}{p} \left[\frac{2}{r} - \frac{1-e^2}{p} \right] = \frac{4C^2}{p} \left[\frac{2}{r} - \frac{1-e^2}{p} \right] = \frac{4C^2}{p} \left[\frac{1+e}{r} \right]$, where $\frac{4C^2}{p} = \frac{4(\pi ab/T)^2}{b^2/a} = 4\pi^2 \frac{a^3}{T^2}$, which is Kepler constant, and

$$v^2 = 4\pi^2 \frac{a^3}{T^2} \left[\frac{1+e}{r} \right] = [4\pi^2 a^3 \cdot f_p^2] \cdot \left[\frac{1+e}{r} \right] = K \left[\frac{1+e}{r} \right] \dots (f6a), \quad \text{The velocity at Perihelion}$$

for eccentricity $e < 1 \rightarrow v^2 = K \left[\frac{1+e}{r} \right] < K \frac{2}{r}$ and Planet follows Elliptic Orbit.

For eccentricity $e = 1 \rightarrow v^2 = K \left[\frac{1+e}{r} \right] = K \frac{2}{r}$ and Planet follows Parabolic-Orbit

For eccentricity $e > 1 \rightarrow v^2 = K \left[\frac{1+e}{r} \right] > K \frac{2}{r}$ and Planet follows Hyperbolic-Orbit

In a circular motion is shown that, velocity is proportional to the inverse square of radius r , and Newton –force, acceleration, the fifth, where

$$C = \frac{\pi ab}{T} = \frac{\pi a}{T} \left[\frac{1}{r^2} \right] = \frac{\pi a}{T r^2}, \text{ From relation } r = 2a \cdot \cos \varphi \text{ is, } \cos \varphi = \frac{r}{2a} \text{ and}$$

$$\frac{1}{r} = \frac{1}{2a \cos \varphi} \text{ also } \frac{d(1/r)}{d\varphi} = \frac{1}{r} \tan \varphi, \text{ and (f4) is } v^2 = 4C^2 \cdot [\tan^2 \varphi + 1] = \frac{4C^2}{r^2} \frac{1}{\cos^2 \varphi} =$$

$$\frac{16C^2 a^2}{r^4} \text{ and velocity becomes } v = \frac{4Ca}{r^2} \dots (f7)$$

Centripetal – acceleration $a_p = \frac{v^2}{r} = \frac{16C^2 a^2}{r^4} \frac{1}{a} = -\frac{16C^2 a}{r^4}$ and equal to $\frac{a_p}{\cos \varphi}$, so Centripetal – acceleration $a_p =$
 $-\frac{32C^2 a^2}{r^5} = -\frac{32\pi a^4 [1]}{T^2 r^4 [r^5]}, \text{ for } r = a \text{ then } a_p = \frac{32\pi}{T^2 r^5} \dots (f8)$

II. Conclusion

1..Orbits: In Orbits issues the **Piezoelectric-effect**, as this is used in a, **Lattice-Disk** (Orbits, Caves, Material-Points, Particles, Atoms, Molecule, Crystals, Microchips, etc.) **where is Converted the Mechanical Energy which is Work, into Electricity**, (Electrical Potential as a Voltage), **across the sides of the Disk** or vice versa, i.e. **When on a Lattice-Disk, is Put a Voltage across the Disk, so thus its Inside-content is subjecting to an electrical-Pressure, Inside-content has to move to rebalance**, and thus deformed, Figure 7. **Gravity is Potential - energy with binder Energy-Field** $\{ [\nabla_i] = [\pm s^2] \}$ a constituent in MFMF Field, **the called Gravity force without Vibration but only local rotation**, **from Energy -Vectors occurring in any Material-Point $[\oplus \cup \ominus]$ in Gravity-field**, and this because are axially on their Spin-Vector $\bar{B} \equiv \text{Spin} \equiv \text{Rotational -Energy}$, **and which Energy -Vectors $\equiv \text{Spin}$, is the Inside-content** of the Gravity-field. The **Dot-product** happens for interactions between **Similar dimensions**, while the **Cross-product** between **Different-dimensions**. Cross-product of two vectors \bar{a} , \bar{b} is $\bar{a} \times \bar{b} = |\bar{a}| \cdot |\bar{b}| \sin \theta \cdot \bar{n}$ and for $\bar{a} = \bar{b}$ and $\theta = 90^\circ$ then $\bar{a} \times \bar{a} = \bar{a}^2$, and for Quaternion, s , which performs the Work of rotating the one vector around the other is $\rightarrow \text{Work} = \bar{a} \times \bar{a} = \bar{a}^2 \cdot \bar{r}$, and for $\bar{a} = \bar{v}$ then $\rightarrow \text{Work} = \bar{v}^2 \cdot \bar{r} = |\bar{v}| \cdot |\bar{v}| \cdot \bar{r} = v^2 \cdot r \cdot \bar{n} = (wr)^2 r \cdot \bar{n}$, or **Work** $= (wr)^2 r \cdot \bar{n} = (2\pi r/T)^2 \bar{n} = (4\pi^2 r^2/T^2) \cdot r \cdot \bar{n} = \frac{4\pi^2 r^3}{T^2} \cdot \bar{n} \leftarrow$
W $= 4\pi^2 \cdot \frac{r^3}{T^2} \cdot \bar{n} = 4\pi^2 \cdot r^3 \cdot f_p^2 \cdot \bar{n}$. **i.e. Kepler constant celestial law for microcosm.**
Kinetic Energy, motion, in Orbits becomes from the, **Piezoelectric-effect**, where Orbit is subject to a Mechanical-stress, $\sigma = \pm \frac{4\pi r}{(1+\sqrt{5})} \cdot f_p$, **becoming from the Centripetal-acceleration \bar{a}_p of the Planet** and thus is appeared a Positive charge at the **Nucleus** and a Negative-charge at the **Planet**, so is created an electric-signal with a given frequency f_p . The two faces at **N** and **P** are connected by the in-between **Energy-Vectors $\bar{B} \equiv \text{Spin}$** , of the oriented Gravity-field $[\nabla_i] = [\oplus \cup \ominus]$
In Orbits which are Negative – Energy-Rims, with binder Energy the attraction between the two opposite forces $P_N \leftrightarrow P_p$ at points Focus **N** and Planet **P**, is created the Central motion where, **Orbital-Resonance** is the Plane Surfaces, representing a Constant-Energy-Rim following the Celestial Kepler Laws **and say this as an Plane Energy-Resonance**, because happens in-Plane and on Energy-Field-vectors of Spins \bar{B} .

In Figure -3,6- are shown the Ellipse-Orbits, $l = c \cdot f_n \cdot r^3$, with their content which is The Spin-Field-vectors \bar{B} in all area $\pi a b$ of MFMF field. During orbiting centripetal acceleration $\bar{a}_p = \sigma = \pm \frac{4\pi r}{(1+\sqrt{5})} \cdot \mathbf{f}$ is directed to Focus N, i.e.

Orbit is subject to a Mechanical-stress σ , becoming from a Centripetal-acceleration

\bar{a}_p , and sois appeared the **Piezoelectric-effect** with Positive-charge at the **Nucleus** and Negative-charge at the **Planet** \equiv A linear-Material-point $|P \ominus \leftrightarrow \oplus N|$.

The two faces at **N**, **P** are connected by the in-between Gravity-field $[\nabla i] = [\pm s^2]$ in [MFMF] Field and flows **Current**, motion is realized by the orientation of the infinite Spin-Energy-vectors, **which is the Resonance on Orbit**, the Gravity Force, \mathbf{g} .

In the **Inverse Piezoelectric-effect** on Orbit, **when a voltage is applied across its opposite** faces at **N**, **P**, becoming from the $[\oplus \leftrightarrow \ominus]$ stretching, then Orbit becomes mechanically stressed, **Deformed in Shape by the Resonance at N and P**.

Further is seen, **Orbit** or, a **Negative – Energy - Rim**, is the Stable and Stationary

Granular-lattice Energy-Disk, **which is kept in the Plane-Orbit of motion**, Ellipse area $\pi a b$, in **Gravity – field**, and in a way it is **Opposite** to that which **follows the Central motion**. The entire Orbit is Scanned, **swept**, by this linear-Material-point PN

$\equiv |P \ominus \leftrightarrow \oplus N|$ with the minimum $\bar{a}_p = \sigma$, i.e. either for macrocosm or microcosm,

Gravity-Force-Vectors $\bar{B} \equiv$ Spin, of Material-points as Spin $[\oplus \cup \cup \ominus]$ is packet into the Orbit-Rim as Energy-conveyer for the interactions between, the Nucleus N, and

the orbiting object, the **Planet P**, and consists the energy – quanta, **the minimum constant energy**, for motion $\rightarrow [\oplus \cup \cup \ominus] \leftarrow$ **in the monad Atom-Rim**.

2..The minimum Energy RIM :

a..From orbiting equation $\frac{T^2}{a^3} = \frac{4\pi^2 m}{2E} = \frac{4\pi^2}{2E/m} = \frac{4\pi^2 a}{GM}$ then $\frac{T^2}{a^3} = \frac{4\pi^2}{GM} = \text{constant } k = \frac{1}{f_n^2 \cdot a^3}$

or $1 = k \cdot f_n^2 \cdot a^3 = \left[\frac{4\pi^2}{GM}\right] \cdot f_n^2 \cdot a^3$, the constant Work $1/k = f_n^2 \cdot a^3$ and the

constant Energy E, in Orbit, is $k = E = \frac{T^2}{a^3}$

It was shown that the maximum Energy in Hydrogen atom is $E = h f = -13,6 \text{ eV} =$

$-13,6 \times 1,6 \cdot 10^{-19} = 2,176 \cdot 10^{-18} \text{ Joule}$, and the frequency is $f = E / h$ or, $f = 2,176 \cdot 10^{-18} \text{ J} / 6,6262 \cdot 10^{-34} \text{ J.s} = 3,28393 \cdot 10^{15} / \text{s}$, and the Period in Orbit, $T = f^{-1} = 3,04513 \cdot 10^{-16} \text{ s}$.

The motion of all moving Energy-tanks is Sinusoidal as equation \rightarrow

$\{ [\epsilon E^2 + \mu B^2] = 2 \cdot \lambda c \cdot \sin 2\phi \} \leftarrow \dots \dots (e1)$ and the work produced is stored in their

Sine-curve-area of x, y , coordinate axis as $\int_0^\pi \sin x \, dx = 2$ as equation (e1). Simultaneously Unit-Work =

Sine integral $= \int_0^t \frac{\sin t}{t} \, dt = 1$, at Critical-Energy-point

where point is such that $\text{Si}(x=1)$ becomes equal to monad 1, and this critical-energy

unit happens at the point $x = 1,0572508754$, or at axis $\rightarrow a = 2x = 2,1145016 \text{ m}$.

From relation $(4\pi a^3/3)^3 = 1,616229 \cdot 10^{-35}$, $a = 5,447 \cdot 10^{-11}$, or semi-major axis in Hydrogen cave is $a = 10^{-11} \text{ m}$, and the Unit-coefficient $[2\text{Si}(1)]$, is the constant

$a = 2x = 2,1145016 \cdot 10^{-11} \text{ m}$. Placing in Hydrogen-Rim the Period **T**, and the prior

Semi-major axis **a**, then $k = \frac{T^2}{a^3} = \frac{[3,04513 \cdot 10^{-16}]^2}{[2,1145016 \cdot 10^{-11}]^3} = \frac{9,272817 \cdot 10^{-32}}{9,4541768 \cdot 10^{-33}} = \mathbf{9,808238}$

$\frac{s^2}{m^3} = \frac{N}{\text{kg}}$, **agreeing with Gravity constant g, measured.**

i.e.The Minimum-Work $\rightarrow W = 4\pi^2 \frac{r^3}{T^2} \cdot \bar{n} = 4\pi^2 \cdot r^3 \cdot f_n^2 \cdot \bar{n}$ \leftarrow in an Negative-Elliptic-energy-field-Disk as this is PNS, is stored as a Voltage $[N \equiv \oplus \leftrightarrow \ominus \equiv P]$

across the Disk between the rotating Planet **P** and Nucleus **N**, **Produced from the pressure σ , of the frequency f_p and of the semi-major axis a_p of the Planet.**

Motion is Kept, is quantized as Unit-work $\rightarrow W = 1 = k \equiv [\nabla i], [\pm s^2] \equiv$ MFMF Field \leftarrow

in the Orbit-area $\pi a b$, upon the Spin \bar{B} Orientation of the Pointy-Material-points $[\pm s^2]$. Orientation of Spin becomes from the Energy in the sinusoidal gravity-fields in

orbit, created by the motion of oscillation of the material points $[\oplus \cup \cup \ominus]$.

Any **Interaction** between this **Oriented-Energy Disk-Rim** and a **Body-Planet** creates

disturbances in Disk and **Reorientation of Spin $\bar{B} \equiv$ motion \equiv work $\equiv k = \text{constant}$**

= quanta and transformed as, The Gravity-Force in Disk, and which Energy is equal to the Gravity acceleration \mathbf{g} , and this because $g = \text{force}$, as equation $g = F/m$.

Bodies produce Gravity {the change of Spin-direction of M-P-Dipole $[\oplus s^2 \cup \cup \ominus s^2]$ }

in MFMF field } from stationary force $[\nabla i] = \pm s^2$, and because Gravity \equiv acceleration and not change of velocity vector, it is by changing the direction of the above dipole.

b. Motion with velocity vector v , may be **Linear or Rotational** for all displacements r , and thus exists a constant – work $W = \mathbf{k} = \nabla \mathbf{x} \cdot \mathbf{v} = v^2 \cdot r \cdot \mathbf{n}$. i.e.

$$\text{Constant-Work} = k = v^2 \cdot r = (wr)^2 \cdot r = \left[\frac{2\pi}{T}\right]^2 \cdot r = \frac{4\pi^2 r^2}{T^2} \cdot r = \frac{4\pi^2 r^3}{T^2} = 4\pi^2 \cdot \frac{r^3}{T^2} = 4\pi^2 \cdot r^3 \cdot f^2 \cdot p$$

Because Gravity-Force F_G becomes from the in-storages acceleration $a = v^2/r$ of the infinite-material-points in MFMF field, and force $[\nabla i]$ is stationary because from the pointy rotation $[-s^2 \cup \cup +s^2]$ of MP-Spin, then for Planck length is,

$$\text{Gravity force } [\nabla i] \equiv F_G \equiv m_G g = g \cdot \nabla \left[\frac{\sigma}{c^2}\right] \cdot r = m_G \frac{v^2}{r} = Jw^2 \cdot g_G = \left[\frac{\pi r^4}{2}\right] w^2 \cdot \frac{v^2}{r} = \frac{v^2}{r} \left[\frac{\pi r^4}{2}\right] \frac{v^2}{r^2} = \left[\frac{\pi r v^4}{2}\right] \dots (b) \text{ and from relation, Spin } S = \mathbf{B} = \frac{h\sqrt{3}}{4\pi} \text{ then,}$$

$$\text{Gravity-force} \rightarrow F_G \equiv \left[\frac{\pi v^4}{2}\right] \frac{n\pi}{2h(1+\sqrt{5})} \mathbf{B} = \left[\frac{n\pi^2}{4h(1+\sqrt{5})}\right] \mathbf{B} v^4 \text{ and so}$$

$$F_G \equiv \frac{n\pi\sqrt{3}}{16(1+\sqrt{5})} v^4 = \frac{n\sqrt{3}\pi}{(1+\sqrt{5})} \left(\frac{v}{2}\right)^4, \text{ and is the Black-hole-gravity-equation which is related to the Inner velocity } v, \text{ and to its } n \text{ lobes.}$$

$$\text{Gravity-Acceleration is } g_G = s \left[\frac{\pi r v^4}{2}\right] = \left[\frac{3,1415926 \left([\sqrt{5}+1] \cdot \sqrt[4]{2} \cdot 10^{-35}\right) \cdot (299793458)^4}{2}\right] \cdot e^3 = 6,044981 \cdot 10^{-35} \cdot 80,776078 \cdot 10^{32} \cdot 20,085536 = g_G = \mathbf{9,8075633} \text{ (5), where}$$

$1/m_G = s = \text{mass-coefficient } [\sqrt{5}+1] \cdot \sqrt[4]{2} \cdot e^3$, because the constant tensor T_z is the length of vector, $\mathbf{z} \equiv \mathbf{m}$, in Euclidean coordinates and which magnitude is

$$k = T_z = \sqrt{y_1^2 + y_2^2 + y_3^2 + y_n^2}, \text{ denoting the Energy-Space relation.}$$

From above the dimensionless coefficient of work W is $[\sqrt{5}+1]$ for any Material cave, r , coefficient for the Unity-Plane-Quaternion is $\sqrt[2]{\sqrt[2]{2}} = \sqrt[4]{2}$, or the same

$i \perp j \equiv \sqrt{2} + k \perp \sqrt{2} \equiv \sqrt[2]{\sqrt[2]{2}} = \sqrt[4]{2}$ and for the Three dimensions Euler Rotation System number is $e \cdot e \cdot e = e^3$.

Bodies produce Gravity { the change of Spin-direction of M-P-Dipole $[\oplus s^2 \cup \cup \ominus s^2]$ in MFMF field } from stationary forces $[\nabla i] = \pm s^2$, as dipole, and because Gravity \equiv acceleration is not by the change of velocity vector But, by the changing of direction of the above dipole $[\oplus s^2 \cup \cup \ominus s^2]$. This Work \equiv Gravity \equiv Energy \equiv Constant becomes from the eternal-motion on Orbit of any Planet either in microcosm or macrocosm.

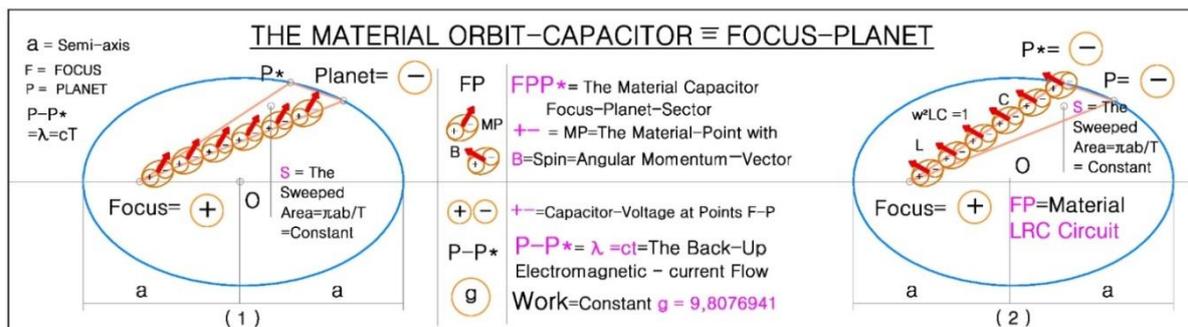


Figure-7. The Material LRC Circuit on Orbit, on Focus-Planet-Sector |F \leftrightarrow P|

In (1). Force g , as wave, is directed to the center of rotation F , and is proportional to the distance $PF \equiv$ Focus-Planet. The Gravitational Potential-Energy $g_G = 9,8076941$ is stored in \rightarrow Focus-Planet-Sector $\equiv FP \leftarrow$ which is The Material-Capacitor Stores-charge, as that of Material-LRC-circuit, and Inductors. Because of the chains of Spins, is thus created a Magnetic field due to LRC-circuit and which is tuning to the critical Quantum-critical-State g_G . The chains of Spins are pointy vibrating with their characteristic frequencies. Since Inner-stresses

$$\sigma_{1,2} = \sigma_1/2 \pm (1/2)\sqrt{\sigma_1^2 + 4 \cdot \sigma_1^2} = \sigma_1/2 [1 \pm \sqrt{5}] \text{ follow the golden ratio on stresses}$$

then this Quantum-energy g_G produced, is the State causing them to Magnetically-Resonate.

In (2) is presented the Back-Up Electromagnetic current flowing in opposite direction FP by changing the Spin direction of the Sector-Material-Points such that work $W = g$.

From Kepler's 2nd law the area, S , swept by any Focus-Planet-Sector $\equiv FP$ is a constant k , and equal to,

$$S^2 = \frac{L^2 T^2}{4m^2} = \pi^2 a^2 [b = \pi a (\frac{L^2}{2mE})], \text{ OR } \frac{T^2}{a^2} = \frac{4\pi^2 m}{2E} = \frac{4\pi^2}{2E/m} = \frac{4\pi^2 a}{GM} \text{ and } \rightarrow \frac{T^2}{a^3} = \frac{4\pi^2}{GM} =$$

$$\mathbf{k} = \frac{1}{f^2 n \cdot a^3} \rightarrow \mathbf{1} = \mathbf{k} \cdot \mathbf{f}^2 \cdot \mathbf{n} \cdot \mathbf{a}^3$$

E.. THE GRAVITATIONAL AND GRAVITY CONSTANT :

In Mechanics Work \equiv Energy \equiv motion is Force (x) Displacement and is conserved. In order that *Motion* is **Conserved as Displacement** in all directions, then this Displacement must be kept, **Quantized**, in a Finite Space differently is annihilated. In Mechanics the only-possible motion in a Finite Space, is the Periodic excitation $[\leftrightarrow]$ and the Revolving motion $[\oplus \cup \ominus]$ defining the quality of particles.

Periodic excitation between Space \oplus and Anti-Space \ominus may exist only as **Collision of Opposite**, and because of the equal and opposite Point-charges that are infinitely close together create Coulomb Electric dipole moment $p = q \cdot ds = \oplus[\leftrightarrow]$ in an Electric-field. Energy is restrained in a Box \mathbf{B}_P containing these three elements as $[\oplus, [\leftrightarrow], \ominus]$. Dipole is Stationary without any inner acceleration \equiv Gravity g , but is the Material-extreme-case of acceleration $[\rightarrow \leftarrow] \equiv 0$ with a Stationary constant Dipole-moment \bar{p} .

Revolving motion may exist between Space \oplus and Anti-Space \ominus so the Revolving of Two-Points $A\oplus$ and $B\ominus$ consist the **Material-Point** as Segment, *magnitude* $|AB|$, and as Vector, *direction* \overrightarrow{AB} , and as **Quaternion** $\overrightarrow{AB} \equiv \text{Box } \mathbf{B}_R$ carries the Principal stress σ between $A\oplus, B\ominus$, which stress σ as Centripetal acceleration is the minimum energy becoming from the in-storage $[AB]$ acceleration and is proved to be equal to the Gravity g .

Since motion \equiv work \equiv energy and is continually produced in The Material-point, therefore is stored in it as the **Golden-ratio-frequency \equiv the motion**, not eternally but Partially and the rest superfluous motion is launched out the Box as an **Propagating Electromagnetic-Wave** which carry the Box $AB \equiv \mathbf{B}_R$. Because of the two different motions, *Excitation and Revolving*, acceleration of Gravity $g \equiv \pm \sigma$ exists in the Second Box- \mathbf{B}_R only while in the First Box- \mathbf{B}_P is followed the Local-Extreme -case of the Dipole-moment \bar{p} .

This **acceleration of Gravity** $g \equiv \pm \sigma$ is altered Locally by changing the Principal stress σ with an \rightarrow **Local Uniform-Pressure** $g_L \equiv g \mathbf{k} = g \cdot [\text{Force/Area}] = \mathbf{G}$, i.e.

it is **the minimum Local-energy**. Photon's Box- \mathbf{B}_P travelling with the constant light velocity c , creates EM-Wave which exerts a force on other charges.

The above property of the Periodic-Excitation motion issues in Material Geometry. For Newton, **every Point-mass attracts every other Point-mass with a Force \mathbf{G} , that is proportional to the Product of the Point-masses and inversely proportional to the square of the distance between them.**

This force \mathbf{G} was later called Gravitational constant and is directly related to the acceleration g , and since g is the minimum-energy quantized in a cave, therefore $\rightarrow \mathbf{G} = g \cdot \mathbf{k}$ and $g = \mathbf{G} / \mathbf{k}$ (1), where,

\mathbf{k} , is a **Unit-proportional-coefficient** issuing for any Energy-System cave.

Since also acceleration in a Material-point (*Centrifugal-Centripetal*) becomes from the **Principal stresses** $\pm \sigma$, therefore constant $g \cong \sigma = \frac{\text{Force}}{\text{Area}} = \frac{\text{Mass}}{\text{Area}} = \frac{G}{k}$ and

for Unit-G $\rightarrow \mathbf{k} = \frac{\text{System Area}}{\text{System Mass}} \mathbf{G}$ where $\rightarrow \frac{1}{g} = \frac{k}{G} = \frac{\text{System Area}}{\text{System Mass}}$ (2)

From (2) is seen that at **Relative - Systems Specific-Unit-proportional-coefficient** \mathbf{k}_R , is always constant and related to the Universal constant gravity g .

Taking **[1/g]-Earth-Unit-coefficient, \mathbf{k}_E as monad**, then the Relative coefficient $k_R = K_E/g_R$ is for any other System **the Gravity of the System** and applied as follows **Numerical value $g_G = 9,8076941$ of Equation (5) is Universal, and issues for all Systems of universe, while the values of Unit \mathbf{k}, \mathbf{k}_R depends on location and issues for any System separately, and this because of the Periodic Excitation.**

With this logic, Newtonian constant \mathbf{G} also issues for Coulomb-Dipole Systems and is in these Systems as above related to g_G as $\rightarrow \mathbf{G} = \mathbf{k}_E g = g \cdot \mathbf{k}_R g_R$

Instances :

For Earth-System mass $M_E = 5,9723 \cdot 10^{24}$ Kg and for Area \rightarrow Radius 6378,137 Km $= 6,378 \cdot 10^6$ m then Earth-constant $\mathbf{k}_E = \frac{[6,378 \cdot 10^6]^2}{5,9723 \cdot 10^{24}} = 6,811551810^{-12}$ and

$$G = g \cdot k_E = 9,8076941 \cdot 6,8115518 \cdot 10^{-12} = \mathbf{6,6805616 \cdot 10^{-11}}$$

i.e. *Gravitational-constant G becomes from g, k_E*, and is

$$G = 6,6805616 \cdot 10^{-11} \text{ m}^3 / \text{N} \cdot \text{s}^2 \dots\dots(7)$$

For Moon-System mass $M_{Mo} = 7,3477 \cdot 10^{22}$ Kg and for the Area is

Radius 1737 Km = $1,737 \cdot 10^6$ m then ,

$$\text{Moon-constant } k_{Mo} = \frac{[1,737 \cdot 10^6]^2}{7,35 \cdot 10^{22}} = 41,06276 \cdot 10^{-12} \text{ and } \rightarrow$$

$$g_{Mo} = \frac{k_E}{k_{Mo}} = 6,81155 / 41,06276 = \mathbf{0,165} \cdot g_E$$

i.e. For Earth-Unit-coefficient $k_E = 6,81155 \cdot 10^{-12} \rightarrow$ Moon-Unit-coefficient

$$k_m = 41,1063 \cdot 10^{-12} \text{ m}^2/\text{Kg}$$

For Mars-System mass $M_{Ma} = 6,41693 \cdot 10^{23}$ Kg and for the Area

Radius 3390 Km = $3,39 \cdot 10^6$ m then ,

$$\text{Mars-constant } k_{Ma} = \frac{[3,39 \cdot 10^6]^2}{6,417 \cdot 10^{23}} = 17,909 \cdot 10^{-12} \text{ and}$$

$$g_{Ma} = \frac{k_E}{k_{Ma}} = 6,81155 / 17,909 = \mathbf{0,380} \cdot g_E$$

i.e. For Earth-Unit-coefficient $k_E = 6,81155 \cdot 10^{-12} \rightarrow$ Mars-Unit-coefficient

$$k_{Ma} = 41,106 \cdot 10^{-12} \text{ m}^2/\text{Kg}$$

For Mercury-System mass $M_{Me} = 3,3 \cdot 10^{23}$ Kg and for Area Radius 2440 Km =

$$= 2,440 \cdot 10^6 \text{ m then ,Mercury-constant } k_{Me} = \frac{[2,44 \cdot 10^6]^2}{3,3 \cdot 10^{23}} = 18,041212 \cdot 10^{-12} \text{ and}$$

$$g_{Me} = \frac{k_E}{k_{Me}} = 6,81155 / 18,0412 = \mathbf{0,377} \cdot g_E$$

i.e. For Earth-Unit-coefficient $k_E = 6,81155 \cdot 10^{-12} \rightarrow$ Mercury-Unit-coefficient

$$k_{Me} = 18,04 \cdot 10^{-12} \text{ m}^2/\text{Kg}$$

For Venus-System mass $M_{Ve} = 4,8675 \cdot 10^{24}$ Kg and for Area Radius 6073 Km

$$= 6,073 \cdot 10^6 \text{ m then ,Venus-constant } k_{Ve} = \frac{[6,073 \cdot 10^6]^2}{4,867 \cdot 10^{24}} = 7,5778362 \cdot 10^{-12} \text{ and}$$

$$g_{Ve} = \frac{k_E}{k_{Ve}} = 6,81155 / 7,577836 = \mathbf{0,899} \cdot g_E$$

i.e. For Earth-Unit-coefficient $k_E = 6,81155 \cdot 10^{-12} \rightarrow$ Venus-Unit-coefficient

$$k_{Ve} = 41,1063 \cdot 10^{-12} \text{ m}^2/\text{Kg}$$

For Milky-Way-System mass $M_{Mw} = 1,42 \cdot 10^{42}$ Kg and for this Area Radius =

$$= 2,4 \cdot 10^{15} \text{ m then ,Milky-constant } k_{Mw} = \frac{[2,4 \cdot 10^{15}]^2}{1,6 \cdot 10^{42}} = 3,6 \cdot 10^{-12} \text{ and}$$

$$g_{Mw} = \frac{k_E}{k_{Mw}} = 6,81155 \cdot 10^{-12} / 3,6 \cdot 10^{-12} = \mathbf{1,892} \cdot g_E$$

i.e. For Earth-Unit-coefficient $k_E = 6,81155 \cdot 10^{-12} \rightarrow$ Milky-Unit-coefficient

$$k_{Mw} = 3,6 \cdot 10^{-12} \text{ m}^2/\text{Kg}$$

and Gravity acceleration of Milky-Way is $\rightarrow g_{Mw} = \mathbf{1,892} \cdot g_E$

i.e. nearly twice that of earth .

For Andromeda-Galaxy-System mass $M_{AG} = 3,4 \cdot 10^{38}$ Kg and for the Area

Radius $5 \cdot 10^{11}$ m , then

$$\text{Andromeda-constant } k_{AG} = \frac{[5 \cdot 10^{11}]^2}{3,4 \cdot 10^{38}} = 7,352941 \cdot 10^{-16} \text{ and}$$

$$g_{AG} = \frac{k_E}{k_{AG}} = 6,81155 \cdot 10^{-12} / 7,353 \cdot 10^{-12} = \mathbf{9,264} \cdot 10^3 g_E = \mathbf{9264} \cdot g_E \text{ i.e.}$$

For Earth-Unit-coefficient $k_E = 6,81155 \cdot 10^{-12}$ and the Andromeda-Unit

coefficient $k_{AG} = 7,353 \cdot 10^{-12} \text{ m}^2/\text{Kg}$ and Gravity acceleration of

Andromeda-Galaxy is $\rightarrow g_{AG} = \mathbf{9264} \cdot g_E$

For Newton-Star-System mass $M_{NS} = 2,8 \cdot 10^{30}$ Kg and for this Area

$$\text{Radius } 4,2 \cdot 10^3 \text{ m , then Newton-Star-constant } k_{NS} = \frac{[4,2 \cdot 10^3]^2}{2,8 \cdot 10^{30}} = 6,3 \cdot 10^{-24} \text{ and}$$

$$g_{NS} = \frac{k_E}{k_{NS}} = 6,81155 \cdot 10^{-12} / 6,3 \cdot 10^{-24} = \mathbf{1,0812} \cdot 10^{12} \cdot g_E \rightarrow \text{ i.e.}$$

For Earth-Unit-coefficient $k_E = 6,81155 \cdot 10^{-12} \rightarrow$ Newton-Star-Unit coefficient

$k_{NS} = 6,3 \cdot 10^{-24} \text{ m}^2/\text{Kg}$ and Gravity acceleration of Newton-Star is

$$g_{NS} = \mathbf{1,0812} \cdot 10^{12} \cdot g_E$$

For Black-Holes-System mass $M_{BH} = 4,0 \cdot 10^{52}$ Kg and for the Area

$$\text{Radius } 3,08 \cdot 10^{25} \text{ m , then Black-Hole-constant } k_{BH} = \frac{[3,08 \cdot 10^{25}]^2}{4,0 \cdot 10^{52}} = 2,3716 \cdot 10^{-2}$$

$$g_{BH} = \frac{k_E}{k_{BH}} = 6,81155 \cdot 10^{-12} / 2,3716 \cdot 10^{-2} = 2,872 \cdot 10^{-10} \cdot g_E \rightarrow \text{i.e.}$$

For Earth-Unit-coefficient $k_E = 6,81155 \cdot 10^{-12} \rightarrow$ Black-Hole -Unit-coefficient $k_{BH} = 2,3716 \cdot 10^{-2} \text{ m}^2/\text{Kg}$, and Gravity acceleration of a Black-Hole is as, $g_{BH} = 2,872 \cdot 10^{-10} g_E$, an expected explanation.

For all Planes issues $G = k_E g = g \cdot k_L g_L$, and for Black-holes where, $G = g \cdot k_{BH} \cdot g_{BH} = 9,8076941 * 2,3716 \cdot 10^{-2} * 2,872 \cdot 10^{-10} = 6,6805616 * 10^{-11}$

Meaning that Gravitational constant is the Same for all Systems.

Remarks :

1.. Since (2) denotes *Area*, (1) denotes *Acceleration* \equiv *Force* \equiv *Energy*, and, are equal and same, so The area Swept-out by a vector radius is, $dS = \text{constant} = k = \vec{r} \times d\vec{r}$ and *Energy is Stored into it*.

Since Photon is Particle as $[\vec{v} = \vec{c} = \lambda f]$, then *Energy* \equiv *Work* produced in motion is stored into its, *Velocity-vector* $\equiv \vec{c} = \lambda f \equiv \mathbf{f}_R = [\mathbf{B}_{PH} \equiv \mathbf{f}_{1=N}, \mathbf{f}_2, \mathbf{f}_3, \mathbf{f}_R] \equiv [E^2 + H^2] = 2(2r) \cdot c \cdot \sin 2\varphi$, where $\mathbf{f}_R \equiv \mathbf{f}_N$ and consists the moving Storage of Photon. *The carrier of Body \mathbf{B}_{PH} is the Outward $\vec{c} = \lambda f$ Electromagnetic-Wave* $\rightarrow \{[\epsilon E^2 + \mu B^2] = 2 \cdot \lambda \cdot c \cdot \sin 2\varphi\} \leftarrow$

2.. From above, the *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. *The Interior motion is kept in its Wavelength-Tank $2r = n \lambda$, and Linear motion is continued by the Propagating Electromagnetic-Wave \equiv The conveyor of storage*

3.. Since Gravity force results to Gravity-acceleration $g = 9,8076941 \text{ m/s}$ and to the Gravitational-constant $G = 6,671684 \cdot 10^{-11} \text{ N.m}^2 / \text{Kg}^2$, then becomes from

$$g_G = s \left[\frac{\pi r v^4}{2} \right] \text{ of Material-point in [MFMF] Chaos and, therefore,$$

g , *Is The only one Universal minimum quantized energy quantity*, The Energy Quanta as Row-material, *a constant in all the Rotating and Periodic Excitation Systems*, while G which is related to g , *is the Universal local and Constant manifestation*, the Force acting on Unit-energy-quantity, g , *in all moving and Stationary Systems as the equation $G = g \cdot k_E = g \cdot k_R g_R$*

F.. THE ENERGY - SPACE - UNIVERSE AS A MONAD :

In [39] was shown that Universe is consisted of two fundamental elements, that of *Space*, i.e. A point without existence and another point B without existence also but not coinciding because if differently should not be a Two-Points-Vector segment, which is property of point. Point B is the *Anti-Space*, and this to exist at a distance AB from point A, is done a motion. This motion in Mechanics is called Energy and, In order that *Motion* is *Conserved as Displacement* in all directions, then this Displacement must be kept, *Quantized*, in a Finite Space

differently is annihilated. In Mechanics the only-possible continuous motion in a

Finite Space is the Periodic excitation $[\leftrightarrow]$ and the Revolving motion $[(+) \cup (-)]$.

Revolving motion may exist between Space (+) and Anti-Space (-) so the Revolving of Two-Points A(+) and B(-) consist the *Material-Point* as Segment, *magnitude* $|AB|$, and as Vector, *direction* \overline{AB} and as *Quaternion* $\overline{AB} \equiv \text{Box } \mathbf{B}_R$ carrying the Principal stress σ between A(+), B(-), which σ as Centripetal acceleration is the minimum energy becoming from the in-storage AB acceleration and is equal to the *Gravity* $g = \sigma$. Periodic excitation between Space (+) and Anti-Space (-) may exist only as collision of opposite, so energy is restrained in Box \mathbf{B}_P containing the three elements $[(+), [\leftrightarrow], (-)]$ without the inner acceleration \equiv Gravity g , but the Material-extreme-case of the Periodic acceleration $[\rightarrow \leftarrow] = 0$, *Reciprocating motion*.

Since motion \equiv work \equiv energy and is continually produced in The Material-point, therefore is stored in it as the \rightarrow *Golden-ratio-frequency* \equiv *motion*, not stored eternally but Partially and the rest superfluous motion is launched out the Box as a *Propagating Electromagnetic-Wave* which carries the Box \mathbf{B}_R .

Because of the two different motions, *The Revolving and Excitation motion*, the acceleration of Gravity $g \equiv \pm \sigma$ exists in the First Box- \mathbf{B}_R only while in the Second Box- \mathbf{B}_P is followed the Local-Extreme-case. This acceleration of Gravity $g \equiv \pm \sigma$ is altered Locally by changing the Principal-stress σ with

an Inverse-Local-uniform-Pressure $\mathbf{g}_L \equiv g \cdot k = g \cdot \sigma = g \cdot [\text{Force/Area}] = G$, i.e.

G is the minimum Local-energy acceleration, *force*, which is the known as the \rightarrow **Universal Gravitational constant** $G = g \cdot k = g \cdot k_E = g \cdot [g_L \cdot k_L] = k_L \cdot \sigma \leftarrow$

So far, this Universal Gravitational constant (the known Newtonian constant of gravitation) denoted by G , is an **empirical-physical-constant** with many variations, while present article shows the theoretical origin of G .

In Newton's law, G , is the proportionality constant connecting the gravitational force between two bodies with the product of their masses and the inverse square of their distance.

The Einstein field equations quantify the relation between the geometry of space time and the Energy Momentum Tensor.

In Markos-Material-Geometry, [72] the standard Universal gravity constant g ,

was theoretically proved to be the base-acceleration $g \equiv 9,8076941 \text{ m/s}^2$ as the

minimum quantized-Work in Material point of any r , *cave*. Constant $G = k_E \cdot g$

is a force, **and** g , the eternal centripetal acceleration of the Rotation of Positive

\oplus to the Negative \ominus constituent created in M-P, where this Work produced is

of the **Golden-ratio frequency** and which is continuously, **Kicked by G**, to Start *everything in this world*.

markos 30/12/2018

1.. The Numerical-values of Energy-constants :

Moreover this acceleration is equal to the principal stresses $\pm \sigma$ applied between the

two constituents and $g = \sigma = \text{Force/Area} = \text{stress} \pm \sigma = [\text{mass/area}] = G / k$, or

$G = g \cdot k = k_L \cdot g = \sigma$ and also inversely $1/g = k/G = \mathbf{g}_L / G$, or

System area / System mass, where k , is a Unit-proportional-coefficient.

For System-Earth $k_E = r_E^2 / m_E = 6,8115518 \cdot 10^{-12} \text{ m}^3 / \text{N} \cdot \text{s}^2$ and

Gravity $g = 9,8076941 \rightarrow$ is The Universal Gravity-Constant, issuing from

microcosm to macrocosm. In the finite-Space *cave* r of the Material-point *is stored*

the Work \equiv motion, the acceleration Gravity, g , which is the minimum energy

becoming from the in-storages acceleration $a = v^2/r \equiv 9,8076941$.

Box- $B_E \equiv G = g \cdot k = 6,6805616 \cdot 10^{-11} \text{ m}^3 / \text{N} \cdot \text{s}^2$ becoming from g , k of each

Relative-System k_E only.

Material Points, Segments etc. consist the Physical Structures of universe. In the finite-Space *cave* r , of the

Material-point *is stored the Work*, *the motion*, produced by the eternal rotation of opposites, which Work

becomes from **Angular-Momentum Vector** \bar{B} , and which is equal to the **Golden-ratio-Spin** and

stored in the r *cave* fix-ends, as a **r -Stationary Wave** with the infinite **Golden**

ratio-frequencies f_n , f_{PH} , $[f_1 \cdot f_n \rightarrow f_\infty] \equiv B_{PH} \equiv$ The Box $B_{PH} \equiv$ called

The Moving-Energy-Storage.

The Golden ratio frequencies are $\rightarrow f_n = \left(\frac{n\sigma}{8r^2}\right) \cdot \bar{B} \equiv \frac{(1+\sqrt{5}) \cdot \sigma}{4\pi r} \equiv \frac{E}{h}$, and $E = h \cdot f_n$

Gravity, g , is the minimum energy Becoming from the in-storages angular velocity acceleration $a = v^2/r \equiv 9,8076941$. [72]

Photon is a Material-point, Box B_R , with fix-ends **Inward-cave** r , and which is the

Energy Storage B_R . **Outward-cave**- r is an **Electromagnetic-Radiation** on wavelength

$\lambda = c \cdot T = c/f_p$ which EM-Radiation, carries Box B_R .

Universal Gravitational constant $G = g \cdot k$ related to g, k_R , is the Principal stress

$\pm \sigma$, or frequency f_R which exists in nature as motion in the minimum **Resonance**

Golden-ratio-frequencies $f_R = f_{n=1}$, and this because of the Periodic motion,

in Excitation, where issues the Coulomb-Dipole law, which Coulomb inverse law

$F = k_c [q_1 \cdot q_2 / r^2] = k_c [\oplus \rightarrow \leftarrow \ominus] / r^2 = \frac{8}{\pi r(1+\sqrt{5})} \left[\frac{B}{r^2} \right]$, and Coulomb constant

$k_c = 9 \cdot 10^9 \text{ Nm}^2/\text{C}^2$, i.e.

Because of the Periodic excitation between, Space (+) and Anti-Space (-),

$[\oplus \rightarrow \leftarrow \ominus]$, exists only collision of opposite, where the inner acceleration is equal

to zero Gravity g , and this because of the Material extreme-case of the Periodic

acceleration $\{[\rightarrow \leftarrow] = 0\}$ which is zero, the Net force vanishes, issues the Coulomb

Dipole-law where acceleration g , becomes from the Stationary constant Dipole

moment $\bar{p} \equiv \bar{B} \equiv$ momentum which is the analogous in the Revolving motion in

where then issues $\rightarrow G = g \cdot k = k_E \cdot g = g \cdot k_R \cdot g_R = \bar{p} \cdot g_c = \sigma = \frac{\text{Force}}{\text{Area}} = \frac{\text{Mass}}{\text{Area}}$

For Earth-System mass $M_E = 5,9723 \cdot 10^{24} \text{ Kg}$, Radius $R_E = 6378,137 \text{ Km}$

= 6,378.10⁶ m, then Earth-constant $k_E = \frac{R_E^2}{M_E} = \frac{[6,378.10^6]^2}{5,98.10^{24}} = 6,811551810^{-12}$ and $G = g k_E = [9,8076941] \cdot 6,8116.10^{-12} = 6,68056.10^{-11} \text{m}^3/\text{N.s}^2$ becoming from g, k_E only, i.e. G as force pushes \rightarrow gas energy in $\rightarrow k_E$.

Summary :

1.. Gravitational Force ,G, is the Pressure which every Object in the Universe exerts

onevery other , *whether small or big* and is equal to $F_{\text{grav}} = \frac{G.M.m}{d^2} = \frac{g.R^2_E.M.m}{Md^2} = \frac{g.R^2_E.m}{d^2} = \frac{mg.R^2_E}{d^2}$, and $G = \frac{g.R^2_E.M.m.d^2}{Md^2} = \frac{g.[R^2_E]}{M} = g.k_E$ where $k_E = \frac{g.[R^2_E]}{M}$

g = The minimum Quantized work as acceleration $\equiv 9,8076941 \text{ m/s}^2$
 k_E = The Earth Local-coefficient between the two constants g, G .
 For Earth (E) $\rightarrow k_E = r^2_E / m_E$, For Bodies (B) $\rightarrow k_B = r^2_B / m_B$,

For any Body \rightarrow Local Gravity $g_L = k_E / k_L$

2..Coulomb Electrical Force ,F_{elect} = $k_c \frac{Q_1.Q_2}{d^2} = \frac{[\oplus \rightarrow \ominus]}{d^2} = \frac{8}{\pi r(1+\sqrt{5})} \left[\frac{B}{r^2} \right]$, where

Coulomb constant $k_C = 9.10^9 \text{Nm}^2/\text{C}^2$

3.. The Work done by the Electric field to rotate the dipole is $W = F_{\text{electron}} \cdot E_{\text{Field}}$.

4.. The Work done in Material point needs a Path to exit from Box $f_R = [B_{PH}] \equiv [f_{1=N}, f_2, f_3, f_R = w^2_N] \equiv [E^2 + H^2]$, from where is Propagated .

Resonance-Path happens as the Force , *EM-Radiation in Two directions* , which can travel in any closed **System** , and for solids through Cauchy-stress-tensor where the two Conveyers $E \perp B \perp r \equiv \sigma_1 \perp \sigma_2 \perp \sigma_3$, can carry the **Energy Storer** , in **System** , and change the Inner-Structure of this System to another or destroy it.

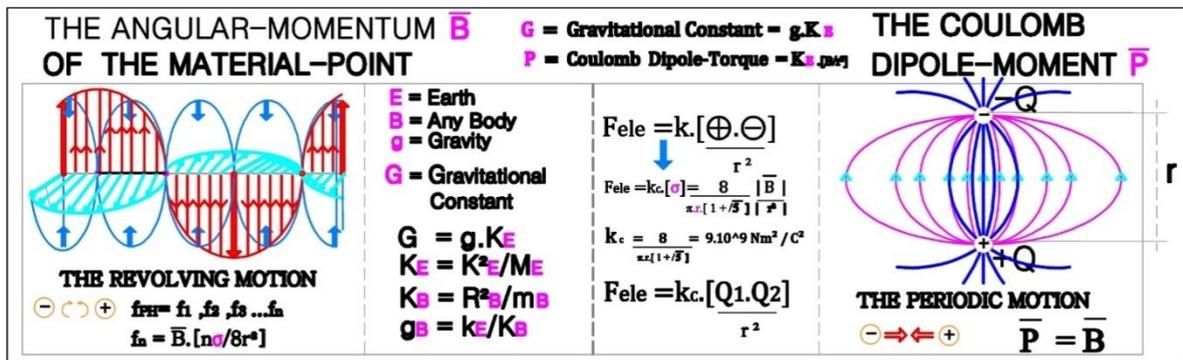


Figure- 8 .

The Two types of motions , for The Space \oplus and Antispace \ominus , to form , g and G .
 In (1) , is shown how Centripetal acceleration , $\bar{a} = v^2/r$, creates in caver , Spin S , Gravity g , and Newtonian constant of Gravitation G .

In (2) , is shown How acceleration is created in Electric field and the Newton Universal Gravitation G .

2.. The Golden-ratio – frequency Φ .

In the next Figure-9 is shown the Way that Universe is formulated by following the basic Internal **Material-Point-eternal-motion** as **Growing-Golden-ratio-Frequency**,

$f_n \equiv \left[\frac{1+\sqrt{5}}{2} \right] \frac{\sigma}{2\pi r}$ \leftarrow from Photons to Atoms , to Molecules , to Crystals , to ,,,, , or to the all Planetary-System obeying Newton`s equations of motion , such in microcosm as in macrocosm and to the expanding universe. Analysis of the Growing-First-kick-start of this cosmos is given at the end .

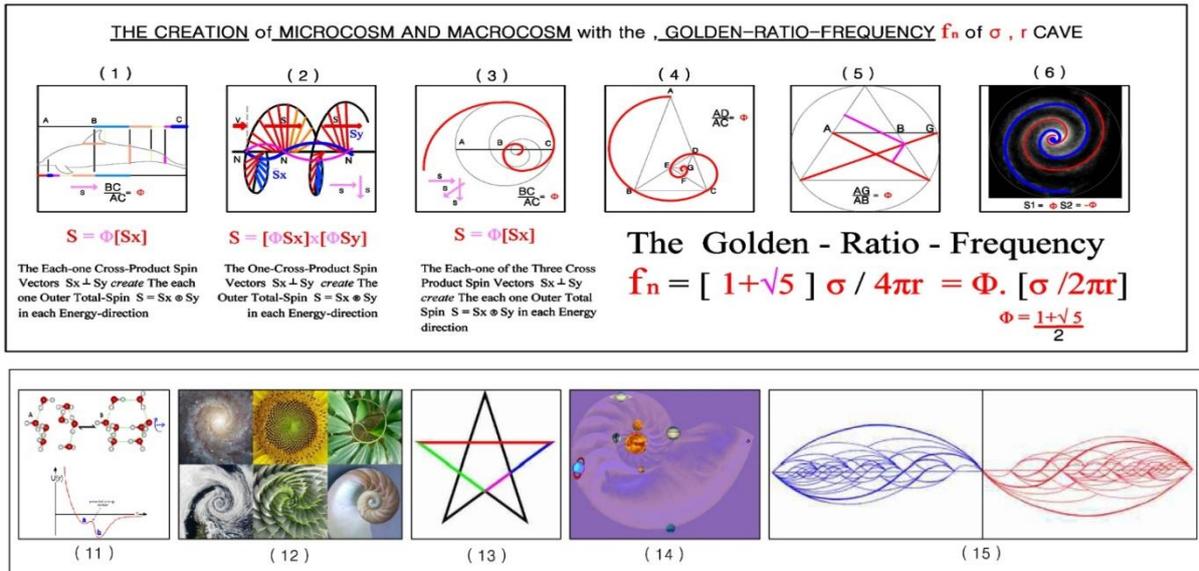


Figure - 9. The How Golden-ratio-frequency is kicking microcosm and macrocosm.

In F- 9, Universe is formulated by the **basic Golden-ratio-frequency** $f_n \equiv \left[\frac{1+\sqrt{5}}{2} \right] \frac{\sigma}{2\pi r}$

Electromagnetic fields undulate within fields in the Universal Electromagnetic process of Dipole $[\pm s^2] \equiv [\oplus \cup \ominus]$, in [MFMF] \equiv **The Chaos** as base for all motions, for the **Centripetal-Centrifugal forces**.

- (1) One-Vector → From velocity vectors, to Animals, to comets to all expanding universe
- (2) Two-Vectors → From Photons, to Pine-cone, Plants, to Galaxies, to expanding universe ...
- (3) Three-Vectors → From Sub-atomic particles, to DNA molecules, to Inorganic Chemistry, to Elliptical Galaxies, to expanding universe
- (4) Three -Vectors → From Elements, molecules, Fruits, to Milky-Wave, Galaxies, Galaxies-Cluster to
- (5) Tree -Vectors in a Circle → From Elements, molecules, to Fruits, to Milky-Wave Galaxies, to all caves and to expanding universe ...
- (6) N-Vectors in a Circle → From Sub atomic particles, Elements, molecules, all Organic and Inorganic elements, all types of Galaxies, to expanding universe

Since **Frequency in Material-point** of cave 10^{-62} m exists as **Golden-ratio pattern**, is seen that **exists also in the Structure and the motion of the Atoms and Molecules** within the materials, and in all Universe .

- (11) From Web, Water molecules-structure follows the **golden-ratio-frequency** f_n
- (12) From Web, Animals and Plant-structures follows the **golden-ratio-frequency** f_n
- (13) From Web, Geometrical Pentagon-structure follows **golden-ratio-frequency** f_n
- (14) From Web, the Planetary Position-structure follows **golden-ratio-frequency** f_n
- (15) From Web, the **Space Anti-space Electromagnetic-fields** in [MFMF] Chaos follow the **Golden-ratio-frequency** f_n for the **Centripetal-Centrifugal forces** .

Since also **Stress** σ eternally exists in Material point and is of the **Golden-ratio-pattern** Φ , therefore microcosm and sequence all macrocosm follows, **the Stress** σ **Property**, of the Golden-ratio-pattern Φ . The How and Why this happens is an Geometry problem because **Stress presupposes area** and **Electromagnetic wave two Inverse Plane waves** .

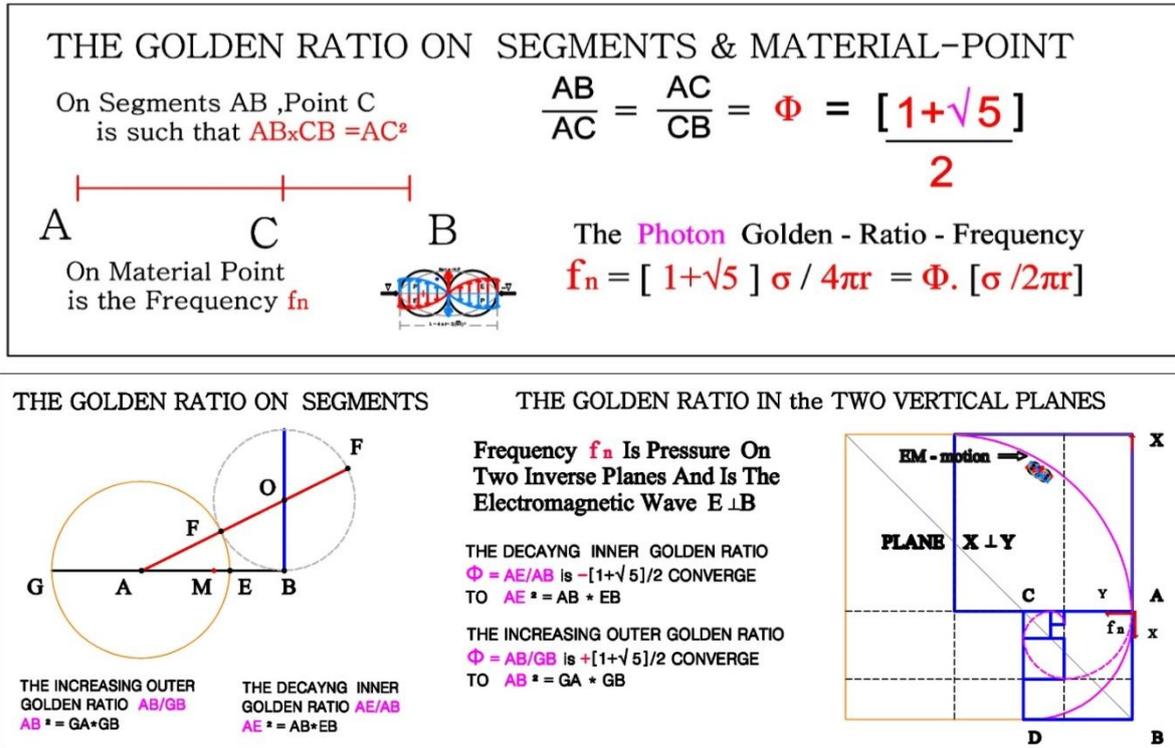


Figure-10. The Golden ratio Φ on Segment AB, is at point C, while on the Material point $[\oplus \cup \ominus \ominus]$ is on Principal Stress σ , as frequency

$$f_n = \left[\frac{1+\sqrt{5}}{2} \right] \frac{\sigma}{2\pi r} = \left[\frac{n\sigma}{8r^2} \right] \cdot \vec{B} = \frac{E}{h} \text{ i.e. Frequency } f_n$$

in Material-point and cave 10^{-62} m exists as *The-Golden-ratio pattern*.

3.. The Extreme and Geometric-Mean ratio :

In figure -9, AB Sector is divided by point C such that $AC = \frac{AB}{2} [\sqrt{5}+1]$ (1)

Proof :

According to the definition of Mean ratio exists $AB / AC = AC / CB$, or $AC^2 = AB \cdot CB = AB \cdot [AB - AC] = AC^2 = - AC \cdot (AB) + AB^2 \rightarrow AC^2 + AC (AB) - AB^2 = 0$ (2) Solving the second degree equation (2)

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

The Physical meaning is from Mechanics where, when a force P acting on a surface S of a differential volume ds^3 , then Principal stresses σ_1, σ_2 , Shear stresses τ_{12}

are as equation $\sigma = \sqrt{(\sigma_1 - \sigma_2)^2 + 4 \tau_{12}^2}$, and

$$\sigma_{1,2} = (\sigma_1 + \sigma_2) / 2 \pm (\frac{1}{2}) \sqrt{(\sigma_1 - \sigma_2)^2 + 4 \tau_{yz}^2}, \text{ where } \rightarrow \tan \theta = 2 \cdot \tau_{12} / (\sigma_1 - \sigma_2) \text{ ..(3)}$$

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

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

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

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

Since also Stress σ eternally exists in Material point and is of the Golden-ratio-pattern Φ , therefore microcosm and sequence all macrocosm follows, the Stress σ , Property, of the \rightarrow Growing-Golden-ratio-pattern Φ as in,

- 1.. Stress with Golden ratio property
- 2.. Centripetal acceleration due to Stress
- 3.. Gravity = Stress = Centrifugal acceleration
- 4.. Spin = Gravitation constant G

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

4..The Φ Properties :

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

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

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

Equation (5) is a very Special property of the Golden ratio because is that, *it can be defined in terms of itself*, i.e. of unit 1 equal to a new Φ which defines *the Space*,

and of $\frac{1}{\Phi}$ defining *the Anti-Space*,

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

Because number Φ , multiplied with its Reciprocal number $\frac{1}{\Phi}$, is process of Addition, and equal to unit 1, so

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

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

$$x = \frac{\Phi \pm \sqrt{[\Phi^2 + 4\Phi^2]}}{2} = \frac{[\sqrt{5}+1]}{2}, \Phi = \Phi * \Phi \text{ i.e. Golden-Ratio Property is continuously}$$

increasing by its self, a *Self-Growing Property of frequency f_n in Material-point*.

Equation (7) is also a very Special property of the Golden ratio because, according to Euclid, A straight line AB is said to have been cut in Extreme and Mean ratio when as the whole line is to the greater segment AB / AC, so is the greater to the lesser AC / CB, and according to Markos, Since frequency in Material-point is \rightarrow

$$f_n = \left(\frac{n\sigma}{8r^2} \right) \cdot \bar{B} \equiv \left[\frac{1+\sqrt{5}}{2} \right] \frac{\sigma}{2\pi r} \equiv \left[\frac{n\sigma}{8r^2} \right] \cdot \bar{B} \equiv \left[\frac{1+\sqrt{5}}{2} \right] \frac{\text{Stress}}{\text{Perimeter}} \equiv \left[\frac{1+\sqrt{5}}{2} \right] \frac{\text{Force [N]}}{\text{Area} * L[m^3]} = \frac{E}{h}$$

then occupies the Property of the Golden-ratio pattern Φ , and equation (7) defines that Material Point of frequency f_n , when collide with another Material Point, or with another Particle or particles then Produces another monad as $\rightarrow 1 \equiv$ New Quaternion and the first continuous to be of the same Identity, frequency f_n , as before and from Euler's, rigid body dynamics work $W = 2L = \bar{B} \cdot \bar{w} = J \cdot w^2 \equiv h \cdot f_n \leftarrow$ i.e.

The Frequency of Photon, embodied with the \rightarrow Growing-Golden-ratio-pattern Φ Uses the Vibrating Physical Structures, the Granular Material-Instruments, to Kick Start everything in this world. The How follows in Lower-Figure -9.

Logarithms is a method of multiplication and simultaneously the basic Growing-mode.

Terminology of b^n , is \rightarrow Base b , to the n th power or, The times n , for Base b , to be repeated in multiplication i.e. $b^n = b.b.b.b \dots b$, n times = c or as, Logarithm of c , on base b , is n , or denoted as $\rightarrow \log_b c = n$, meaning $\log_b c = n \rightarrow$ To find the n , Repetitions of Base b , to give the Result c .

$\log_2 16 = 4 \rightarrow$ Base 2, to be repeated in multiplication 4 times 2.2.2.2 and be equal 16

The number of Repetitions, or times, means the Frequency executed on the Base.

The unknown is to be found, this Base such that its logarithm to be Unit. This Base

called Natural logarithm was found the constant, e , and notated as $\rightarrow \ln e = 1$

and then for any number x , is $\ln x = [\log_{10} x] / [\log_{10} e]$ and, $[\log_{10} x] = \ln x / \ln 10$

For a complex number $\bar{z} = x + i.y$ issues $\rightarrow \ln \bar{z} = \ln r + i.\theta = \ln \sqrt{x^2 + y^2} + i.\text{atan2}(y/x)$

From logarithm Property $\log(z^{-1}) = \ln(1/z) = -\ln z$, and angular velocity $w = 2\pi.f$

$$\text{issues, } \log([-1]^{-1}) = -\ln[-1] + 2\pi.i = -\pi.i + 2\pi.i = \pi.i = \ln[-1] = \frac{w}{2f} \dots(8)$$

From relation $x = e^{\ln(x)}$ then $x^n = e^{\ln(x).n}$ a Growing of Base x , by repetition as index n , times.

Relation (8) reveal the relation of frequency and Natural-logarithm-Base e .

The Geometrical construction of the Mean-ratio of AB Segment, defines Two-Points Point E , in between and point G , the outwards A, B, such that $AE^2 = AB.EB$ and $AB^2 = GA.GB \dots(8)$

Relations (8) defines that the symmetric to E point G, related to centre A of circle

(A,AE) transforms magnitude AE to AB, or AE magnitude is converted to AB, i.e. **The In-between-magnitude AE**, the Part, **→becomes the Outer AB**, the Whole. **This Augmentation-Property**, the Geometrical-Growth, of the Part-to-Whole, of the two Golden-ratios, exists in the Material-point and on Frequency f_n , which motion \equiv Growth, is Spread in the Two-Closed-Transverse-Planes as an, Propagating-Electromagnetic –Wave $E \perp H$. Since above Property exists also in

Photon which is a self-Propagating Particle, therefore Photon in this cosmos is the **Kick - Start - Mechanism** of the **Augmented-Golden-ratio-pattern** Φ .

Remarks :

1.. From relation $G = g \cdot k_E = 9,8076941.6,8116.10^{-12} = 6,68056.10^{-11} \text{ m}^3 / \text{N.s}^2$ and from relation $1 = c \cdot r^3 \cdot f_p^2 \rightarrow f_p = \sqrt{1/cr^3}$ and from $f = E/h$ then $\frac{E}{h} = \sqrt{1/cr^3}$

or $\rightarrow E = h \cdot \sqrt{1/c \cdot r^3}$, $\frac{E^2}{h^2} = \frac{1}{cr^3} \rightarrow E^2 = \frac{h^2}{cr^3}$, an Energy relation between c, r

2.. From relation $E = h f = h \cdot f_n \equiv \left[\frac{1+\sqrt{5}}{2} \right] \frac{h\sigma}{2\pi r}$ is seen the way that **Golden-ratio frequency** influences on other material points and bodies .

In the same way, **Negative frequency**, - f, lags the imaginary part of a quaternion and **Planck's constant**, h, describes the behavior of particles and waves on the atomic scale **The Gravity acceleration**, g, describes the bedding of force G, on the local-Resistance coefficient k_E , in all scales of Nature. Analogous issues and for stresses σ .

Since the **Medium-Field-Material-Fragment** $\{ \pm s^2 \} \equiv [MFMF] \equiv \text{The Chaos}$, is the **Ocean of Material-points and the base for all motions**, in-where **Stress** σ eternally exist and produces the minimum Quantum-Gravity g, **exercises a Local-Uniform-Pressure**

$g_L \equiv k_L \sigma \equiv k_L g$, on any other Object, Body, where local constant $k_L = \frac{\text{System Area} \cdot G}{\text{System Mass}}$

Gravity g is of the **Golden-ratio-pattern** Φ .

From relation $\rightarrow g_L = k_E / k_L = [g/G] / [k_L]$, issues $\rightarrow g \cdot g_L \cdot k_L = G$, i.e.

Newtonian Constant of Gravitation is equal to the Product of Gravity and Local-gravity

or $\rightarrow g \cdot g_L \cdot k_L = G \rightarrow \text{Gravity} \times \text{Local-gravity} \times \text{Local constant}$ where

The-Local-Gravity g_L , is the **ratio of Earth-constant** k_E **to the Local-constant** k_L .

Local-Constant $k_L = \frac{\text{Local System Area}}{\text{Local System Mass}}$, is the **ratio of Local-area** R_L^2

to the Local-mass m_L .

3.. From relations $g = \frac{T^2}{a^3}$, $G = g \cdot g_L \cdot k_L$, $f_p \equiv \left[\frac{1+\sqrt{5}}{2} \right] \frac{\sigma}{2\pi r} = \sqrt{1/cr^3}$, $T_p = \sqrt{cr^3}$, $T_p^2 = c r^3$

issues $G = g \cdot k_E = g \cdot [g_L k_L] = \left[\frac{T_p^2}{a^3} \right] \cdot [g_L k_L] = \left[\frac{c \cdot r^3}{a^3} \right] \cdot [g_L k_L] \dots \dots \dots (G)$

and because exists $\rightarrow \text{Force} = \text{Mass} \cdot \text{Acceleration}$ then,

$\{ G \equiv \text{Force} \}$, $\{ [g_L k_L] \equiv \text{Mass} \}$, $\{ g = \frac{T^2}{a^3} = \frac{c \cdot r^3}{a^3} \} \equiv \text{Acceleration}$

4..The Acceleration Growth in Material point :

a).The Equations of motion In Material point related to the Inner motion was referred before where, The In-between-magnitude AE, The Part, becomes the Outer AB as the, Whole or the Self-Growth. This Augmentation-Property, of these two Golden-ratios, exists in the Material-point and on Frequency f_n , which motion \equiv

Growth, is Spread in Two-Closed-Transverse-Planes as Propagating Electromagnetic Wave $E \perp H$.

From equations $E = h \cdot f_n \equiv \left[\frac{1+\sqrt{5}}{2} \right] \frac{h\sigma}{2\pi r} = \left[\frac{n\sigma}{8r^2} \right] \cdot \bar{B} \cdot \mathbf{f}_R \equiv [f_{1=N}, f_2, f_3, f_R = w^2_N]$,

Euler's $e^{-iA \left(\frac{\pi}{2} + 2k\pi \right)} \cdot b = e^{-iA \left(\frac{\pi + 4k\pi}{2} \right)} \cdot b = A \cdot \cos \left[\frac{\pi + 4k\pi}{2} \right] \cdot b - i \cdot A \cdot \sin \left[\frac{\pi + 4k\pi}{2} \right] \cdot b$, $L = [\bar{B}/2] \cdot w$

Then $w = \sqrt{2\pi f_R} = 2L/\bar{B}$ and Wave Equationy = $2A \cdot \sin \left(\frac{2\pi \cdot x}{\lambda} \right) \cdot \cos wt \dots \dots (a)$

Equation (a) is the equation of the Inner Electromagnetic wave denoting that the vertical motion, v_y , is related to the position, x, and is defined on the Sinus curve while the horizontal motion, $v_x = 0$, frequency w, is on the Cosines curve and is,

$w = \frac{2\pi}{T} = 2\pi \cdot f_N \equiv \left[\frac{1+\sqrt{5}}{2} \right] \frac{\sigma}{2\pi r}$, and follows the **Growth-Golden-Ratio-Pattern**.

The same happens to the Outer Electromagnetic wave which equations are,

$\bar{E} = v_x \cdot E_0 \cdot \cos(kz - wt + \varphi)$, $\bar{B} = v_y \cdot \left[\frac{E_0}{c} \right] \cdot \cos(kz - wt + \varphi) \dots \dots (b)$

Equation (b) is the equation of the Outer Electromagnetic wave, denoting that the Electric field travels with light velocity c \rightarrow directed to k. Magnetic field travels

with light velocity also, $c \rightarrow$ directed to k , and is in phase with Electric field.

For both, Outer Electromagnetic fields the frequency, w , is that of inner motion i.e.

$$w = \frac{2\pi}{T} = 2\pi \cdot f_N \equiv \left[\frac{1+\sqrt{5}}{2} \right] \frac{\sigma}{2\pi r}, \text{ which continuous to follow } \mathbf{Growth-Golden-Ratio-Pattern}$$

Photon also occupies above property of the Material point and the Growth-Pattern. In this way Photon's frequency $\rightarrow f_p = 1 / T_p$ Kick-Start, everything found on its-way.

From relation, constant $k = \frac{1}{f_n \cdot a^3} \rightarrow$ or $l = k \cdot f_n^2 \cdot a^3$ then cave-Semi-major-axis

$$a = \sqrt[3]{T^2 / k} = \sqrt[3]{\frac{1}{g \cdot f^2}} = \sqrt[3]{\frac{16 \cdot \pi^2 \cdot r^2}{(6+2\sqrt{5}) \cdot g \cdot \sigma^2}} = \sqrt[3]{\frac{8 \cdot \pi^2 \cdot r^2}{(3+\sqrt{5}) \cdot g \cdot \sigma^2}}, \text{ and } f_R = \frac{w}{2\pi} = \sqrt[3]{\frac{1}{g \cdot a^3}} \dots (c)$$

From (c) is seen that Resonance-frequency f_R follows **Growth-Golden-Ratio-Pattern**.

b). Work \equiv motion, is produced in Material-points as the frequencies f_N ,

$$f_N [S \equiv f_{1=n}, f_2, f_3, f_R = w^2] = n \frac{(1+\sqrt{5})\sigma}{4\pi r} - \frac{n\sigma \cdot B}{8r^2} \leftarrow \text{the meter of Stationary motion.}$$

THE NUMERIC LENGTH OF SPACES - CAVES. [26 - 29]

c). The Planck's length L_p :

Why Rotational energy \bar{L} , **Angular momentum vector**, is Elastically damped in monad $\lambda_2 = 10^{-35}$ m as \rightarrow mass m , velocity \bar{v} , angular velocity \bar{w} , and finally as

a **Constant Frequency**, f , which is dissipated in the fundamental particles (Fermions and Bosons) by altering the two variables, velocity \bar{v} and wavelength λ , only ???

Since monad (\overline{AB}) = **quaternion** = \bar{z} and the w , Spaces and $1/w = w^{-1}$, Sub-spaces are monads in w , power and w^{-1} , the root which represent the Regular Circumscribed and the Regular Inscribed Polygons in monad \overline{AB} , then quaternion $z^w = \bar{z}^w = [s + \bar{v}]^w = [s + \bar{v} \cdot i]^w = [s + (v_1 + v_2 + v_3) \cdot \nabla i]^w = s + \bar{v} \nabla i$, where s = the Scalar part, and $\bar{v} = [v_1 + v_2 + v_3]$ the Imaginary part of it, equal to $\bar{v} \nabla i$ as $z^w = (s + \bar{v} \nabla i)^w = [z_0 (\cos \varphi + i \sin \varphi)]^w = |z_0|^w (\cos w\varphi + \varepsilon \cdot \sin w\varphi) = |z_0|^w \cdot \mathbf{ei} \cdot \mathbf{w}$

where $\rightarrow |z_0| = \sqrt{s^2 + v_1^2 + v_2^2 + v_3^2}$, and

$$\varepsilon = [v_1 \cdot i + v_2 \cdot j + v_3 \cdot k] / \sqrt{v_1^2 + v_2^2 + v_3^2}, \cos \varphi = \frac{s}{|z_0|} \dots (1) \text{ and}$$

$$z^{1/w} = [s + \bar{v} \nabla i]^{1/w} = |z_0|^{-w} \cdot \cos(\varphi + 2k\pi) / w + i \cdot \sin(\varphi + 2k\pi) / w = |z_0|^{-w} \cdot \mathbf{e}^{-i \cdot (\varphi + 2k\pi) \cdot w}$$

where $z^w =$ The Space, and $z^{1/w} = z^{-w}$ The Anti-space of Monad \equiv Quaternion \overline{AB}

Above equations define the Wave-nature of monads in all Levels or Sub-levels.

From above monads $(s + \bar{v} \nabla i)^{1/w} = |z_0|^{-w} \cdot \mathbf{e}^{-i \cdot (\varphi + 2k\pi) \cdot w}$, where $\cos \varphi = s / |z_0|$

and for **the Rotated Energy case**, where $s = 0$ and $\cos \varphi = 0$ exists for angle $\varphi = \pi/2$ the quaternion $(s +$

$v \nabla i) \mathbf{1/w}$ as **dimension power** $\rightarrow w = \mathbf{b} \leftarrow$ and **fork** = **1 above**

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

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

which is the smallest 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 two Constant and Natural numbers, e, π , where for base the natural logarithm, e , and exponent the decimal base, $b = 10$, then for Stationary and accelerating energy exists as \rightarrow

$$\mathbf{Planck's Length } L_p = \mathbf{e}^{-i \cdot (\frac{\pi}{2} + 2k\pi) \cdot \mathbf{b}} = \mathbf{e}^{-i \cdot (-5\pi/2) \cdot 10} = \mathbf{e}^{-i \cdot (-5\pi/2) \cdot 10} = \mathbf{e}^{-(78,5398)} = \mathbf{8,906.10}^{-35} \text{ m}$$

$$\text{For base } e = 2,71828 \text{ and base } b = 10 \text{ then } \mathbf{e}^{-78,2879} = 1.10^{-34} \text{ m}$$

$$\text{For base } e = 2,71828 \text{ and base } b = 10 \text{ then } \mathbf{e}^{-78,5398} = 1.10^{-34} = \mathbf{8,906.10}^{-35} \text{ m}$$

$$\text{For base } e = 2,71828 \text{ and base } b = 10 \text{ then } \mathbf{e}^{-80,5905} = 1.10^{-35} \text{ m}$$

Since cave is a versor then **Planck's Length** $[8,906 \cdot 10^{-35}]$ is divided by $\pi \cdot \sqrt{3}$ and is $= 1,616199 \cdot 10^{-35}$ m and

$$\text{Planck's cave } L_p = \mathbf{e}^{i \cdot (\frac{\pi}{2} + 2k\pi) \cdot \mathbf{b}} = \mathbf{e}^{-i \cdot (5\frac{\pi}{2}) \cdot \mathbf{b}} = \mathbf{e}^{i \cdot (-5\frac{\pi}{2}) \cdot 10} =$$

$$\mathbf{e}^{-(78,5398)} = \mathbf{8,906.10}^{-35} \text{ m} = \{ \sqrt{3} \cdot \pi \cdot \mathbf{1,616199.10}^{-35} \text{ m} \} \equiv L_p$$

Extending quantization of Space and Energy according to exponential formula for min-acceleration then **Planck's Length** $L_s = \mathbf{e}^{-i \cdot (-\pi + k\pi) \cdot \mathbf{b}} = \mathbf{e}^{-i \cdot \pi \cdot (k-1) \cdot 10} \rightarrow \mathbf{e}^{-(29,933606)}$

$$\text{For base } e = 2,71828 \text{ and base } b = 10, \text{ then } \mathbf{e}^{-(29,933606)} = 1.10^{-13} \text{ m Particles}$$

For base $e = 2,71828$ and $k = 0$ then exists the minimum energy cave as,

$$L_s = \mathbf{e}^{i \cdot (-\pi) \cdot \mathbf{b}} = \mathbf{e}^{-i \cdot (-31,41593)} = \mathbf{3,56237.10}^{-14} \text{ m}$$

$$\text{For base } e = 2,71828 \text{ and base } b = 10 \text{ then } \mathbf{e}^{-(32,236191)} = 1.10^{-14} \text{ m length.}$$

$$\text{For base } e = 2,71828 \text{ and base } b = 10 \text{ then } \mathbf{e}^{-(92,103404)} = 1.10^{-27} \text{ m length}$$

$$\text{For base } e = 2,71828 \text{ and } k = 1, \text{ then } L_s = \mathbf{e}^{i \cdot (-2\pi) \cdot \mathbf{b}} = \mathbf{e}^{-i \cdot (-62,83185)} = \mathbf{9,31289.10}^{-28}$$

$$\text{For base } e = 2,71828 \text{ and base } b = 10 \text{ then } \mathbf{e}^{-(94,405989)} = 1.10^{-28} \text{ m length}$$

Minimum Acceleration happens for Particles in , **Cave** \equiv **Recession** \equiv **Wavelength**, and

Energy $E_a = \frac{1,24}{3,56237 \cdot 10^{-14+6}} = 3,481 \cdot 10^7 \text{ eV} = 5,576 \cdot 10^{-10} \text{ Joules}$, while Redshift

Energy happens $E_R = \frac{1,24}{0,7495} = 1,6542 \text{ eV} = 2,65 \cdot 10^{-19} \text{ Joules [Kg.m}^2/\text{s}^2]$. [31]

d). Numeric Analysis :

Planck constant , $h = 6,62606957 \cdot 10^{-34} \text{ joules}$, $1 \text{ eV} = 1,60218 \cdot 10^{-19} \text{ J}$

Light velocity $c = 2,998 \cdot 10^8 \text{ m/s}$, $1 \text{ THz} = 10^{12} \text{ Hz}$, $1 \text{ nm} = 10^{-9} \text{ m}$, $1 \mu\text{m} = 10^{-6} \text{ m}$

Total-Energy $E = h \cdot f = \frac{hc}{\lambda} = \frac{6,62606957 \cdot 10^{-34} \cdot 2,998 \cdot 10^8}{\lambda} = 1,99 \cdot 10^{-25} \text{ m} \cdot (10^6 \mu\text{m/m}) = \frac{1,2398}{\lambda(\mu\text{m})} \text{ (eV)}$

and for redshift $\rightarrow f = 400 \text{ THz} = 400 \cdot 10^{12} \text{ Hz} = 4 \cdot 10^{14} \text{ Hz}$ then corresponds a light's wavelength $\lambda = \frac{c}{f} =$

$\frac{2,998 \cdot 10^8 \text{ m/s}}{4 \cdot 10^{14} \text{ Hz}} = 7,495 \cdot 10^{-7} \text{ m} \cdot (10^6 \mu\text{m}) = 0,07495 \mu\text{m}$ and Total-Energy $E = \frac{1,24}{\lambda(\mu\text{m})} \text{ (eV)}$ (a)

$E_R = \frac{1,24}{0,7495} = 1,6542 \text{ eV} = 2,65 \cdot 10^{-19} \text{ Joules}$. Where $1 \text{ eV} = 1,6022 \cdot 10^{-19} \text{ Joules}$.

Because Photon may have any wavelength and also that of Planck cave $1,616 \cdot 10^{-35} \text{ m}$,

Energy $E_p = \frac{1,24}{1,616 \cdot 10^{-35+6}} = 7,673 \cdot 10^{28} \text{ eV} = 1,229 \cdot 10^{21} \text{ Joules}$.The difference in Energy is $E = E_p - E_R = 7,673 \cdot 10^{28} \text{ eV} = 1,229 \cdot 10^{21} \text{ Joules}$, *zeroi.e*

The Energy - Stores of Photon are always full of Energy \equiv The Up - Down Motion in Lobes , following on wavelength , λ , The Stationary Wave - Nodes Principle .

Considering the wavelength equal to Planck's length $r = 4,453 \cdot 10^{-35}$ then to observe this length we need the wavelength to be smaller than this cave r , being viewed .

The frequency is as $f_p = c/\lambda = (3 \cdot 10^8 \text{ m/s}) / (4,453 \cdot 10^{-35} \text{ m}) = 6,73 \cdot 10^{42} \text{ s}^{-1}$ corresponding to an Energy $E = h \cdot f_p = [6,6260696 \cdot 10^{-34} \text{ Js}] \cdot [6,73 \cdot 10^{42} \text{ s}^{-1}] = 4,459 \cdot 10^9 \text{ J} = 2,783 \cdot 10^{28} \text{ eV}$.

Planck's constant h , is the ratio of a Quantum of Energy to its frequency and equal to $h = [6,6260696 \cdot 10^{-34} \text{ Js}]$ where $\rightarrow 1 \text{ eV} = 1,6022 \cdot 10^{-19} \text{ Joules} \rightarrow 1 \text{ J} = 6,24141 \cdot 10^{18} \text{ eV}$

The relation of wavelengths and colors , *energy* , is given from equations $\lambda = hc / E$ and $\lambda f = c$. The seven light-colors are as below with wavelength in $\text{nm} = 1 \cdot 10^{-9} \text{ m}$, and energy in eV as ,

Red $\rightarrow 700$, **Orange** $\rightarrow 620$, **Yellow** $\rightarrow 580$, **Green** $\rightarrow 530$, **Blue** $\rightarrow 475$, **Indico** $\rightarrow 450$, **Violet** $\rightarrow 400 \text{ nm}$,
 $f = 4,29 \cdot 10^{14}$, $f = 4,84 \cdot 10^{14}$, $f = 5,17 \cdot 10^{14}$, $f = 5,66 \cdot 10^{14}$, $f = 6,32 \cdot 10^{14}$, $f = 6,67 \cdot 10^{14}$, $f = 7,50 \cdot 10^{14} \cdot \text{s}^{-1}$
 $E = 1,77 \cdot 10^0$, $E = 2,00 \cdot \text{eV}$, $E = 2,14 \cdot \text{eV}$, $E = 2,34 \cdot \text{eV}$, $E = 2,64 \cdot \text{eV}$, $E = 2,76 \text{ eV}$, $E = 3,10 \cdot \text{eV}$.

From above is seen the large size of energy difference .

In future , Planck's length may be useful for redefinition of the New Kilogram .

The G , Kick-Start :

5.It was shown that , **An Energy-Rim** , is a Plane-Surface , *an orbit* , representing a Constant Energy becoming from the squared Frequency f_n^2 , *represents the Imaginary Part of monad* , and r_n^3 , representing the Real-Space-Part of monad as $1 = k \cdot f_n^2 \cdot r^3$. Stationary-Energy is spread in one Plane as this happens in Stationary-waves in caves, while in Propagating-Energy in two , as the Electromagnetic Transverse waves .

All these Energy-Rims consist the Quantized-Plane-curves. The two different motions of Space \oplus , Anti-space \ominus , in any cave r , and in a Finite Space, *The Revolving and*

Periodic Excitation create an Eternal frequency which influence all other Spaces, *caves*

The G-Kick-Start , *on frequency* $\rightarrow f_p = 1/T_p = \frac{w}{2\pi} = \sqrt{\frac{1}{g \cdot a^3}}$, *in this world is* ,

the How this frequency can **Enter, Format and cohesive, the first or any other Energy-Rim in Planck's length.**

The minimum quantized-energy is stored in the Gravity-bedding , g , becoming from the Unit energy of the sinus orbit. From equation $g = T^2 / a^3$ then period is ,

$T = \sqrt{g \cdot a^3} = \sqrt{9,80769411 \cdot (2,1145016)^3} = 3,04513 \cdot 10^{-16} \text{ s}$, *since for*

Unit-Work = sine Integral $= \int_0^t \frac{\sin t}{t} dt = 1$. and the semi-major axis , a , is ,

$a = 2,1145016 \cdot 10^{-16} \text{ m}$, and frequency $T^{-1} = f_p = 3,28393 \cdot 10^{15} / \text{s}$, which

corresponds to a loop in Planck's scale $(4/3) \cdot \pi \cdot r^3 = 3,96 \cdot 10^{-32} \text{ m}$, and then the Energy in this Planck's loop is the minimum quantized .

Energy $E = h \cdot f_p = [6,6262 \cdot 10^{-34} \text{ Js}] \cdot [3,28393 \cdot 10^{15} / \text{s}] = 2,176 \cdot 10^{-18} \text{ J}$,
 and in eV $\rightarrow [2,176 \cdot 10^{-18}] / [1,6 \cdot 10^{-19}] = 13,6 \text{ eV}$,

Above quantity of energy consist the Hydrogen minimum Energy-Rim, becoming

from equation $a = \sqrt[3]{\frac{T^2}{g}} = \sqrt[3]{\frac{[3,04513 \cdot 10^{-16}]^2}{9,8076941}} = 2,1145016 \cdot 10^{-11} \text{ m}$, for unit

energy quantity, and from Newtonian Constant of Gravitation

$$G = E = h \cdot f_n = \left[\frac{c \cdot r^3}{a}\right] \cdot [g_L k_L] = g \cdot k_E = g \cdot [g_L k_L]$$

and since for the **First Chemical-Neutral-material-cave**, r , constants g_L, k_L are equal to unity *i.e.* $g_L = k_L = 1$, then above Energy of $E = 13,6 \text{ eV}$ in Hydrogen-Plane-orbit corresponds to the **minimum-energy-cave** \rightarrow the *Quantized-Energy-Structure*.

Since G Pushes $\rightarrow g$, on the Earth-Unit-coefficient, k_E , and because is the **Starting for first time begins**, of this **Mechanism** then from $G = g \cdot [g_L k_L] \equiv \rightarrow g$, or $G = g$ meaning that in Earth System of gravity, the Newton's Gravitational constant G , and Gravity g are equal, while in all other relative Systems are equal to the proportionality of their Local-constant k_L .

Now is proved that, **Constant G is the mechanism, mould**, for the **First-kick-Start** upon this Unit-Granular-Energy-monad, g , to formulate in that orbit, a , of Planck's cave the lightest and the less-mass Particle of this universe, which is the Hydrogen with the minimum **Quantized-energy** of **13,6 eV**.

1.. For a frequency $f = 3 \cdot 10^9 < 3 \cdot 10^{15}$ then from Energy $E = h \cdot f$,
 $E = [6,6262 \cdot 10^{-34} \text{ J.s}] \cdot [3,10^9 / \text{s}] = 1,98786 \cdot 10^{-24} \text{ J} / 1,6 \cdot 10^{-19} = 1,2424124 \cdot 10^{-5} \text{ eV}$

Semi major axis a , the cave r , is $a = \sqrt[3]{\frac{1}{g \cdot f^2}} = \sqrt[3]{\frac{1}{9,80769411 \cdot 9,10^{18}}} = 2,245986 \cdot 10^{-6} \text{ m}$

i.e. is a cave 10^{10} times greater than, the critical, to Unit-energy-cave 10^{-16} .

2.. For a frequency $f = 3 \cdot 10^{21} > 3 \cdot 10^{15}$ then from Energy $E = h \cdot f$,
 $E = [6,6262 \cdot 10^{-34} \text{ J.s}] \cdot [3,10^{21} / \text{s}] = 1,98786 \cdot 10^{-12} \text{ J} / 1,6 \cdot 10^{-19} = 1,2424124 \cdot 10^{+7} \text{ eV}$

Semi major axis a , the cave r , is $a = \sqrt[3]{\frac{1}{g \cdot f^2}} = \sqrt[3]{\frac{1}{9,80769411 \cdot 9,10^{42}}} = 2,245986 \cdot 10^{-14} \text{ m}$

and is a cave 10^2 times greater than, the critical, to Unit-energy-cave 10^{-16} m .

i.e. exists the **critical-Space-cave** $= 2,1145016 \cdot 10^{-16} \text{ m}$, in which is **kicked** the minimum Energy, while in other caves any quantity. From $\rightarrow G = k_E g = g \cdot k_L g_L \leftarrow$

Constant g, was proved to be the acceleration of the inner motion in Material-Point and it is, its Outer and minimum-quantized-force, the Unit-Granular-Energy-monad in Planck's length, or Planck's cave P_l , and summarizing,

$g \equiv$ The minimum Granular-Quantized-Energy, from the gravity-frequency f_g ,

is, and represents the Quantum-Raw-material of the Energy structures.

$G \equiv$ The Pulling \rightarrow and Cohesive Bond on all Quantized-Energy-Structures.

either in Planck's cave P_l or Outer cave, following the first Newton's law.

$f_n \equiv$ The Amount of motion-meter in the Augmented-Golden-pattern Φ .

A wide analysis of Golden-ratio-frequency follows soon, markos 12/1/2019

The Three Energy-Space constants in Nature :

$$L_P \equiv e^{-i \left(\frac{\pi}{2} + 2k\pi\right)} \cdot b \equiv e^{i \cdot (-5\pi/2)} \cdot 10 \equiv e^{i \cdot (-5\pi/2)} \cdot 10 \equiv \{ \sqrt{3} \cdot \pi \cdot 1,616199 \cdot 10^{-35} \text{ m} \} \rightarrow$$

The Planck's length cave,

$$g \equiv \frac{T^2}{a^3} \equiv \frac{1}{f_n^2 \cdot a^3} \equiv 9,8076941 \rightarrow \text{The minimum Granular Quantized Energy,}$$

from the gravity frequency f_g , represents the Bedding-Quantum-Raw-material

of force G , on all Energy structures.

$$G \equiv g \cdot k_E \equiv g \cdot [g_L k_L] \equiv \left[\frac{T^2}{a^3}\right] \cdot [g_L k_L] \equiv 9,8076941 * 6,8116 \cdot 10^{-12} \equiv$$

6,68056 \cdot 10^{-11} m^3 / N.s^2 The Pulling and Cohesive Bond, of all Quantized-Energy-Structures in all Spaces.

$$f_n \equiv \{ [S \equiv B_p \equiv EM-R \equiv f_{1=N}, f_2, f_3, f_D, f_n] \equiv n \frac{(1+\sqrt{5})\sigma}{4\pi r} = \frac{n\sigma \cdot \bar{B}}{8 r^2} \text{ and}$$

$$\lambda_N = \frac{8 \cdot r \cdot c}{n \sigma^2 \cdot (1+\sqrt{5})} = \frac{8 r^2 c}{n \sigma \bar{B}} \text{] }, \text{The Amount, the meter of motion, in the}$$

Augmented-Golden-Ratio-Pattern Φ .

III. Discussion

The present article is the Supplementary of the two priors [68-72] both published.

Acknowledge

The essence of ideas contained in the article were formulated recently, after a pedant continuous conceptual understandable to assimilation in the Euclidean and Mechanical logic, not only for this particular problem but on all related-subjects which are connected to the physical world. The difference between Gravity constant and Gravitational constant pressed me to think the way of their origination. Many questions by mathematicians gave me the chance for a better critical understanding.

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