



THE PHYSICAL - INTERPRETATION OF GRAVITY- CONSTANTS , ELECTRON AND PHOTONS

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Abstract

Distance is the Quanta in E-Geometry, while **Material-point** is the Quanta in **Physics** and Material-Geometry which is the composition of opposites and the Elements 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 . Its 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** $[(+)\cup\cup(-)] \equiv$ Box **B_Q** \equiv Material Point \equiv Dipole 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 in-Box may exist different motions , *Revolving and Periodic* , the acceleration of Gravity $g \equiv \pm \sigma$ exists for the First Box-**B_R** , while for the Second Box-**B_P** is followed **the Local-Extreme-case** where acceleration of Gravity $g \equiv \pm \sigma$, is Locally altering **S** , by changing the Principal-stress σ with an Local-uniform Pressure $g_L \equiv g k_E = g * [\text{Force/Area}] = G$, i.e. is proved that the minimum Local - Energy acceleration is the known , **Universal Gravitational-constant G** = $g k = k_E g = k_L \sigma = g \cdot g_L k_L$, such for *Macrocosm as for Microcosm* , and for both cases Obeying Newton`s Laws of motion . **Photon is a Box** **B_R** \equiv { **The moving Energy-Storage** , $r \equiv$ The Golden ratio frequencies $\rightarrow f_n = [\frac{n\sigma}{8r^2}] \cdot \bar{B} \equiv \frac{(1+\sqrt{5}) \cdot \sigma}{4\pi r} = \frac{E}{h}$ } , **Transported** with Light velocity by **An Electromagnetic-Radiation** of wavelength $\lambda = c / f_n = c / f_1$. It was Proved that Force **G** pressing , through Stress **g** , to Enter the Critical-cave **L_p** in Planck-length with minimum-Energy creates the **Hydrogen-cave** , while vibration **f_n** , into the **Energy-Space-meters** , **g** , π , creates the **Electron** , e , and **Charges** , **q** .
Keywords : Newtonian constant of Gravitation G and g , The Hydrogen ,The Electron

CONTENT

A.. :	INTRODUCTION	Page	3
B.. :	THE PHOTON	Page	6
a.. :	The Compton Effect	Page	8
b.. :	The Wave-Particle Duality and Uncertainty Principles	Page	8
c.. :	The Material Wave-Particle Duality	Page	8
C.. :	THE TOTAL – ENERGY IN LOOPS	Page	9
a.. :	Dot product <i>and</i> Cross product	Page	9
D.. :	THE PERMISSIBLE RESONANCE – PATH	Page	11
E.. :	THE CONIC-SECTIONS AND PLANAR CURVES.	Page	18
a.. :	Central motion and Gravity.	Page	20
b.. :	Conservation laws in Astronomy	Page	21
c.. :	The minimum Energy RIM.	Page	30
d.. :	The Rotational motion in all Displacements.	Page	31
e.. :	The Periodic motion in all Displacements r .	Page	34
F.. :	GRAVITATIONAL AND GRAVITY CONSTANT.	Page	36
	: Instances	Page	38
G.. :	ENERGY - SPACE - UNIVERSE AS MONAD	Page	40
a.. :	The Numerical-values of Energy-constants	Page	41
b.. :	The Golden-ratio – frequency Φ .	Page	43
c.. :	The Extreme and Geometric-Mean ratio.	Page	45
d.. :	The Φ Properties.	Page	46
e.. :	The Acceleration Growth in Material point.	Page	48
H.. :	THE NUMERIC LENGTH OF SPACES-CAVES	Page	49
a.. :	The Planck's length L_p	Page	49
b.. :	The Minimum Energy Quantization.	Page	52
c.. :	Numeric Analysis.	Page	52
I.. :	THE KICK – START FORCES IN UNIVERSE	Page	53
a.. :	The Gravitation force G , and Hydrogen Kick-Start.	Page	54
b.. :	The Orbital Geometry and Orbital Physics.	Page	55
c.. :	The Unique Three-Body Problem and Electron	Page	57
J.. :	A NEW ENERGY-SPACE ATOM-MODEL.	Page	60
a.. :	The Protons and The Nucleus Structure	Page	60
b.. :	The Physical-Mechanical Explanation of forces G , g	Page	65
c.. :	The Hydrogen – Structure and Onion .	Page	69
d.. :	The Energy– Space Constants in Nature.	Page	74
3.. :	The Hydrogen – Cave H .	Page	76
4.. :	The Electron – Charge e	Page	77
5.. :	The Electromagnetic Wave Principles	Page	78
6.. :	Electron and Photon Charge	Page	81
K.. :	QUANTIZATION OF GEOMETRY AND ENERGY	Page	85
L.. :	DISCUSSION ON ALL	Page	100
M.. :	CRITICISM, ON EPR ARGUMENT	Page	109
f.. :	The current – Method for Physical-Quantity.	Page	110
N.. :	THE CRITICISM	Page	114
P.. :	REFERENCES.	Page	118

A.. INTRODUCTION :

1.. Article [75] is the completion of [72-74] and the Physical interpretation of the three constants of nature , that of Planck constant L_p , Newton`s Gravitational constant G , and Gravity Constant g ,with a rigorous Geometrical and Mechanical logic It was shown [33-36] that Un-clashed Fragments through center , O , consist the Medium-Field Material-Fragment $\rightarrow [\pm s^2] = [MFMF] \equiv \textit{The Chaos}$, as base for all motions , and Gravity as force $[\nabla i]$, while the clashed with the constant velocity , \bar{c} , consist the Dark matter $[\pm \bar{c}.s]$ and the Dark energy $[\bar{c}.\nabla i]$, **declaring that** \rightarrow Antimatter-Galaxies and Antimatter-Asteroids can exist only as Dark-matter or and Dark-Energy and **Not** as Antimatter light , - c , alone , or from \rightarrow velocity - Breakages , $[\pm s^2 = \pm (wr)^2]$ and $[\nabla i = 2(wr)^2]$, where then become Waves { *The distance $ds = |AA_E|$ is the Work embedded in monads and it is what is vibrated* } and Material-Points with their Vibrating equations of motion , and after 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.. $[\pm \bar{v}.s^2] \rightarrow$ Fermions , *Quarks and Leptons* , and $\rightarrow [\pm \bar{v}.\nabla i] \rightarrow$ Bosons ,
- B.. $[\pm s^2] \rightarrow [MFMF]$ *Neutral Field* $\equiv \textit{The Energy - Chaos}$, and the *Negative-Energy* binder Field is $[\nabla i] \rightarrow$ Gravity force ,
- C.. $[\pm \bar{c}.s^2] \rightarrow$ Dark-matter , and the binder Gravity-force $[\nabla i]$, $[\bar{c}.\nabla i] \rightarrow$ 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} , and , \bar{c} , exists in the *Discrete monads* , $\pm \bar{v}.s^2$ and $\pm \bar{c}.s^2$.

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

Dark Energy $DE \equiv [\bar{c}.\nabla i]$ (©) \rightarrow Acting , *Positive-Energy* ,on the Five Constituents \rightarrow $\{ [(\nabla i), (+s^2), (-s^2), (+cs^2), (-cs^2)] \}$ produces

- $[\pm s^2] \rightarrow$ MFMF Field $[\pm \bar{c}.s^2] \rightarrow$ 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 $c \times$ (©) $[\nabla i]$
- \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 , k , during these motions of velocities , \bar{v} , and since are vectors

$$k = \bar{v} \times \bar{v} \cdot \bar{r} = v^2 \cdot r \cdot \bar{n} = v^2 \cdot r = (wr)^2 \cdot r = \left[\frac{2\pi}{T} \right]^2 \cdot r = \frac{4\pi^2 r^2}{T^2} \cdot r = \frac{4\pi^2 r^3}{T^2} = 4\pi^2 \cdot \frac{r^3}{T^2} = 4\pi^2 \cdot r^3 \cdot f^2 p$$

A Photon during Motion in $[MFMF] \equiv$ Chaos , collides with other Photons by means of Cross - Product and produces a constant Work which is stored *into the Only-Four Energy - Geometrical - Shapes* , of the motion which shapes are the Conic – sections . The Interior motion is kept in its Wavelength-Tank $2r = n\lambda$, as well as the Outer-Linear motion as an Propagating Electromagnetic-Wave , which carries the Energy-conveyer,

i.e. The stored energy in the loop is $\rightarrow W_1 = v^2 \left[\frac{h}{2\pi} \right] = 4\pi^2 \cdot r^3 \cdot f_p^2$, it is **The Particle** and dependent on velocity, v , and Planck's constant h , or **on 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 Orbit is subjected 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-Vector $\bar{B} = \frac{\pi r^3 \sigma}{8} [1 + \sqrt{5}]$ of Pointy-Gravity-Field MP - $[\nabla i] = [\oplus \leftrightarrow \ominus]$.**

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 **Stationary-Gravity-Force-Point** is the **Spin $[\oplus \leftrightarrow \ominus]$ of these Material-points**. They are packets into the **Orbit-Rim as the Energy - Granular - Conveyers** for the interactions between, **Nucleus \underline{N}** and the orbiting object, **the Planet \underline{P}** . **The-Pointy-chain-Spins** are Pointy vibrating with their characteristic frequencies $f = \frac{(1+\sqrt{5}) \cdot \sigma}{4\pi r} B$, and Oriented and Reoriented from the Potential g_G , and filling up the entire universe. Quanta g_G , is **the minimum Constant-energy**, of the MP-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, $1 = c \cdot f_n^2 \cdot a^3$, 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 $a \rightarrow \pm 0$, 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 = $h \cdot f_1$

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

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

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

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

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

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

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

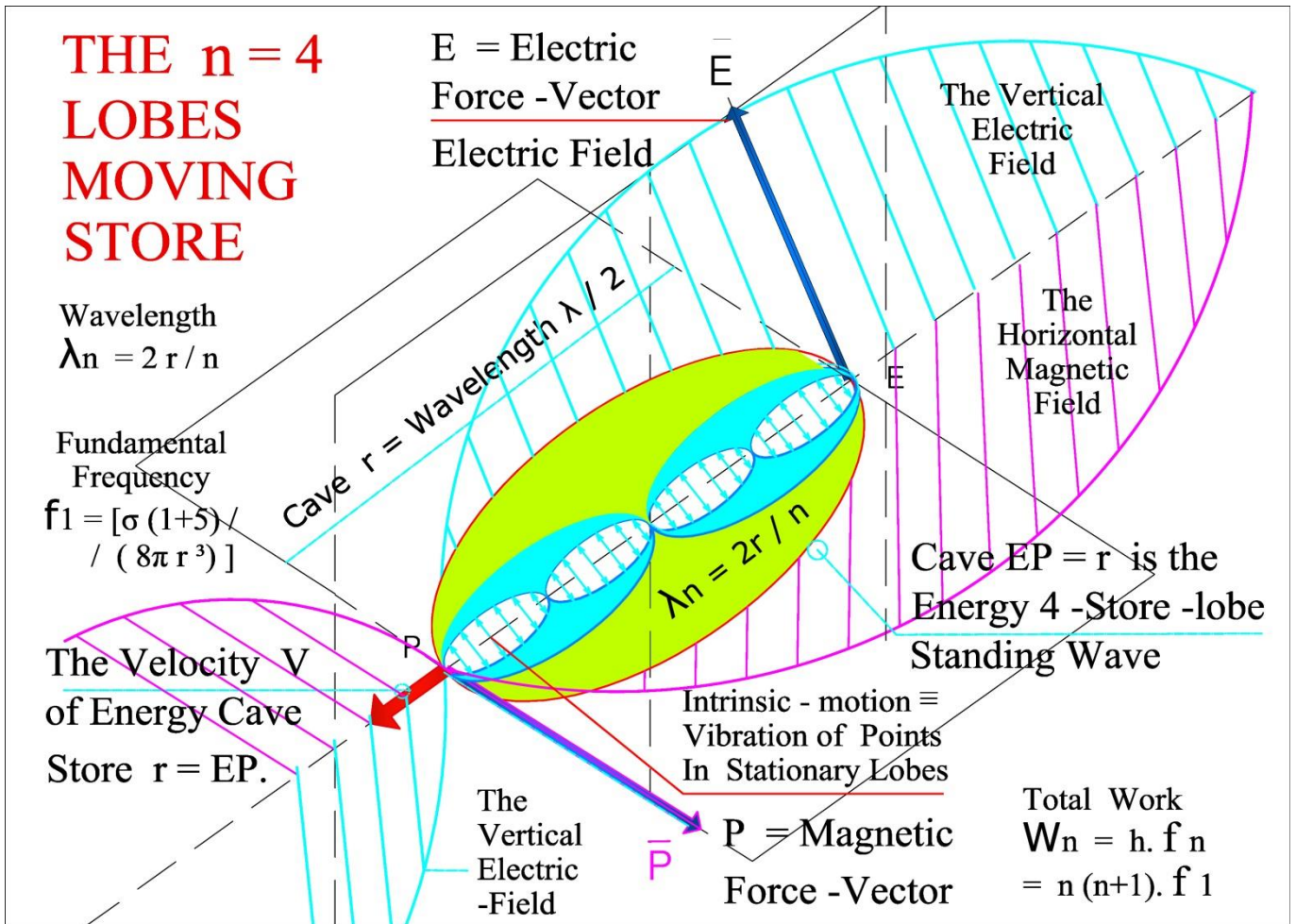


Figure-1.

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 $\lambda_n = \frac{\sigma \cdot (1+\sqrt{5})}{4\pi r} = \frac{n \cdot \bar{B}}{4\pi r^2}$, as **Particle**, where velocity $\bar{v} = w \cdot r$, follows the **Breakage-Principle** which is Quaternion $\bar{z} = [s + \bar{v} \nabla i \text{ or } \rightarrow s^2 - |\bar{s}|^2 + 2|\bar{s}|^2 \cdot \nabla i \leftarrow$

$\equiv [\epsilon E^2 + \mu B^2] \equiv$ **The Energy-monad EP**, as **The Wave**, as,
Matter (+) \equiv Electric-field $\rightarrow [\epsilon E^2]$
Antimatter (-) \equiv Magnetic-field $\rightarrow [\mu B^2]$
Energy (+ \leftrightarrow -) \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 $[E^2 + H^2] = 2 \cdot (2r) \cdot c \cdot \sin 2\phi$, the **Wave Photon**. **Energy-Storage-monads** are consisted of the above **three-constituents** all-together,

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

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

$$\text{for } \lambda_n = 2r, v_n = v_1, \text{ then } \mathbf{n \cdot \lambda_n = 2r} \quad \text{or}$$

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

From Mechanics , the *Only - Possible motions* are , the **Periodic excitation** , and the **Revolving motion** therefore all *Moving-Energy- Stores travel as a Wave and Not as a Particle* . The **n** , Energy-tanks , the **N** Antinodes in its moving Store $2\lambda = r = h/p \equiv [f_1, f_2, f_n \equiv n = w^2 \text{ lobes}]$ 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 $\bar{v} = \lambda/T = \lambda \times f$. The frequency is $f = \frac{n.\bar{v}}{2.r}$ where **n** is a positive integer number .

Because in lobes the inner particles are the [+] , [-] constituents of Space and of Anti-space , the maximum amplitude of each constituent is related with its position and each amplitude oscillates periodically as the **wave equation** ,

$$x = v_o .\sin wt = A .\sin [\sqrt{(a/Am)}.t + \pi/2] , \dots\dots\dots(1) \text{ where}$$

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

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

in cave , r .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

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

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** $\equiv [E^2 + H^2] = 2(2r).c.\sin 2\phi$, of wavelength λ , *Outward* λ , as *The Outer Electromagnetic-Wave* $\rightarrow \{ \text{The-Wave} \equiv [\epsilon E^2 + \mu B^2] = 2.\lambda.c.\sin.2\phi \} \leftarrow$ 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 the Material-Fragment** $\rightarrow [\pm s^2] = [MFMF] \equiv \text{The Chaos , is the base for all motions so then it is , the Motion of Photons}$: All motions create Work which is conserved , Motion presupposes the velocity vector \bar{v} , which when it is in motion collides with other velocity vectors , creating a Constant Work **k** .

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

Constant-Work $k = v^2 \cdot r = (wr)^2 \cdot r = \left[\frac{2\pi}{T}\right]^2 \cdot r = \frac{4\pi^2 r^2}{T^2} \cdot r = \frac{4\pi^2 r^3}{T^2} = 4\pi^2 \cdot \frac{r^3}{T^2} = 4\pi^2 \cdot r^3 \cdot f^2_p$
 \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 , as equation $E = h \cdot f = h \cdot (c/\lambda)$, 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, and [-] Magnetic-field as Anti-space. [70]

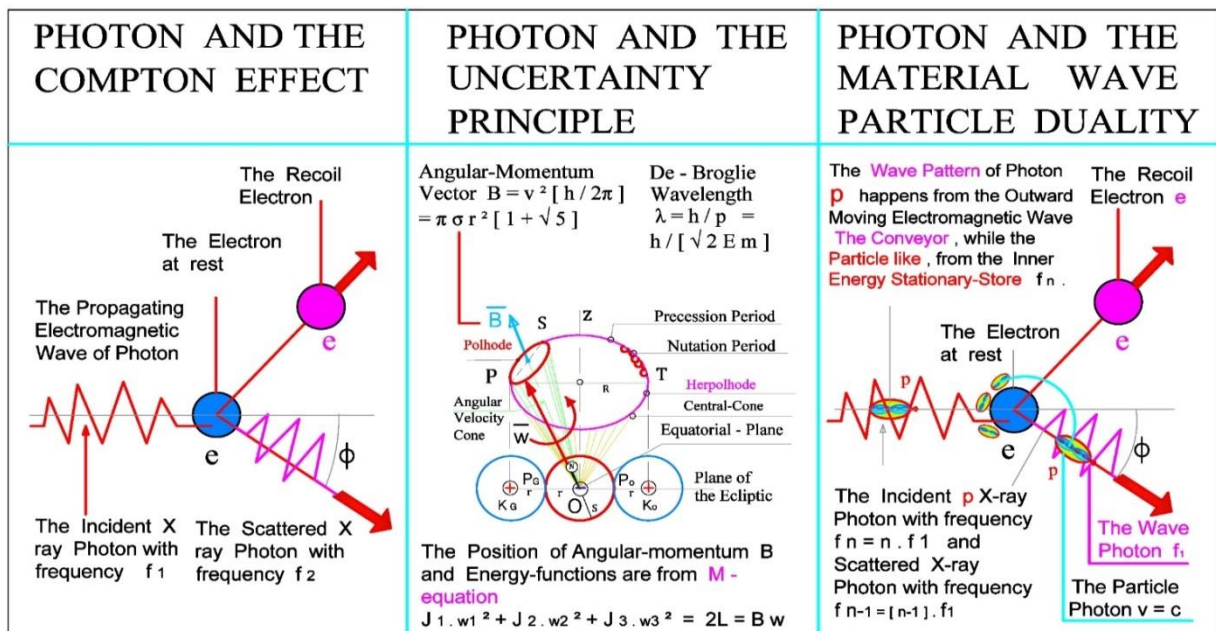


Figure-2. (1) (2) (3)

The Wave $[f_1 = (E^2 + H^2) = n \frac{(1+\sqrt{5})\sigma}{4\pi r} = \frac{n\sigma \cdot \bar{B}}{8 r^2}]$ - Particle $[\bar{v} = \bar{c} = \lambda f] \rightarrow$ 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 an energy loss $df = f_1 - f_2$.
 - 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 above , its 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 an Electromagnetic-Wave* , and are [*Quantum - Particles*] their Conveyer .
In Energy-Storages issues the *Stability of Equilibrium* as this is in Energy-Rims \equiv Orbitals , also .

a.. The 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 , \mathbf{n} , energy lobes in the Stationary –Wave of cave , \mathbf{r} , as the *Golden-ratio-frequency* $f_n = \frac{n\sigma}{8r} [1 + \sqrt{5}]$, and consists the Massive-energy-part of Photon , \mathbf{p} , that part considered as particle.
- 2.. The Vertical Electric-field \mathbf{E} is perpendicular to \mathbf{r} , axis of motion and consists the Space Energy - part of Photon.
- 3.. The Horizontal Magnetic-field \mathbf{P} , perpendicular to \mathbf{r} , axis and field \mathbf{E} , both being always in Phase consists the Anti-space and Energy-Store of Photon.

b.. The 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 $\lambda = 2r / \mathbf{n}$ outward the λ .

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

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

Light Storage $r \equiv \mathbf{E} \perp \mathbf{H}$, 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 Photon has been stored within the material is false ,on the contrary **Storage is the E,H**, Energy-tank with n frequencies f_n in Photon and **Electromagnetic Radiation , E , B** , is **The-Conveyer** \rightarrow *the carrier of Storage*.

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 then dispersion follows Pythagoras theorem and the resultant Quantized linear Space length , r , becomes , as the Resultant of Energy Vectors $r = |(\bar{c}.T)| = \sqrt{v^2 + c^2}$ and by using Space Vector $\bar{r} = |(\bar{c}.T)| = \sqrt{v^2 + c^2}$ then The total Rotating energy is $\rightarrow \pm \bar{\Lambda} = \bar{p}.r = (M.c).r = (M.c). \sqrt{v^2 + c^2}$ and squaring both sites $[\pm \bar{\Lambda}]^2 = p^2.r^2 = M^2.c^2.(v^2+c^2) = (M^2.v^2).c^2 + M^2.c^4 = (p^2.c^2) + M^2.c^4 = [p.c]^2 + [m_o.c^2]^2$ or is $E_T = E_R + E_K \rightarrow$ 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 frequency $\rightarrow f_e = \frac{c}{2\pi r}$ (a) Rotational Energy $E_R = \bar{B} . \bar{w} = 2L = J.w^2$ and

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

Energy and frequency of Elementary particles can be found from cave r , only since , c , constant ,**Total-Energy** $\rightarrow E_T = E_R + E_K = \frac{\pi c^2}{8} r^2 + \frac{1}{2} m.v^2 = 3,535.10^{16}. r^2 + \frac{1}{2} m.v^2 \dots(c)$

Mass of elementary particles is $m = \frac{E}{2r^2.w^2} = \frac{J.w^2}{2} \cdot \frac{1}{2r^2.w^2} = \frac{J}{4.r^2} = \frac{\pi.r^2}{16}$, i.e. dependent on radius of cave , and for $r = 10^{-62}$ then mass $\rightarrow m = \frac{\pi.10^{-124}}{16} = 1,945. 10^{-125}$ kg.

a.. Dot Product and Cross Product :

The **Dot-product** happens for interactions between Similar dimensions , while the **Cross-product** between Different-dimensions. Cross-product of any 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 \rightarrow Work = $\bar{a} \times \bar{a} = \bar{a}^2 . \bar{r}$, and for $\bar{a} = \bar{v}$ then ,Work = $\bar{v}^2 . \bar{r} = |\bar{v}|.|\bar{v}|. \bar{r} = v^2. r. \bar{n} = (wr)^2r. \bar{n} = (2\pi r/T)^2r.\bar{n} = (4\pi^2r^2/T^2). r. \bar{n} = \frac{4\pi^2r^3}{T^2}. \bar{n} = (4\pi^2r^2.f^2). r. \bar{n}$, or ... (w)

$$W = 4\pi^2 \frac{r^3}{T^2} . \bar{n} = 4\pi^2 . r^3 . f^2 . \bar{n}$$
 , which is the Kepler celestial law for *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 $\rightarrow s^2 - v^2 = 1 \dots(d)$ 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 $n \lambda = 2r$ 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 Energy=Cave Space $r \equiv [EM-R \equiv f_{1=N}, f_2, f_3, f_D, f_n = w^2]$ with binding constant, *proved to* be the g .

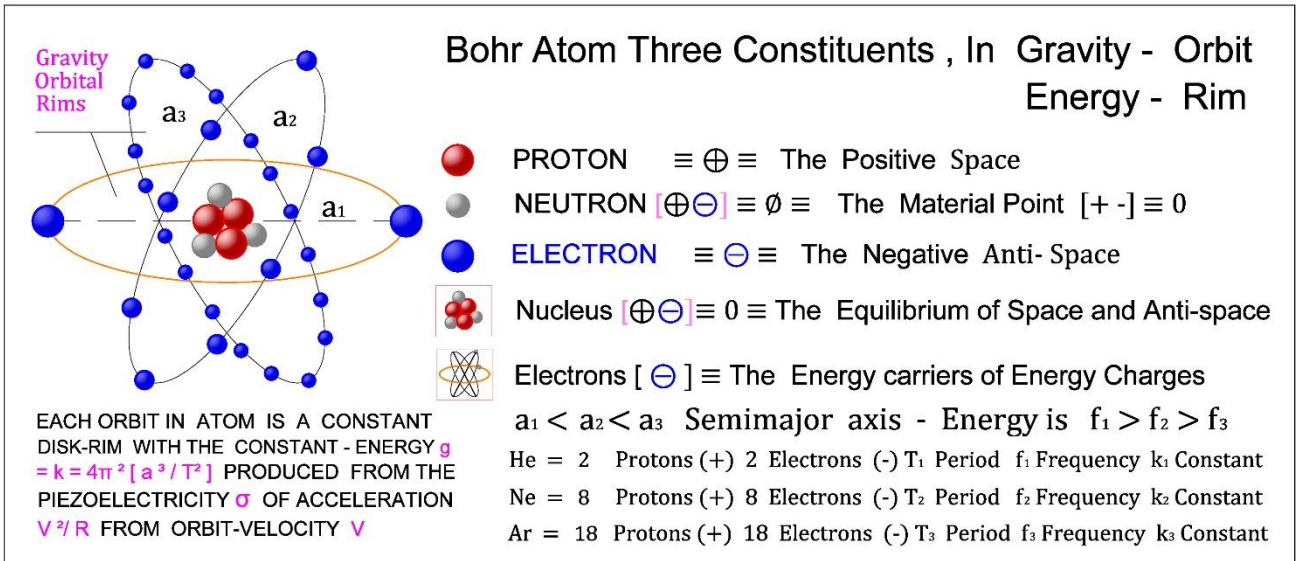


Figure-3.

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

Nucleus consists the \rightarrow Equilibrium **Positive** Breakage Store , in Atom-Model. Electron Orbits are the \rightarrow Equilibrium **Negative** Breakage Store-Rims in Atom . Orbital Electron is the \rightarrow 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**

$\rightarrow s^2 , -|\bar{v}|^2 , [2\bar{w}] \cdot |s| |r| \cdot \nabla_i \leftarrow$ where for , $\bar{v} = s \equiv$ 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** the Electromagnetic-Wave $[E^2+H^2] = 2(2r) \cdot c \cdot \sin 2\phi$ with **n** Lobes representing the

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

Outward is the **Propagating Electromagnetic-Wave** $\rightarrow \{[\epsilon E^2 + \mu B^2] = 2 \cdot \lambda \cdot c \cdot \sin 2\phi\} \leftarrow$ where Particle $2r = n \lambda$, **Cave r** , is the **Electromagnetic-Energy-Storage** , and Electromagnetic-Radiation E,B is the **Wave Conveyer** . Following above constituents of Photon then , Since **Energy is motion** and the **Total - Energy of Elementary - Particle** is equal to the \rightarrow **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 **g** , Entering the Planck-cave creates the

Hydrogen-cave as the lightest and less-mass element , while Entering the Energy-Space-meters \mathbf{g} , $\boldsymbol{\pi}$, creates the *Electron* , e .

The Breakage – Principle , is the way of *Energy conservation* , where *Energy never annihilates and which is always reverted into* \rightarrow the two *Opposites* $\{ (\pm \mathbf{w})$ or the *Conveyers* \equiv *Carriers* $\}$ and an *Neutral Part* $2 \cdot \nabla_i$ which is the *Energy-store* \equiv *Tank* $\text{Energy} \equiv$ or as *Matter* $(+ \mathbf{w})$, as *Antimatter* $(- \mathbf{w})$ and as *Energy part* , $2L = \bar{B} \cdot \bar{w}$ i.e. **Work = Energy \equiv Motion \equiv Space + Anti space + Kinetic Energy**(m)
 Vibrations of Systems issues for Orbits as $\rightarrow \mathbf{W} = 4\pi^2 \cdot \frac{r^3}{T^2} \cdot \bar{\mathbf{n}} = 4\pi^2 \cdot r^3 \cdot f^2_p \cdot \bar{\mathbf{n}} \leftarrow$ on radius r , and agree , to Kepler celestial law such as for *macrocosm and microcosm* .

D.. THE PERMISSIBLE - PERMEABLE RESONANCE – PATH :

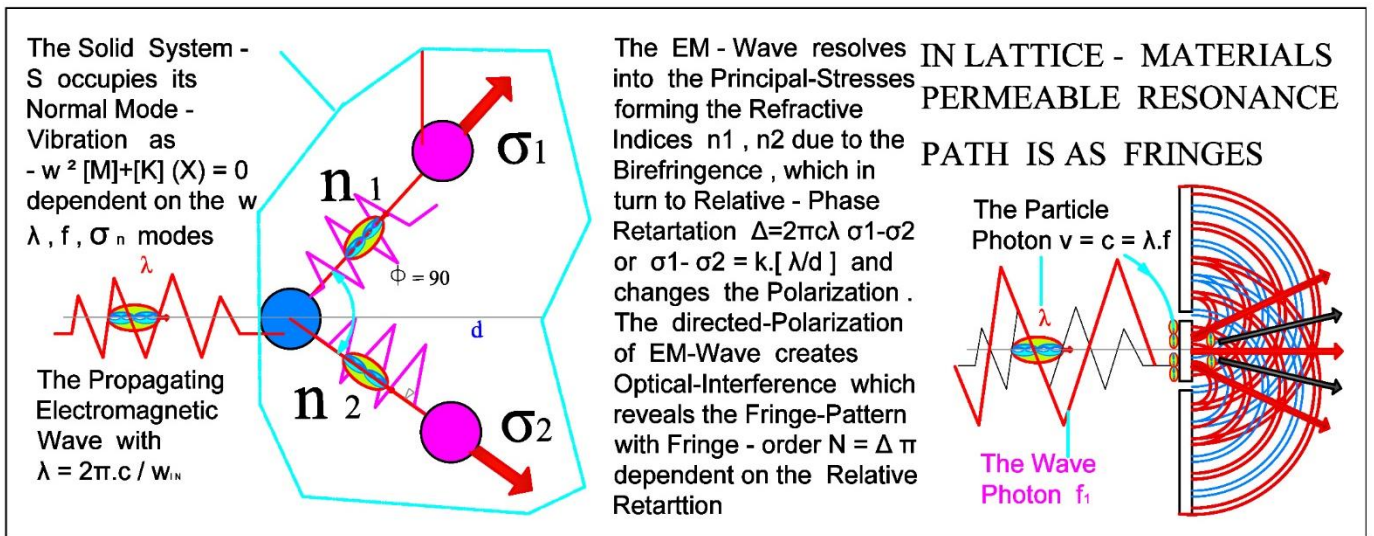


Figure-4.

- 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 In order to Pass a Force through a Medium ,or mass, is needed the Permissible Path *a Conductor* . For Gravitational Force \mathbf{G} is the acceleration of Gravity constant \mathbf{g} ,
- b) The Permissible - Permeable - Resonance - Path is for ,
 - 1) Solids \rightarrow The Normal-mode-Vibration - **System** $\{ - \mathbf{w}^2 [M] + [K] (X) \} = 0$
 - 2) Liquids \rightarrow The Cauchy Stress-Tensor as Momentum equation $\nabla \cdot \boldsymbol{\sigma} = -\nabla p + \nabla \cdot \boldsymbol{\tau}$
 - 3) Gases \rightarrow The combined Avogadro's Pressure-law $PV = n RT = \mathbf{n} \cdot m v^2 / 3$
 - 4) Crystals \rightarrow The Cauchy Ellipsoid-Stress-tensor where $E \perp B \perp r \equiv \boldsymbol{\sigma}_1 \perp \boldsymbol{\sigma}_2 \perp \boldsymbol{\sigma}_3$
 - 5) Molecules \rightarrow The Lattice-Crystal-Arrangement with **Chemical-Bonds** relation
 - 6) Atoms \rightarrow The Energy-Rims with Chemical Bonds , **Ionic , Covalent**, 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 $\mathbf{f}_R [S \equiv f_{1=n}, f_2, f_3, f_R = w^2] = \mathbf{f}_n = \frac{n(1+\sqrt{5})\sigma}{4\pi r} = \frac{n\sigma \cdot \bar{B}}{8r^2} \rightarrow$ i.e. **The Golden-ratio-Pattern , which is related to Spin.**
 - 9) Cave-Orbit \rightarrow The Relation $c \cdot L_s = L_v$, Light-velocity $3 \cdot 10^8$ m/s * $1 \cdot 10^{-42}$ m cave = $3 \cdot 10^{-34}$ m²/s are the Cave-Energy-Plane-Rims in Atom's , Planet orbits

Vibrations of Systems issues for Orbits as $\rightarrow \mathbf{W} = 4\pi^2 \cdot \frac{r^3}{T^2} \cdot \bar{\mathbf{n}} = 4\pi^2 \cdot \mathbf{r}^3 \cdot \mathbf{f}_p^2 \cdot \bar{\mathbf{n}} \leftarrow$
 which is the Energy in the Conic-Sections Kepler`s Orbits .

Remarks :

The Path Permeable to a common motion is following one of the , \mathbf{w} , \mathbf{f} , $\boldsymbol{\sigma}_n$, quantities as the below procedure ,

- 1.. A transmitted Electromagnetic wave with angular velocity vector $\mathbf{w} = 2\pi\mathbf{f} = 2\pi\mathbf{c}/\lambda$ 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 $\Delta = (2\pi\mathbf{c}/\lambda) \cdot \mathbf{k} \cdot (\sigma_1 - \sigma_2)$ or as
 $\sigma_1 - \sigma_2 = \left[\frac{\lambda}{d} \right] \cdot \frac{\Delta}{2\pi\mathbf{c}} = \mathbf{k} \cdot \left[\frac{\lambda}{d} \right] \dots$ (a) *where*
 $\Delta =$ The Controlled Phase-Retardation from the transmitted Electromagnetic wave
 $\lambda = \frac{2\pi\mathbf{c}}{\mathbf{w}}$, 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.. Studying the Fringe-Pattern one can determine the State of stress at various points of the material and the **General Permeable Paths** of Electromagnetic-State of the body In Fig-4.(3) is seen the Energy-Storage p , which is transported by the Electromagnetic conveyer \mathbf{f}_n .

The Energy-Storages $r = n \cdot \left[\frac{\lambda}{2} \right] \equiv W_{n(n+1)} = \left[\frac{4\pi r^2 f_1}{3} \right] \cdot n \cdot (n+1)$, *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) can travel in any Solid either in Motion or at Rest .

Laplace`s Orbital Angular-momentum $e^{i2\pi n} = 1$ 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 \mathbf{f}_R [$S \equiv f_{1=N}, f_2, f_3, f_R = \omega^2$] *as wavelengths* $\lambda \equiv [f_1, f_2 \dots f_n = \omega^2] \equiv$ *the n lobes* , or

$\rightarrow f_N = n \frac{(1+\sqrt{5})\sigma}{4\pi r} = \frac{n\sigma \cdot B}{8r^2}$, a Principal-Stresses $\boldsymbol{\sigma}$, and a Resonance-frequencies \mathbf{f}_R relation , which is the Energy stored in the MP-lobes. [70]

The 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** . The **Lattice - crystal** is a Regular 3D geometrical arrangement of Atoms , or 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 , $\mathbf{r} = [n.\lambda/2]$ with the , \mathbf{n} frequencies $f_n = n.f_1$, with \mathbf{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-Storage \mathbf{r} , 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 , \mathbf{r} , in Cell , **and change the Inner-Structure of Cell to another desirable Property** .

From Inner-velocity equation $v = wr = (2\pi/T).r = 2\pi.f_1 r$, wavelength $\lambda = cT=c/f_1$, $r = n.\lambda/2$, then $r = n.(c/2f_1)$ and $\mathbf{v} = 2\pi.f_1[n.c/2f_1] = \mathbf{n}.\pi.c$ or $\mathbf{v} = \mathbf{n}.\pi.c \dots(4)$ Showing that velocities in lobes are , $\mathbf{n}.\pi$, times that of light and for $n = 1$ then $\mathbf{v} = \pi.c$ more than three times faster of light velocity , and is the **Velocity-Quantization**.

Because of the above velocity \mathbf{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 .

The Geometry and Physical Configuration - Structure of the Energy - Systems.

- A.. The Point-Line-Plane-Volume : E-Geometry : (1) . (2) .. (3) . . (4) . . .
- B.. The Material-Point : M-Point : $[\oplus \cup \cup \ominus]$, $|\ominus \leftrightarrow \oplus|$
- C.. The Material-Point-Spaces : M-Geometry : $f_R [S \equiv f_{1=N} , f_2 , f_2, f_R] \leftarrow f_R \equiv f_N$
- D.. The Forced-Nodes -Structure : Mechanics : $[-\lambda M + K]X = 0$, $[\bar{A} - \lambda I]Y = 0$, $\lambda = w^2$
- E.. The Valence-Bond-Particles : Chemistry : $\textcircled{R} \textcircled{R}$, $\textcircled{R} \textcircled{R} \textcircled{R} \textcircled{R}$, $\textcircled{R} \textcircled{R} \textcircled{R} \textcircled{R} \textcircled{R}$, $\textcircled{R} \textcircled{R}$

In Euclidean-Geometry are shown the different Stationary-Shapes that Points maybe formatted . The Points on Plane or Volume-Shapes are called *Vertices* .

In Material-Geometry are shown the different Stationary-Shapes that Material-Points maybe formatted .The Points on Shapes are called *Spaces* , \oplus , *Anti-spaces* , \ominus , or (+) , (-) charge and consist a Stationary-System .

In Mechanics are shown the modes of Non-stationary-Shapes in General-coordinates equal in number to degrees of freedom of the system , and by using Energy-Equation of motion is converted to the Standard-eigenvalue-form of frequencies $w^2 = f_1, f_N$ where $f_R [S \equiv f_{1=N} , f_2 , f_2 , f_n = w^2] \leftarrow$ and $f_{Resonance} \equiv f_N \equiv w^2$.

The Points on Shapes are characterized with the *Degrees of freedom* , which are , Loaded or Unloaded.

In Chemistry are shown the different, Stationary or Non-stationary-Shapes of the Elementary-Particles Atoms, Ions, Molecules, Crystals, etc. and Compounds, placed with their Chemical-Bonds, that maybe formatted. The Points on mode-Shapes are in *each-State* the System of *Atoms-Ions-Molecules- etc.* which are Loaded or Unloaded

→ All above, **Configuration - Structures, Are under a Common-Relationship, That of Resonance, i.e. Gravitation through Gravity acceleration follows the Permissible-Permeable-Path to communicate with all Energy-Structures.** ←

In Material-point, **M-Point - Resonance** occurs on Material-point when placed in a uniform Magnetic Field. Its energy $E = W = \left[\frac{4\pi r^2}{3}\right].f_n = n \frac{(1+\sqrt{5}).\sigma r}{3} = 2L = \bar{B}. \bar{w} = J.w^2$ is split into the, **n**, finite numbers of Energy-lobes dependent on the angular – momentum-vector $\bar{B} \equiv \text{Spin}$. Reorientation of Spin creates a New Nutation-Period $f_N = n \frac{(1+\sqrt{5})\sigma}{4\pi r}$ as in Fig-7. and a New wavelength $\lambda_N = \frac{2r}{n}$, where $\lambda = 2r$.

Since frequency $f_N = n \frac{(1+\sqrt{5})\sigma}{4\pi r} = \frac{\lambda_N}{c}$, then $\lambda_N = \frac{n\sigma c (1+\sqrt{5})}{4\pi r} = \frac{3c}{nr\sigma\bar{B}}$ which is the New wavelength. If Material-point is ticked with a field of another frequency then is unlikely to transition only-when acquire a common frequency f_T .

This common Transition-frequency is the **M-Point-Resonance**.

In Mechanics, **Resonance** occurs in a Mechanical-System under the **EXCITATION** of an Oscillatory-System. If the frequency of excitation coincides with one of the natural-frequencies of the system, a condition of Resonance is encountered.

Vibrating Systems are all subject to damping because energy is dissipated by the resistances of motion.

In Physics, **Physical - Resonance** occurs in a Physical-System when another Vibrating - system or external forces **DRIVE** the System to oscillate with greater amplitude at specific frequencies called Resonance-frequencies. This property is found in Orbits either in Atoms, or in Universe.

In Electricity, **Electrical-Resonance** occurs in an Electric-circuit, Resistor [R], Inductor [L], Capacitor [C] at a particular, *Resonant-frequency*, when the Imaginary-parts of Impedance $Z = R+iX$, of the circuit elements cancel each other.

In Medicine, **MRI-Medicine-Resonance** occurs between the Nucleus, *of the Two-Hydrogen-atoms in water-molecules*, consisted of a single Proton and when **excited by an Strong-Magnetic-field** then is twisting its orientation so that aligned with the field.

Proton all by itself may absorb and reemit 900 MHz photons, but when it gets near other charges it gets twisted and distorted and its Resonance frequency shifting to 906 MHz. This means that MRI Machine maybe used to generate special Spectra corresponding to the amount of Resonance at various frequencies and which in turn reveals the details of the structure of molecules. Newton's, First-Law states that, *Any change in vector \bar{v} , to motion or direction $d\bar{v}$, involves acceleration $a = F / m = 2S/t^2$, or $E=F dS=(ma).d(at^2/2) = m.a^2t dt$, i.e. **Resonance $w^2_R \cong \text{Acceleration } \bar{a}_R$** i.e. Newton's law for, *vector \bar{v} change or direction $d\bar{v}$* , issues in Microcosm.*

In Cells which are growing and moving alone , Energy-Path is through Photosynthesis and not by fossil fuels in order to sustain , **Growth , Metabolism and Reproduction** . From-Web , In order to transform the Energy held in the chemical bonds of the food molecules into more readily usable forms , *as these are for Cellular Nutrients sugar and fat which are molecules* , have to pass their membrane which is semi-permeable using Oxidation , *a type of chemical reaction*, and Glycolysis , *sugar splitting* , and thus their Electrons are transformed from one molecule to another . Because chemical reactions in Cells may need accomplished too long time , exist Enzymes which are Proteins ,that accelerate chemical reactions within the Cell . i.e.

Cells need energy to accomplish the task of life , beginning with the Energy - Sources obtained from their environment in the form of , *Sunlight and Organic food molecules* , **via the Energy - Pathways Photosynthesis and Glycolysis** , Conclusion → → →

All above mentioned processes fulfil many purposes and Principally the main one which is that of the Direct-Communication of the Golden-ratio-frequency-Pattern the $\{ f_n = [\frac{(1+\sqrt{5})}{2}] \frac{\sigma}{2\pi r} = \frac{\Phi \cdot \sigma}{2\pi r} = \frac{E_n}{h}$ of Material-Point } **which is the Energy-needed via the referred Energy- Pathways to Kick-Everything-Done in this world** ← ←

In Momentum-Paradox of light , **MP - Light-Resonance** occurs, when the Photon as a System S , as this is $\{ [B_p \equiv EM-R \equiv f_{1=N}, f_2, f_3, f_D, f_n]$ and $\lambda_N = \frac{\sigma \cdot (1+\sqrt{5})}{4\pi r} = \frac{n \cdot \bar{B}}{4\pi r^2}$ } and which is a moving Energy-tank as EM-Radiation and , **DRIVE** the System of the Dielectric-Medium $[S_D \equiv f_D]$ to oscillate with a common amplitude , *that of the Dielectric-Polarization frequency* f_D , with a → New-mass Density-Wave , becoming from *the Reaction to the New Reorientation of the Spin* .

It was proved that when Spin = \bar{B} -Vector changes direction , Then frequency is between $[f_{1,...}, f_n = w^2]$, and the New-frequency becomes another Particle .

A light-Pulse , Driven forward , in a sort of Optoelectric shock-wave , E.M-R $\equiv f_{1=N}, f_2, f_3, f_R, \dots, f_n = w^2$, *Electromagnetic-Radiation* , then Photon`s momentum $\bar{B} = \frac{r \cdot \sigma \cdot (1+\sqrt{5})}{n} = [\frac{\sigma \cdot (1+\sqrt{5})}{2}] \frac{2r}{n} = v_R \cdot \frac{2r}{n} = \frac{2rc}{n \cdot N_R}$ i.e. Photon`s momentum follows

the **Inverse-dependence of Radiation-pressure on the Refractive-Index N_R** .

In Gravity which is a Potential-energy with binder Energy - Field $[\nabla_i]$, becoming from the Excitation-motion , *the called Gravity force without Vibration but only local rotation* , **Gravity-Resonance** occurs in any Material-Point , *as the Photon is* , when collides with one of the $\{ [\pm s^2]$ dipole Spin-constituent in MFMF} – Field , becoming from the Revolving-motion , **and say this is an Energy - Vector Resonance** , because happens axially on Spins-Vector and , **Resonance is the Orientation of both Spins** .

In Orbits which are Negative – Energy-Rims with binder Energy the attraction between the opposite forces $P_A \leftrightarrow P_B$ at points A , B , is created the Central motion where , **Orbital-Resonance** , are 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 → the Infinite series of Spin \bar{B} . In Figure -5-7- are shown the Ellipse-Orbits , $1 = c \cdot f_n^2 \cdot r^3$, with their content which is The Spin-Field-vectors \bar{B} in all area πab of MFMF field .

During orbiting centripetal acceleration $\bar{a}_p = \sigma = \pm \frac{4\pi r}{(1+\sqrt{5})} \cdot f$ i.e. *Orbit is subject to a Mechanical-stress, σ , becoming from the Centripetal-acceleration \bar{a}_p , therefore is appeared from stress σ , the Piezoelectric-effect with Positive-charge at the Nucleus and Negative-charge at the Planet \equiv Material-point.*

The two faces at **N, P** are connected by the in-between Gravity-field $[\nabla i] = [\pm s^2]$ in [MFMF] Field, so flows Current which is the Resonance on Orbit. 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 and Deformed in Shape by the Resonance at **N, P**, faces.

From above, motion needs the Granular-Layer-Gravity-field $[\nabla i]$ to make a circuit in Orbit tiny Battery. In Atoms Negative-Energy-Rims are the Energy-Plane-Field vectors the Rims, so that at focus the Proton and at Orbits the electron or electrons, to follow the Central motion, and motion conserved.

The Energy, as motion, is transformed into velocity vectors, the moving Energy-tank in wavelength $\lambda_N = \frac{2r}{n}$, and the Velocity vector, \bar{v}_i , to a Field-Vector $\nabla \cdot \bar{v}_i$, which is the Stationary Surface of the Motion in Orbit, and because follows the Extrema Principle, as Figures 5-7.

Vibrations of Systems: For Orbits issues $\rightarrow W = 4\pi^2 \cdot \frac{r^3}{T^2} \cdot \bar{n} = 4\pi^2 \cdot r^3 \cdot f_p^2 \cdot \bar{n} \leftarrow$ which is Kepler celestial law for microcosm.

For the vibration of systems of many degrees of freedom and because an estimate of the Fundamental and a few of the lower modes is sufficient Rayleigh's method, and Dunkerley's equation, are of great value and importance in the theory of Resonance. For M and K, the Mass and Stiffness matrices and X, the assumed Displacement vector for amplitude of vibration, then for Harmonic motion, the maximum Kinetic and Potential energies are written as,

$T_{\max} = \frac{1}{2} w^2 \cdot X^T \cdot M \cdot X$ and $U_{\max} = \frac{1}{2} X^T \cdot K \cdot X$ where, w, are the frequencies $[B_p \equiv EM-R \equiv f_{1=N}, f_2, f_3, f_D, f_n, w^2 = f_n]$ of the System.

By equating the two and solving for w^2 , then $w^2 = \frac{X^T \cdot K \cdot X}{X^T \cdot M \cdot X}$ which is the lowest natural frequency from the high side and by expressing the assumed displacement curve, wavelength λ , in terms of the normal modes X_i as $X = X_1 + C_2 X_2 + C_3 X_3 + \dots$ then by normalizing to the same number equation becomes,

$$w^2 = w_1^2 \cdot [1 + C_2^2 \left(\frac{w_2^2}{w_1^2} - 1\right) + \dots] \dots (a) \text{ i.e. a relation between the}$$

Fundamental frequency $f_n = \frac{w}{2\pi}$, which is found as the Natural-Frequency

$f_n = \frac{n \cdot v}{4r} = \frac{n\sigma}{8r} [1 + \sqrt{5}]$, which is the Golden-ratio-frequency-Pattern and all the other harmonics in any cave r, of the, n, lobes.

The plus and minus signs show the phase of the antinodes at a particular instant.

In Mechanics equation (a) is a regression method as the, Least Squares, to approximate the solution of overdetermined systems for angular velocity vector \bar{w} .

Because \bar{w} is related to the Total work $2L = \bar{B} \cdot \bar{w}$ then $w_1 = 2\pi \cdot f_1 = \frac{(1 + \sqrt{5}) \cdot \sigma}{8\pi r} = \frac{[1 + \sqrt{5}] \sigma}{4 \cdot r}$ i.e. dependent on cave, r, and Glue-Bond, σ . Moreover since in monads

exist n, frequencies as equation of, Spin = $\bar{B} = f_n \cdot \left(\frac{8r^2}{n\sigma}\right) =$ Energy in n wave-node

loop where $f_n = [n \frac{\sigma(1+\sqrt{5})}{\pi (2r)^3}] \equiv \frac{(1+\sqrt{5}) \cdot \sigma}{4\pi r} = \frac{\Phi \cdot \sigma}{2\pi r} = \frac{E}{h}$, $\bar{B} = [r \cdot \sigma \cdot (1 + \sqrt{5})]$, and
 Total - Energy $2L = 2n(3 + \sqrt{5}) [\frac{\sigma^2}{\pi r^2}] \dots\dots\dots[70]$

Orbitals in an Atom are the three dimension standing waves because electrons are waves following the Breakage - Principle and consist the eigenvalues or and , the Eigen-frequencies .Since the wavelength λ , follows the sequence $\frac{1}{1} , \frac{1}{2} , \frac{1}{3} , \frac{1}{4} , \frac{1}{n}$, and frequency in , n , lobes the Odd and Even sequences 1 ,2 , 3, 4, 5, 6 ... and 1 , 3 , 5 , 7 , 9 , wavelength is fractionally quantized while Energy as whole numbers . Equation (a) shows the fundamental deflection (*or mode*) X_1 which is the greatest of all . Since infinite large number in algebra , is what is called also *Maxima* in Geometry, and Zero in the **New Material-Geometry** then article [65 -70] consists **The Energy - Beacon** , for understanding nature.

Question . How Energy \equiv Work \equiv Motion is penetrating matter ???

Given the External-Forces that are acting on a System , to determine the distribution of Internal-Stresses throughout the system . Explicitly is the Cauchy-stress-tensor at every point. In a Solid-object, *By Newton`s laws of motion where any external forces that act on a system must be balanced by internal reaction forces or cause the particles in the effected part to accelerate* , all particles must move substantially Resonated in order to keep overall the shape , so follows that any force applied to one part must give rise to internal reaction forces that **Propagate from Particle to Particle** of the system. All these internal forces are due to the very short-range intermolecular interactions ,manifested as surface contact forces σ , between adjacent particles , which is what is said as Stress . *Since now* , the Work executed in the Elastic material Configuration the Strain energy is absorbed as Support Reactions and displacement field in the three dimensions [$\nabla \epsilon$ ($\bar{u}, \bar{v}, \bar{w}$)] upon the deformed placement (these alterations of shape by pressure or stress is the Euler`s-Lagrange elastic Equilibrium State of the Configuration and is as

$$G \cdot \nabla^2 \cdot \epsilon + [m \cdot G / (m-2)] \cdot \nabla [\nabla \cdot \epsilon] = F \dots\dots\dots(1) , \text{ where}$$

E = Young modulus of elasticity. G = Shear modulus = E . m/2(m+1)
 m = Poisson`s ratio = 1 / $\mu \approx 10/3$ σ = Stress = Force / Area.
 ϵ = Strain = change of length / length . F = External forces .

In Electricity , the linear Electrical behavior , *Field and Strength* , of a Material point is $\check{D} = \epsilon \hat{E}$, where \check{D} = the Electric displacement field , \hat{E} = the Inside Electric field strength and then according to Maxwell`s equations $\rightarrow \nabla \cdot \check{D} = 0 , \nabla \times \hat{E} = 0$ and since in Elasticity , Hook`s law $\rightarrow \epsilon = E \cdot \sigma$ then $\nabla \cdot \sigma = 0$, $\epsilon = \frac{\nabla u + u \nabla}{2}$ where u = the displacement. All above when combined in *coupled equations then* $\epsilon = E \cdot \sigma + \partial \hat{E}$ and $\check{D} = \epsilon \hat{E} + \partial \sigma \dots\dots(2)$ and since in Material-point $\sigma = 2(1+\sqrt{5}) \cdot \bar{v} =$ constant , *because* $v = w \cdot r$, then (1) becomes , $\epsilon = E \cdot \sigma + \partial \hat{E} = 2 \cdot E (1+\sqrt{5}) \cdot \bar{v} + \partial \hat{E}$, $\check{D} = \epsilon \hat{E} + \partial \sigma = \epsilon \hat{E} + 0 = \epsilon \hat{E} \dots\dots(3)$

System (3) defines the Strain , ϵ , and the Electric displacement field $\hat{E} = [\oplus]$, in M-Point which is the Work in a much deeper stresses-level as $dW = \frac{\sigma^2}{2E} (dx \cdot dy \cdot dz)$ Work is always motion in the three dimensions dx , dy , dz , **therefore** ,

Energy To be Transported , is needed **First to be Conserved in Energy-Caves and then to be Transported** . **This Remark for Energy-Packaging** , will be useful for **Existing and Future Research** .

E.. THE CONIC-SECTIONS AND PLANAR – CURVES :

Menaechmus came to think of producing curves by cutting a cone , starting from the circle definition which is → **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 ←**

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 [O₁P,PO₂] of two centers O₁,O₂ issues for point P , PO₁+ PO₂= major-axis , which is constant . This property allows Central-motion to be seen as a Geometrical problem of Proportional on Points and lines [44] .

In [70] Torsional-Momentum is $\bar{M} = [\bar{r} \times \bar{p}] = \frac{d\bar{B}}{dt}$ → the Theorem of Equal-Areas and Kepler`s 1st Law , i.e. Momentum \bar{p} , of a force \bar{P} , to a constant center O , of radius \bar{r} , is equal to the change of the angular - momentum \bar{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 , → **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) ← **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 → $p = r + r e \cdot \cos \varphi = r (1 + e \cdot \cos \varphi)$ (1) where , p = a constant parameter , r = the orbit radius from O . Inversing (1) then → $\frac{1}{r} = \frac{1+e \cdot \cos \varphi}{p}$ and

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

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

where the constant area O,P,P₁ = $A = \frac{1}{2} \cdot r^2 \cdot \frac{d\varphi}{dt}$, and for ellipse the Area = $(\pi a_e b_e)$.

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 is

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

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

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

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

and constant $\mathbf{k} = \left[\frac{4\pi^2 r^3}{T^2} \right] = 4\pi^2 \cdot r^3 \cdot f_e^2$, where r is any cave 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** \rightarrow **on Kepler`s constant** \mathbf{k} :

During the Central-Plane-motion of a Planet \equiv Momentum $\bar{\mathbf{B}}$ and a Sun \equiv Focus \mathbf{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 , \mathbf{g} , in our gravitational field with frequency unchanged , and \rightarrow velocity , $d\bar{v}$, 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 $c T = \lambda = c / f$, of this Isochronous motion .
- 3.. The Spotting on Kepler`s constant \mathbf{k} : **Question ??**

Since the Central-Plane-motion of point $\mathbf{P} \equiv \mathbf{Planet} \equiv$ Momentum $\bar{\mathbf{B}}$, and a Sun \equiv **Focus** \mathbf{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 , \rightarrow **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 , \mathbf{P} and \mathbf{O} , instead is a Fixed sum from rotation $\equiv [\oplus \cup \cup \ominus] \equiv$ motion, trapped in a closed-curve. The Energy-quantity \mathbf{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 $\mathbf{k} = \left[\frac{4\pi^2 r^3}{T^2} \right] = 4\pi^2 \cdot r^3 \cdot f_p^2$,where for the Sun-Earth-Rim Semi-major-axis , $r = 15 \cdot 10^{10}$ m , and the period $T = 1$ year the Energy in this Plane-Sun-Earth Rim is $\mathbf{k} = 3 \cdot 10^{-34} = [3 \cdot 10^8] \cdot 10^{-42} \text{ y}^2/\text{m}^3$.

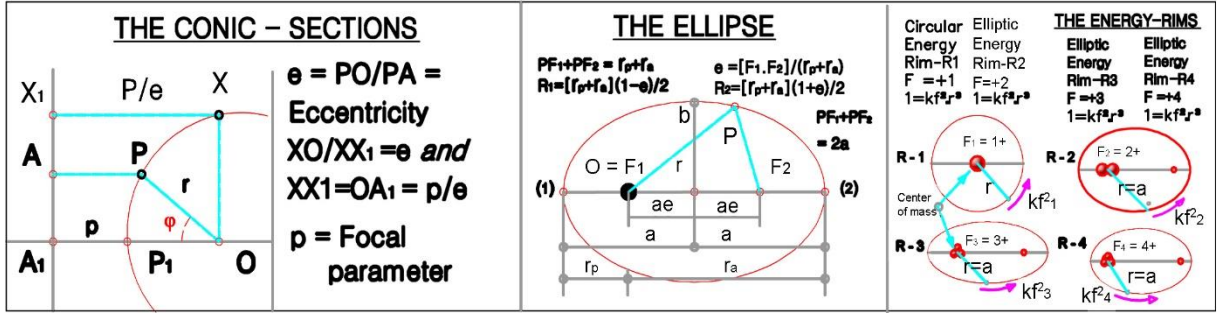


Figure-5.

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 $0 \leq e \leq 1$, where $e1 = e2 = ae$
- 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,,n.. 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 .

a.. The 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 \rightarrow Gravity-force $\rightarrow G_F$

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

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 ,

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

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*,

$$a = \sqrt[3]{\frac{G[M_1 + M_2]T^2}{4\pi^2}} \dots\dots(2) \text{ where , } G = \text{The Gravitational constant} =$$

$$= 6,67.10^{-11} \text{ Nm}^2/\text{Kg}^2, M_1, M_2 \text{ the masses of any two material-points .}$$

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 $\mathbf{1} = C.f_n^2.r^3$. **These constant are the Energy-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 is $\bar{L} \perp [\bar{a} . \bar{v}]$, or

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

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 ,

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

$$\text{The Total-energy } E = K_E + P_E = K_E - 2.K_E = -K_E \dots\dots\dots(4) \text{ i.e.}$$

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

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

b.. 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 $[\oplus \leftrightarrow \ominus] \equiv [\bar{v} . \nabla i]$, **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 and so **without any Force acting on them** .

The above Remark is very useful for Future Research , on Atoms and Molecules where is later proved that , Hydrogen Atom is an **Energy-Monad in PNS** motionless in-where exists the minimum Negative-Energy and equal to Quantum , g .

2.. In [70] , the Work produced In Material-Point \overleftrightarrow{AB} is equal to $\rightarrow W = 2L = \overline{B} \cdot \overline{w} = J.w^2 \leftarrow$ consisting the **First-Energy-Store** which is a Stationary Wave with n , lobes as , $W_{n(n+1)} = [\frac{4\pi r^2 f_1}{3}].n.(n+1)$ and wavelength $\lambda_N = \frac{\sigma.(1+\sqrt{5})}{4\pi r} = \frac{n.\overline{B}}{4\pi r^2}$ i.e. , that which **Happens in Material point** , Momentum as Work is $W_{n(n+1)} =$ 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 Trajectories \equiv Rims \equiv Orbits \equiv Circuits** because there exists the pressure of centripetal-force Fig-6

3.. **Energy = motion = Work** , and makes the matter move . **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	$5,79 \cdot 10^{10}$	2 , 993	1
Earth	\rightarrow 1,0000	1,0000	$15,00 \cdot 10^{10}$	2 , 974	1
Pluto	\rightarrow 248,3000	0,0040	$590,00 \cdot 10^{10}$	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 also 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 or the Eight-Figure . Each Proton in Atom creates only one Energy-Rim .

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

All motions create Work which is conserved . Question ?? **Since Work \equiv motion \equiv \equiv Velocity-vector \equiv Energy-vector*Space-vector , then where this motion is kept ?**

Since Motion presupposes velocity vector \overline{v} which , when it is in motion collides with other velocity vectors and creates Constant work , \mathbf{k} . Motion may be Linear or ,

Rotational for any displacement , r , where then is This Constant-Work as →

$$k = \vec{v} \times \vec{v} \cdot \vec{r} = v^2 \cdot r . \text{ Analyzing the two rotating vectors then } \rightarrow$$

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

Equation (k) is Kepler-third-law , denoting that **Macrocosm and Microcosm Obey Newton`s Laws of motion in all Scales** . Because (k) is constant , $r^3 \cdot f_p^2$, is also a Constant multiplication of cave , r , and frequency $f \equiv$ Energy, then **Work \equiv motion is conserved in cave , r , as the , n , frequencies** → $f_N = n \frac{(1+\sqrt{5})\sigma}{4\pi r} = \frac{n\sigma \cdot \bar{B}}{8 r^2}$ and for a Damping-cave → $r(t) = r(t+w)$, with min-Damping =1 and Unit-Energy-Quantity W_u , (critical-energy unit) in-min r , is what we call **Gravity g** .

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 inner surplus-produced-energy and which is the outer Propagating Electromagnetic Wave , the Conveyer of tank $r = n \lambda / 2$.

Newton`s second law states that where there is acceleration , there must be a Force. Since either a change in the , *Magnitude* or the *Direction* , of the velocity-vector , constitutes an acceleration , and according to 2nd law *there is a Force* that acts at every point on the orbit . From $E = h \cdot f \rightarrow f = E / h =$ Energy per Planck`s length .

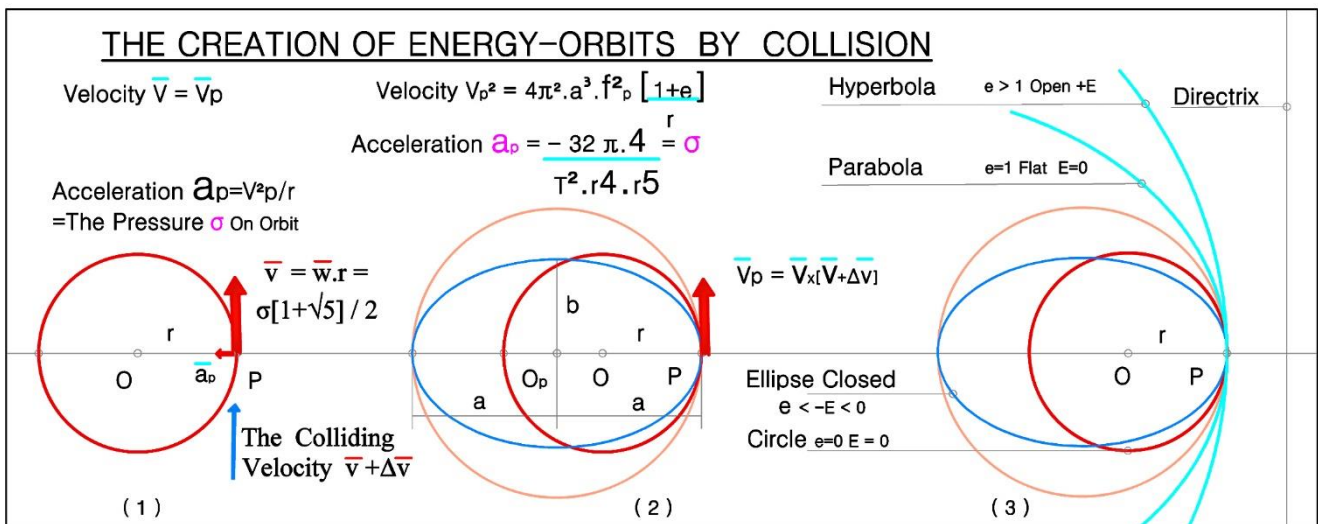


Figure-6. Velocities and Accelerations on , Planar and Atom , Orbits after Collision.

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

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

In (2) is presented the Elliptical motion after collision , where the acceleration is

$$\text{increased , the velocity is equal to } v_p^2 = 4 \pi^2 a^3 \cdot f_p^2 \cdot \left[\frac{1+e}{r} \right]$$

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

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

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

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

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

In a Conservative System, the Total energy is constant and the differential equation of motion can also be established by the principle of conservation of energy and for the free vibration of an undamped system, the energy is Party-kinetic and Party-potential.

The kinetic energy K_E is stored in the mass by virtue of its velocity, where as the Potential Energy P_E is stored in the form of strain energy in elastic deformation or work done in a force field such as gravity. Since Total energy $E = K_E + P_E = \text{constant}$

its range of change is zero and $\frac{d}{dt}(K_E + P_E) = 0$. From the Principle of 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 max-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, P , energy we have

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

Phase plane is equation $y = \dot{x} = \pm \sqrt{2[E - P(x)]} \dots(2)$ where trajectories must be

symmetric about the x-axis, and the differential equation of motion for a conservative system is $\ddot{x} = f(x) \dots(3)$ or because $\ddot{x} = \dot{x} (d\dot{x}/dt) = f(x)$ equation (3) is written

$$\dot{x} \cdot d\dot{x} - f(x) \cdot dx = 0 \dots(4), \text{ and Integrating } \frac{\dot{x}^2}{2} - \int_0^x f(x) dx = E \text{ and by comparison}$$

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 as equation

$$\frac{dy}{dx} = \frac{f(x)}{y} \dots(5). \text{ Equations note that, at the equilibrium Points the slope of the}$$

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 , then the period associated with them is

$$T = 2 \int_{x_1}^{x_2} dx / \sqrt{2[E - P(x)]} \dots\dots\dots(6) \quad \text{where } x_1, x_2, \text{ are extreme points of the trajectory on x-axis.}$$

In E – Figure - 5 , On a Planet of mass m_1 , orbiting mass m , where , r , is their distance between their centers , the corresponding **Gravitational Potential-energy** is

$$P_G (r) = \int F(r) dr = - G \frac{m.m_1}{r} \dots\dots\dots (7)$$

The Spring like central-Force from Point of mass m , on an Attached mass m_1 , is $F = - k.r.\bar{r}_0 = - k.r \bar{r}$, which has a three dimensional **Spring-Potential-energy** as

$$P_G (r) = \int F(r) dr = \frac{1}{2} k r^2 \dots\dots\dots (8)$$

The Coulomb force $F = \frac{q_1 q_2}{4\pi \epsilon_0 r^2} \bar{r}$, on a charge q_2 , due to a central charge q_1 ,

has a **Coulomb-Potential-energy** $P_G (r) = - \int F(r) dr = \frac{q_1 q_2}{4\pi \epsilon_0 . r} \dots\dots\dots (9)$

In Figure - 6, mass m , at point P , is orbiting with velocity vector \bar{v} , analyzed into the radial \bar{v}_1 , and the tangential \bar{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 $K_E = mv_1^2/2 + mv_2^2/2 \dots\dots (a)$, and the magnitude of the Angular-momentum $L = r m v_2$, and in terms of L , then

$$K_E = \frac{1}{2} mv_1^2 + \frac{L^2}{2mr^2} \quad \text{and adding the Negative Potential energy } P_E = G \frac{Mm}{r} \quad \text{then}$$

Total energy $E = K_E + P_E = \frac{1}{2} mv_1^2 + \frac{L^2}{2mr^2} - G \frac{Mm}{r} \dots\dots\dots(b)$

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 $\rightarrow E = G \frac{Mm}{r} - \frac{L^2}{2mr^2} = 0$, an equation with the two roots r_p and r_a , as

$$(r - r_p) . (r - r_a) = 0 \quad , \quad \text{or} \quad r^2 - (r_p + r_a).r + (r_p . r_a) = 0 \quad \text{where is the}$$

$$\text{Sum of roots } [r_p + r_a] = - G \frac{Mm}{E} = 2a \quad \text{from where} \quad \frac{2E}{m} = \frac{GM}{a} \quad , \quad \text{and}$$

$$\text{Product of roots } [r_p . r_a] = - \frac{L^2}{2mE} \quad \text{from where } L = r.m.v \quad , \quad v = L/r.m \quad , \quad E = \frac{1}{2} m \left[\frac{L}{rm} \right]^2 = \frac{L^2}{2mr^2}$$

The turning points are related to the axes of the ellipse by $r_p + r_a = 2a$, and

$$r_p \cdot r_a = b^2 = - \frac{L^2}{2mE} \text{ so , } \mathbf{Energy\ on\ Orbit} \quad E = \frac{GMm}{2a} \text{ , where is } \frac{2E}{m} = \frac{GM}{r}$$

$$\text{Angular-momentum } L^2 = - 2m.E.b^2 \quad \dots\dots\dots(c)$$

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

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

and $m r^2 w = L . f_n^2$. 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

$$\rightarrow \pi ab = S = \int \frac{L}{2m} dt = \frac{LT}{2m} \text{ , and } T \text{ is the Period of rotation.}$$

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

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

$$1 = k . f_n^2 . a^3 = [\frac{4\pi^2}{GM}] . f_n^2 . a^3 \quad \dots(d) \quad \mathbf{Existing\ in\ microcosm\ and\ macrocosm .}$$

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

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 ,

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

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

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

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

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

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

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

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

$$v^2 = 4C^2 \cdot \left[\frac{e^2 \sin^2 \varphi}{p^2} + \frac{1+e^2 \cos^2 \varphi + 2e \cos \varphi}{p^2} \right] = \frac{4C^2}{p^2} [e^2 + 1 + 2e \cos \varphi] = \frac{4C^2}{p} \left[\frac{e^2 + 1}{p} + \frac{2}{r} - \frac{2}{p} \right] =$$

$$\frac{4C^2}{p} \left[\frac{2}{r} - \frac{1-e^2}{p} \right] \dots (f5) , \text{ and for ellipse issuing } 2a = r_{\varphi=0} + r_{\varphi=\pi} = \frac{p}{1+e} + \frac{p}{1-e} = \frac{2p}{1-e^2}$$

$$\text{therefore , } v^2 = \frac{4C^2}{p} \left[\frac{2}{r} - \frac{1-e^2}{p} \right] = \frac{4C^2}{p} \left[\frac{2}{r} - \frac{1}{a} \right] \dots (f6)$$

From (f6) , when Planet is at Perihelion near the Sun $\frac{1}{r} = \frac{1+e}{p}$, then velocity is

$$v^2 = \frac{4C^2}{p} \left[\frac{2}{r} - \frac{1-e^2}{p} \right] = \frac{4C^2}{p} \left[\frac{2}{r} - \frac{1-e}{r} \right] = \frac{4C^2}{p} \left[\frac{1+e}{r} \right] , \text{ where } \frac{4C^2}{p} = \frac{4(\pi ab/T)^2}{b^2/a} = 4\pi^2 \frac{a^3}{T^2} ,$$

which is Kepler constant , and

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

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

$$\text{Centripetal-acceleration } a_p = -\frac{32C^2 a^2}{r^5} = -\frac{32\pi a^4 [1]}{T^2 r^4 [r^5]} \text{ and for } r = a \text{ then } a_p = -\frac{32\pi}{T^2 r^5} \dots (f8)$$

6.. *Orbital - Geometry and Orbital – Physics* :

The Geometrical elements in orbit is the semimajor axis a , and eccentricity e .

For radius r , issues $\frac{2E}{m} = \frac{GM}{a}$ and solving for $a = \frac{GMm}{2E}$, and

$$e = \sqrt{1 + 2EL^2/G^2M^2m^3} \dots(g)$$

For $r_p (1 + e) = L^2 / GMm^2$ radius of Planet $r_p = \frac{L^2}{(1+e)GMm^2} \dots\dots(g1)$

The Physical parameters in orbit is Total energy $E = K_E + P_E$, and Angular-momentum $L = \bar{r} m \bar{v}$.

From above Total $E = -\frac{GMm}{2a}$ and $L = \sqrt{(1 - e^2).GMm^2.a} \dots(p)$

Energy in Orbit $E = -\frac{GMm}{2r_p}(e - 1)$ and $L = \sqrt{(1 + e).GMm^2.r_p} \dots(p1)$

For $e = 1$, issues for Parabolas and Hyperbolas where $r_p(1 + e) = L^2 / GMm^2$.

3. 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. This motion is the Work produced as in Figure 7.

2.. Gravity : **Gravity is Potential-Energy with binder the Energy-Field** $\{ [\nabla i] = [\pm s^2]$ a constituent in MFMF Field, the called Gravity force without Vibration but only local rotation} becoming, **from Energy - Vectors occurring in the Material-Points and of a Tack-Geometry $\rightarrow [\oplus \leftrightarrow \ominus]$ of the Gravity-field**, and this because are axially on their Spin-Vector \bar{B} as $\bar{B} \equiv Spin \equiv Rotational - Energy$, and which **Energy - Vectors $\equiv Spin$, is the Inside content** of the infinite M-Points of 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 $\bar{a} \times \bar{b} = |\bar{a}|.|\bar{b}| \sin \theta . \bar{n}$ 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 is $\rightarrow Work = \bar{a} \times \bar{a} = \bar{a}^2 . \bar{r}$, and for $\bar{a} = \bar{v}$ then $\rightarrow Work = \bar{v}^2 . \bar{r} = |\bar{v}|.|\bar{v}|. \bar{r} = v^2 . r . \bar{n} = (wr)^2 r . \bar{n}$, or $Work = (wr)^2 r . \bar{n} = (2\pi r/T)^2 \bar{n} = (4\pi^2 r^2 / T^2) . r . \bar{n} = \frac{4\pi^2 r^3}{T^2} . \bar{n} \leftarrow$

$W = 4\pi^2 . \frac{r^3}{T^2} . \bar{n} = 4\pi^2 . r^3 . f_p^2 . \bar{n}$ 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, $\sigma = \pm \frac{4\pi r}{(1+\sqrt{5})} . f_p$, 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 $\bar{B} \equiv Spin$** , of the Oriented-Gravity-field $[\nabla i] = [\oplus \leftrightarrow \ominus], [\oplus \cup \ominus]$

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 , $1 = c.f_n^2.r^3$, with their content which is The Spin-Field-vectors \vec{B} in all area πab of MFMF field . During orbiting centripetal acceleration $\vec{a}_p = \sigma = \pm \frac{4\pi r}{(1+\sqrt{5})} \cdot \vec{f}$ is directed to Focus N , i.e.

Orbit is subject to a Mechanical-stress σ , becoming from a Centripetal-acceleration \vec{a}_p , and so is appeared the Piezoelectric-effect with Positive-charge at the Nucleus and Negative-charge at the Planet \equiv A linear-Material-point [$P\oplus \leftrightarrow \ominus N$] .

3.. Resonance : 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** , and the Gravity Force , **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 πab , 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-Sector PN $\equiv [P\oplus \leftrightarrow \ominus N]$ with the minimum $\vec{a}_p = \sigma$, i.e. either for macrocosm or microcosm , Gravity-Force-Vectors $\vec{B} \equiv$ Spin , of Material-points as Spin $[\oplus \cup \ominus]$ 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 $\rightarrow [\oplus \cup \ominus] \leftarrow$ **in the monad Atom-Rim** .

4.. The Permissible-Permeable-Path for transferring Energy in Orbits is proved to be the Electromagnetic current which is created on Stationary-Pointy-Material points with Spin S , which is Oriented and Reoriented by Gravity acceleration **g** , which is a Pressure on Pointy-Spins , on which the Gravitation force **G** , is affecting . i.e. the Permeable Path of force **G** , **or the Golden-ratio-frequency as pressure passes through Gravity-pressure g** , from Planet P on orbit to Nucleus on center N through pressure this **g** , which is the gravity acceleration on orbit .

This Path-way through the series of the infinite Spins S , Oriented and Reoriented Spins, of The Two-Types of , Material-Points , shows the way that Planet P , and Nucleus N , continually communicate each other .

This Remark for Energy-Pressure-Transportation is useful for Future Research

From Centripetal-acceleration (f8) related to that of M-Point is seen that Particles are extended in the Physical reality so , **Neutrons are useful for Future Research.**

Since constant $k = \frac{T^2}{a^3} = 9,808$ and $1 = k.f_n^2.a^3$, is easy to calculate , a cave ,

$$a = \sqrt[3]{\frac{1}{9,808.f_n^2}} \dots\dots(e2)$$

1.. Hydrogen Z=1 electron is of frequency $f_H = 1,3.10^{17}/\text{sec}$ and $f_H^2 = 1,69. 10^{34}$, so a_H cave is $a_H = \sqrt[3]{\frac{1}{9,808.1,69.10^{34}}} = \sqrt[3]{6,0329928. 10^{-36}} = 1,82043047.10^{-12}$ m

2.. Uranium Z=92 electron is of frequency $f_U = 1,1.10^{21}/\text{sec}$ and $f_U^2 = 1,21. 10^{42}$, so a_U cave is $a_U = \sqrt[3]{\frac{1}{9,808.1,21.10^{42}}} = \sqrt[3]{84,262462. 10^{-45}} = 4,3840830.10^{-15}$ m

i.e. caves are energy-circuits.

3.. Constant k , becoming from the microcosm by measuring the energy of a cave or Atom-orbit and the semi-major axis, or from the macrocosm by measuring the energy of Planetary system and the axis of orbiting, gives the same result.

c.. The minimum Energy RIM :

1.. 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 $\frac{T^2}{a^3} = \frac{4\pi^2}{GM} = \text{constant } k = \frac{1}{f^2 \cdot a^3}$

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

Constant Energy E, in Orbit, is $k = E = \frac{T^2}{a^3} = \frac{1}{f^2 \cdot a^3}$

It was shown that the maximum Energy in Hydrogen atom is $E = hf = -13,6 \text{ eV} = -13,6 \times 1,6 \cdot 10^{-19} = 2,176 \cdot 10^{-18} \text{ Joule}$, and the frequency is $f = E/h$ or, $f = 2,176 \cdot 10^{-18} \text{ J} / 6,6262 \cdot 10^{-34} \text{ J.s} = \mathbf{3, 28393 \cdot 10^{15} /s}$, and therefore Period in Orbit, $T = f^{-1} = 3,04513 \cdot 10^{-16} \text{ s}$.

The motion of all moving Energy-Storages is Sinusoidal as equation $\rightarrow \{ [\epsilon E^2 + \mu B^2] = 2 \cdot \lambda c \cdot \sin 2\phi \} \leftarrow \dots (e1)$ 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 $k = \frac{T^2}{a^3} = \frac{[3,04513 \cdot 10^{-16}]^2}{[2,1145016 \cdot 10^{-11}]^3} = \frac{9,2728109 \cdot 10^{-32}}{9,4541768 \cdot 10^{-33}} = \mathbf{9, 808238}$

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

i.e. The Minimum-Work $\rightarrow W = 4\pi^2 \frac{r^3}{T^2} \cdot \bar{n} = 4\pi^2 \cdot r^3 \cdot f_p^2 \cdot \bar{n} \leftarrow$ in an Negative -

Elliptic-energy-field-Disk as this is PNS, is stored as a Voltage $[P \oplus \leftrightarrow \ominus N]$

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 $\rightarrow W = 1 = k = [\nabla i] \cdot [\pm s^2] \equiv$ 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 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.

It is later seen that Gravitation as an external force G to masses, is affecting bodies through this Gravity-bedding-Layer, g, created by the Bodies.

d.. The Rotational motion in all displacements r :

It was shown before that , since Motion presupposes velocity vector \bar{v} which , when it is in motion collides with other velocity vectors and creates Constant work , k . then Motion may be Linear or Rotational for any displacement , r ,where then is created a Constant-Work $W = k = \bar{v}x\bar{v} \cdot \bar{r} = v^2 \cdot r \cdot \bar{n}$. i.e.

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

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 $[+s^2 \rightarrow \cup \cup - s^2]$ of MP-Spin , then for Planck length is ,

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

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

$$F_G \equiv \frac{n\pi\sqrt{3}}{16(1+\sqrt{5})} v^4 = \frac{n\sqrt{3}\pi}{(1+\sqrt{5})} \left(\frac{v}{2}\right)^4 , \text{ and it is the Black-Hole-Gravity-equation}$$

which is related to the Inner velocity v , and to its n lobes .

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

$$6,044981 \cdot 10^{-35} \cdot 80,776078 \cdot 10^{32} \cdot 20,085536 = g_G = \mathbf{9,8076925} \quad (5) , \text{ where}$$

$1/m_G = s = \text{mass-coefficient } [\sqrt{5}+1] \cdot \sqrt[4]{2} \cdot e^3$, 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 $\sqrt[2]{\sqrt{2}} = \sqrt[4]{2}$, or the same

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

As in Binary system $[1, 0]$, where one kilobyte = $2.8^3 = 1024$ bytes is eight times than a Kilobit = $2.4^3 = 128$ bytes [1byte = $2^3 = 8$ bits , **1bit** = a = **1 or 0**] , similarly are above dimensions as Units mass .

Bodies produce Gravity , which is pressure happening from , *the Change of the Spins direction on Stationary M-P-Dipole* $[\oplus \leftrightarrow \ominus]$ due **from Stationary forces** $[\nabla i] = \pm s^2$, **as Dipole** and because Gravity \equiv acceleration , this happens not by the change of the velocity vector But , **by the Changing of Direction** of above dipole $[+s^2 \rightarrow \cup \cup - s^2]$ This Work \equiv Gravity \equiv Energy \equiv a Constant , which becomes from the eternal-motion of Opposites in Material-point either on Orbit of any Planet either on Focus of the Planetary-Systems such in microcosm as in macrocosm . of MFMF field .

Remark :

Equation (5) denotes that **Kinetic-Energy** K_E , { The Unit-work in $[\nabla i] \cdot [\pm s^2] \equiv$ **MFMF Field** produced from the Quantized velocity-vector , \mathbf{c} , of Planck`s Undamped System } **is stored in mass** which is the **Material - Point \equiv Photon** , by virtue of its velocity \mathbf{c} , and the **Potential Energy** P_E { the Energy in the sinusoidal gravity-fields in orbit } in **Gravity-Stress** \mathbf{g} and because $G = \text{constant}$ the System is conservative and the energy is conserved as , $\mathbf{G} \rightarrow K_{EG} \equiv [\text{Photon , Velocity-vector } \mathbf{c}] + P_{EG} \equiv [\text{Gravity field } \equiv \mathbf{g}]$

i.e. **The Work** produced from the Gravitational-force \mathbf{G} , { Force \mathbf{G} , is constant in all universe therefore becomes from an Conservative -System} **in the Undamped Planck`s- Conservative -System, IS** for free vibration \rightarrow [Party-Kinetic-energy $\equiv \mathbf{K}_E$ and Party Potential-Energy $\equiv \mathbf{P}_E$] \leftarrow The Kinetic-energy $\equiv \mathbf{K}_E$ *is stored in* the Mass \equiv The-Energy-moving-storage \equiv **Photons**, by virtue of its velocity-vector, \mathbf{c} , whereas the Potential-Energy $\equiv \mathbf{P}_E$ *is stored in* the form of Strain-energy in Elastic Deformation which is the **Material-Points**, or Work-done in a *force field* such as **Gravity-field** \mathbf{g}_F . The Why, \mathbf{c} , is such in [39-78]

Since **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 . This was proofed as an Geometry problem and when applied for the two possible cases of motion, then Gravity acceleration is produced and Spin is linearly Oriented to the Gravity force \mathbf{G} . Gravity acceleration \mathbf{g} , is the minimum Energy which is Quantized in Energy-cave, r , while Speed of light \mathbf{c} , is the minimum Energy-linear-Plane-Volume for Speed in Planck`s scale as, $\mathbf{v} \equiv \mathbf{n} \cdot \pi \cdot \mathbf{c}$. because for $\mathbf{n}=1$ then, $\mathbf{v} \equiv \pi \cdot \mathbf{c}$, for each direction which is **the, π , Physical perception**. 7/7/2018. Potential-Energy $\equiv \mathbf{P}_E$ **stored** in Material-point is the Electric-Field $\mathbf{E} = \mathbf{g} \pi$ in where [\oplus moves to \ominus] and thus from Geometry-Shape are created the two opposite Angular momentum vectors and from Dipole the Spin $\mathbf{S} = \frac{1}{2}$ in \mathbf{r} cave filling the whole universe.

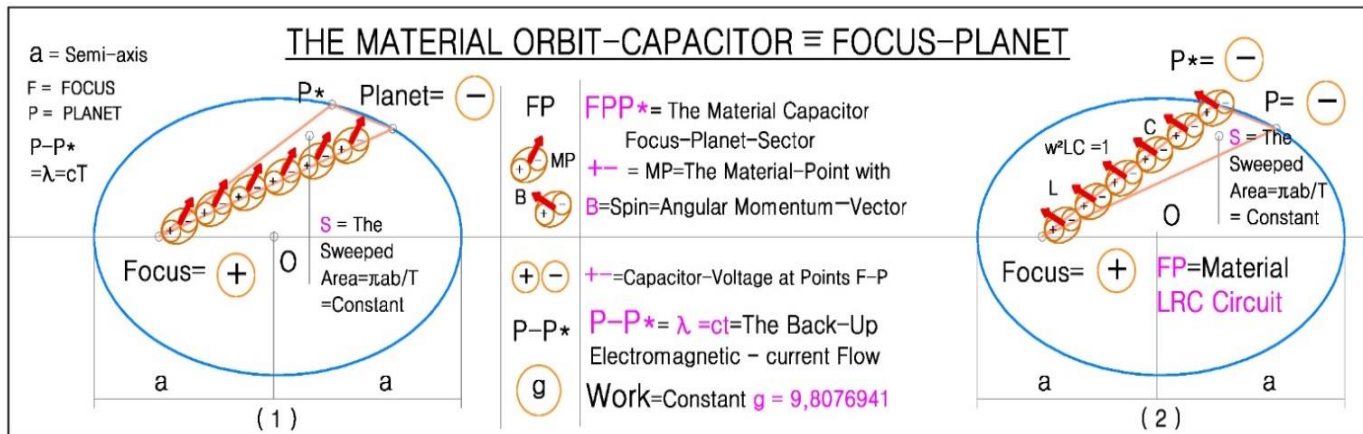


Figure-7. The Material, **LRC Circuit** on Orbit, on Focus-Planet-Sector [F \leftrightarrow P] **In (1).** Force \mathbf{g} , as wave, is directed to the center of rotation \mathbf{F} , and is proportional to the distance $\mathbf{PF} \equiv$ Focus-Planet. The Gravitational Potential-Energy $\mathbf{g}_G = 9, 8076925$ is stored in \rightarrow Focus-Planet-Sector $\equiv \mathbf{FP} \leftarrow$ which is the Material Capacitor Stores charge, *as that of Material-LRC-circuit*, and Inductors.

Because of the chains of Spins and of their Periodic excitation [\leftrightarrow], is thus created a Magnetic field due to LRC-circuit and which is tuning to the critical Quantum and critical-State \mathbf{g}_G . The chains of Spin are pointy vibrating with their characteristic frequencies $f = \frac{(1+\sqrt{5}) \cdot \sigma}{4\pi r} \bar{B}$ and filling up the entire universe.

Since Inner-stresses $\sigma_{1,2} = \sigma_1/2 \pm (1/2)\sqrt{\sigma_1^2 + 4 \cdot \sigma_1^2} = \sigma_1/2 [1 \pm \sqrt{5}]$ follow the **Golden ratio on stresses** then this Quantum-energy \mathbf{g}_G produced, is the State causing them to Magnetically- Resonate. In Material-point-chain of caves $r = \lambda/2$, and since $\dot{x} = w \cdot r \rightarrow w = \dot{x}/r$ then **Golden ratio Damping-Force** is the Work produced with Unit Damping-ratio $\zeta=1$. Since also $\dot{x} = v$ then exists,

$$F_d = c \cdot \dot{x} = 1m \cdot \omega_n \cdot \dot{x} = 1 \cdot [(\pi r^2/2) v^2] \cdot \frac{\dot{x}^2}{r} = \left[\frac{\pi r v^4}{2} \right] = g = \frac{2}{r} [\sigma (1+\sqrt{5})]^2 = \frac{4\sigma^2}{r} [3+\sqrt{5}] .$$

This dissipation of energy is determined under conditions of cyclic oscillations , and dependent on Glue-bond σ , and r , cave . Since r , is in denominator then for the very small caves , *the under Planck`s caves*, Damping-Force becomes infinite independently of Glue-bond . This may be considered as a type which happens in **Black holes** as this happens in algebra inverse fractions also .

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,

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

$$k = \frac{1}{f_n^2 \cdot a^3} , \text{ from which } \rightarrow 1 = k \cdot f_n^2 \cdot a^3 \text{ and } , k = \frac{4\pi^2}{GM} \text{ where}$$

Is seen that ,**Resonance between Focus-Planet** exists through ,Space a and Energy f .

From the Second-order differential equation excited by a Harmonic external force ,

$$F_t \cdot \sin wt , \text{ and is as } , m \frac{d^2x}{dt^2} + c \frac{dx}{dt} + k \cdot x = F_t \cdot \sin wt$$

corresponds Physically to the free damped vibration , where x = the displacement , dx / dt = the velocity and , d^2x / dt^2 = the acceleration of monad , m, c, k constants , with the general solution given by the equation

$$x = A \cdot e^{s1.t} + B \cdot e^{s2.t} + X \sin(wt-\phi) \dots\dots(1)$$

$$\text{Equation } \rightarrow L \frac{d^2q}{dt^2} + R \frac{dq}{dt} + \frac{1}{C} q = E_t \cdot \sin wt .$$

Corresponds physically to the free damped vibration , where Charge q = is the physical property of matter that causes it to experience a force which can be positive or negative , dq / dt = the least quantized amount of charge and d^2q / dt^2 = the space distribution of charge , and L, R, C Inductance , Resistance , Elasticity constants with general solution given by the equation $q = A \cdot e^{s1.t} + B \cdot e^{s2.t} + X \sin(wt-\phi) \dots\dots(2)$

Equations (1) and (2) give the analogic relation of the **Classical mechanics** [Space position , x ,] and the **Electromagnetism** [Quanta of Energy , q ,] of **Storing and Removing of energy in Energy-Space** cosmos .

The distributed force is as $L_1 - L_2 = L (di/dt)$, $R_1 - R_2 = R \cdot i$, $C_1 - C_2 = q / C$, respectively , showing the **Identification** of the **Mechanical** and **Physical laws** .

The way that **Potential-Energy is stored** , is that of **Material-LRC-Circuit** , which is for the Gravitational-Potential-Energy the **Material-Capacitor** or the \rightarrow **Focus-Planet-Sector-Stores-Change** \leftarrow which develop a Voltage in response to that charge .The coil of wire is the infinite Stationary-Dipole-Spinning Material-Points of this \rightarrow **Focus - Planet-Sector** \leftarrow which develops the back-em-f. ,when current through them changes .

In-Box exist two motions , **Revolving and Periodic** , the acceleration of Gravity $g \equiv \pm \sigma$ exists for the First Box-**B_R** ,while **Local-Extreme-case** for the Second Box-**B_P** .In this Gravity $g \equiv \pm \sigma$, is Locally altering **S** , by changing the Principal-stress σ with Local uniform Pressure $g_L \equiv g k_E = g \cdot [Force/Area] = G$, i.e. is proved that the minimum Local-Energy acceleration is the known , **Universal Gravitational-constant G** = $g k = k_E g = k_L \sigma = g \cdot g_L k_L$, such for **Macrocosm as for Microcosm** , and for both cases Obeying Newton`s Laws of motion .

e.. The Periodic motion in all Displacements r :

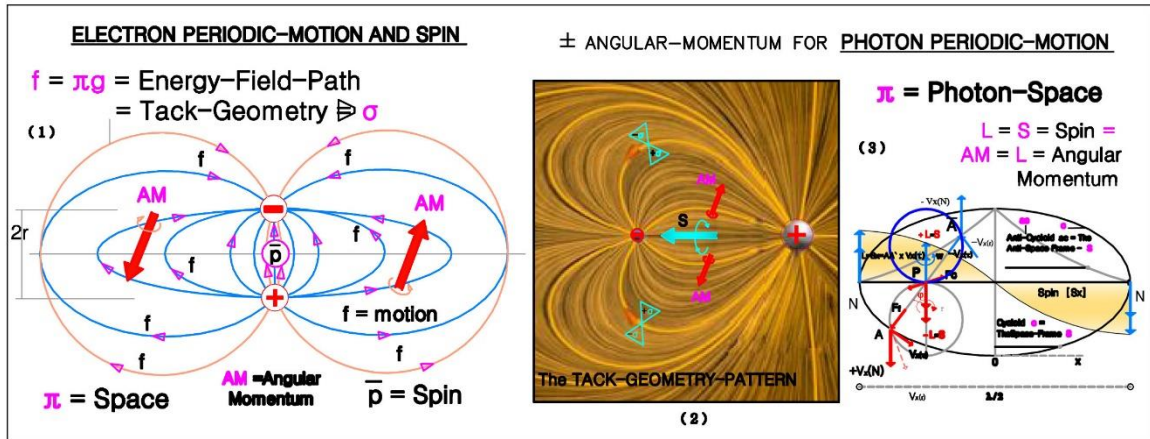


Figure-8 . The Two Possible motions in caves , The Periodic and The Rotational .

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

$a = \sqrt[3]{\frac{1}{k \cdot f^2}} = \sqrt[3]{\frac{1}{g \cdot f^2}}$, for $k = g$, and $f = E / h = 13,6 \text{ eV} / h = \text{Unit-Energy-Space-frequency}$
 $= 3,28393 \cdot 10^{15} / \text{s}$, cave $a = 2,11450164 \cdot 10^{-11} \text{ m}$. From Periodic motion and

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

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

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

The $k = \pi g$, denotes the \oplus **Space** \equiv Electric-field in-where exist the Electric-lines the tracks for the motion of electrons \ominus **Anti-space** . The Right angular momentum vector $\mathbf{AM} \equiv \uparrow$ is the Produced Work and stored in Magnetic-field as motion while left-vector $\mathbf{AM} \equiv \downarrow$ is the Produced Work and stored in the opposite Magnetic field as motion and both consist the Dipole [$\oplus \cup \ominus \cup \ominus$] vector directed to [$\oplus \rightarrow \ominus$] as, in *Tack-Geometry* For Material-Point , the chains of Spins due to Periodic excitation [\leftrightarrow] , is created in a Magnetic field due to LRC-circuit and which is tuning to the critical Quantum and critical-State g_G . The *chains of Spins* are Pointy vibrating with their characteristic

frequencies $f = \frac{(1 + \sqrt{5}) \cdot \sigma}{4\pi r} \bar{B}$ and are filling up the entire universe .

The-monads $a = \sqrt[3]{\frac{1}{k \cdot f^2}} = \sqrt[3]{\frac{1}{k \cdot f^2}} = \sqrt[3]{\frac{h^2}{k \cdot E^2}}$ and $\sqrt[3]{\frac{h^2}{g \cdot E^2}}$, the corresponding cave a is for ,

$$1 \text{ cal} = 4,184 \text{ J} \rightarrow a^3 = \frac{43,906526 \cdot 10^{-68}}{9,808238 \cdot [4,184]^2} = 25,57141 \cdot 10^{-66} \text{ and } a = 2,94612764 \cdot 10^{-22} \text{ m}$$

$$1 \text{ KWh} = 3,6 \cdot 10^6 \text{ J} \rightarrow a^3 = \frac{43,906526 \cdot 10^{-68}}{9,808238 \cdot [3,6 \cdot 10^6]^2} = 34,54085 \cdot 10^{-78} \text{ and } a = 3,2566994 \cdot 10^{-26}$$

$$1 \text{ eV} = 1,6022 \cdot 10^{-19} \text{ J} \rightarrow a^3 = \frac{43,906526 \cdot 10^{-68}}{9,808238 \cdot [1,6022 \cdot 10^{-19}]^2} = 1,74383 \cdot 10^{-30} \text{ and } a = 1,2036536 \cdot 10^{-10}$$

$$1 \text{ Btu} = 1054,35 \text{ J} \rightarrow a^3 = \frac{43,906526 \cdot 10^{-68}}{9,808238 \cdot [1054,35]^2} = 40,268748 \cdot 10^{-75} \text{ and } a = 3,42759401 \cdot 10^{-25} \text{ m}$$

$$1C = 1J/1V \rightarrow a^3 = \frac{43,906526 \cdot 10^{-68}}{9,808238 \cdot [1]^2} = 44,764947 \cdot 10^{-69} \text{ and } a = 3,55068947 \cdot 10^{-23} \text{ m}$$

$$1Ah = 3600J/V \rightarrow a^3 = \frac{43,906526 \cdot 10^{-68}}{9,808238 \cdot [3600]^2} = 3,4540853 \cdot 10^{-75} \text{ and } a = 1,511626 \cdot 10^{-25} \text{ m}$$

$$1eV = 1,6022 \cdot 10^{-19} \text{ C/V} \rightarrow a^3 = \frac{43,906526 \cdot 10^{-68}}{9,808238 \cdot [1,6022 \cdot 10^{-19}]^2} = 1,74383 \cdot 10^{-30} \text{ and } a = 1,2036536 \cdot 10^{-10}$$

$$1C/V = 6,2415099 \cdot 10^{-20} \text{ J} \rightarrow a^3 = \frac{43,906526 \cdot 10^{-68}}{9,808238 \cdot [6,2415 \cdot 10^{-20}]^2} = 1,1491 \cdot 10^{-27} \text{ and } a = 1,04741769 \cdot 10^{-9}$$

In (2). Is formatted the Energy-Space of M-P vibration of opposites which creates a wave which has an Electric, \mathbf{E} , and an Magnetic component, \mathbf{H} , perpendicular each other and is as $[E^2 + H^2] = 2 \cdot (2r) \cdot c \cdot \sin 2\varphi$ on where **does Not-exists the Skin-effect** and this because of the Geometry-Structure, the **Tack-Geometry**. This Property of Periodic motion in M-P conserves **The Inner-Magnetic-Wave**, into the Centre of mass-Charges with a changeable Spin, S , between, $-S$, to $+S$, resulting to a Stationary-State. i.e. it is a continuous $-S + S = 0$, torsional equilibrium, where Charge is equal to the Angular Momentum-vector per Unit-Plane or $S = AM / \pi = r m v = [a m c] / \pi \rightarrow \text{Spin } S = [\frac{amc}{\pi}]$

Above **Double-Orbital-Periodic motion** $[\oplus \leftrightarrow \ominus]$ in a Material-Point is the eternal-Curve-line-motion of the \oplus constituent to the \ominus constituent in the two x, z , axis of motion. Considering the distance of motion be, the diameter of the cave, $l = 2r$, then velocities as angular velocity, w , and velocity, v , under the condition $y(2r, 0) = 0$, then leads to Energy-equation $\sin \frac{2rw}{v} = 0$, or $w_n \frac{2r}{v} = \frac{4\pi r}{\lambda} = \pi = \frac{4\pi r f}{v}$, where $n = 1, 0$, $\lambda = \frac{c}{f}$ is the wavelength and, f , is the frequency of oscillation, *i.e.* The, $n = 1$, defines **a Normal mode vibration** with natural frequency by $\rightarrow f_n = \frac{v}{4r} = \frac{\sigma}{8r} [1 + \sqrt{5}] \dots (n)$ *i.e. Normal mode vibration is an Energy - cave* (the 2 modes of f_n) in where, Energy as Spin is stored and distorted. Above relation (n) denotes the Material-point Energy-cave or Oscillations or and monads which are the Quantization of frequencies as the harmonics f_1, f_0 , of cave, $r = l$, depended on, σ , only as in Figure 8-(2).

The rotating axis, $l = 2r = \mathbf{KK}_1$ in Material - point, creates the Linear vibration of string, l , which is $K \equiv [\oplus] \leftrightarrow K_1 \equiv [\ominus]$ and the Natural - frequency f_1 , in points, K, K_1 , or the Rotational vibration of string which is $[K \equiv \oplus s^2 < \cup \cup K_1 \equiv \ominus s^2]$.

In cave of radius, r , the correlation of \rightarrow **Natural frequency f_n** , becoming from the **Linear vibration of string**, and \rightarrow **Spin equal to the Angular - momentum Vector \bar{B}** , becoming from the **Rotational vibration of string** as, **Spin $\equiv \frac{E}{w} = \bar{B} = [r \cdot \sigma \cdot (1 + \sqrt{5})]$** and **Natural-Frequency $f_n = \frac{n \cdot v}{4r} = \frac{n \sigma}{4r} [1 + \sqrt{5}]$** , where **Spin $\equiv \bar{B} = [r \sigma (1 + \sqrt{5})] = (\frac{4r^2}{n}) \cdot f_n = 2r \cdot \sigma \Phi$** and, $\frac{\bar{B}}{f_n} = (\frac{4r^2}{n \sigma}) = \text{Constant for each cave}$, and **Frequency $\equiv f_n = (\frac{1 \sigma}{4r^2}) \cdot \bar{B} \rightarrow$ i.e. Energy-caves are Stationary Wave-Fringes.**

In Material point and for the **Periodic-Orbital-motion** issues the **Task-Geometry** i.e. the tracks of the Electric-lines-Pattern are closed loops, **Curve-straight-lines**, and because of the Voltage between the ends, is created the motion as an Eternal rotation of the $[\oplus]$ constituent towards $[\ominus]$ constituent, [The opposite issues for Rotational motion where then and because of Stress, σ , is created the Centrifugal-Force F_f]. Because $f_1 = (\frac{1 \sigma}{8r^2}) \cdot \bar{B}$ and $\bar{B} = \text{Angular-Momentum} = \pm \bar{B}$ so, Stress $\sigma = \pm \sigma$, also and $AM = 0 \rightarrow AM$ and Spin is equal to $AM / \text{Unit-Area} = AM / \pi$, and because of the closed One-way-loops, **Spin is also either Positive or Negative** as $\rightarrow \text{Spin} = \pm AM / \pi$.

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] **Reciprocating**, and the Revolving motion [$\oplus \cup \cup \ominus$] 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 $p = q.ds = \oplus[\leftrightarrow] \ominus$ in an Electric-field [**The Tack-Geometry**]. Energy is captured in this Box **B_p** \equiv **Conductor** , 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 as this is case [$\rightarrow \leftarrow$] $\equiv 0$ with a Stationary constant Dipole-moment $\bar{p} = (AM) / \pi$.

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* **AB** , and as this is the **Quaternion AB** \equiv Box **B_R** carrying the Principal stress σ between , $A\oplus$, $B\ominus$, which stress σ as Centripetal acceleration is the Centripetal-force and 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 out-wave carry the Box $AB \equiv B_R$.

Because of the two different motions , *the Revolving and the Excitation* , acceleration of Gravity $g \equiv \pm \sigma$ and this *because are both pressures* , exists in the First motion in the Box-**B_R** only while in the Second Box-**B_p** is followed the Local- Extreme -case of the Dipole-moment \bar{p} , in the Tack-Geometry Pattern .

i.e. The External-stress , g , of Box-**B_R** , acts on the Internal-Spin , $S = \bar{p}$, of Box-**B_p**. This **acceleration of Gravity** $g \equiv \pm \sigma$ **is altered Locally by changing the Principal stress σ** , from an \rightarrow **Local-Uniform-Pressure** $g_L . k_L \equiv g k = g . [\text{Force/Area}] = G$, i.e. **it is , the minimum Local-energy** . Photon's Box-**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 G , that is proportional to the Product of the Point-masses and inversely proportional to the square of the distance between them.**

This force G was later called Gravitational constant and is directly related to the acceleration g , where g was proved to be the minimum-energy quanta-stress in a cave , **Force P** , in Material body appears as **Kinetic energy** , In an Elastic surface is appearing as **Principal and Shear stress** , In a Material line or segment as **Tension** , in Euclid line becomes **velocity on line** or , a **Free Velocity moving Line - Segment** , or a moving **Vector** (quaternion \equiv monad) , In-Particles as an **Electromagnetic wave** in cave $r = \lambda/2$, Out- Particles as an system $S \equiv$ **Electromagnetic-Radiation with n , frequencies in**

λ_N as { [$S \equiv B_p \equiv EM-R \equiv f_{1=N} , f_2 , f_3 , f_D , f_n = w^2$] and $\lambda_N = \frac{8.r.c}{n\sigma^2.(1+\sqrt{5})} = \frac{8.r^2.c}{n\sigma B}$]} .

A force **F** , is a Vector with Properties *Magnitude* and the *Direction* . A force is acting on a surface A , when is spread in the surface differently is acting on a Point of this Surface . Two Equal or Unequal and Opposite forces acting on the same Point of a straight line can move across this line **Penetrating** each other , and continue to **move forever** on opposite directions , $\leftarrow \rightarrow$, of the same straight-line .

Question ??? How can Two Opposite and equal forces can continuously act each other without moving .

The answer is that , → *is Needed a Small - Surface , a Layer , in which Work as Energy Produced can be Spread and Stay.*

Stress σ , is the Unit-Force spread on the surface A , called *Bedding-Layer* , where issues $F = \sigma A$. From Newton`s second Law of motion , force $F = m g$, where , m , is the mass of an object on which force is applied , and g is the acceleration of the mass . The small Surface is not Zero , but a Quantum as a Material-point is .

The above notation agrees with Euler - Cauchy Stress Principle Stress-Vector where each *Surface-force* σ , and *Body-force* G , formulate a Tensor-field where σ denotes the Normal to the Surface . From above , $\sigma A = m g$, or $m = \sigma .(A/g)$, and so

Body-Force → **is Spread-Out in a Layer** → **Surface-Force** or ,

Force G -Over-area- A → $\{m * d\vec{\sigma} \equiv \text{Surface-force}\} \rightarrow \sigma \equiv \text{Stress}$

where , $m \equiv$ *is the meter of the Reaction to the motion at a Point* \equiv The center mass
The distance r , becoming from a UNIT velocity-vector magnitude \bar{v} , and the Scalar time T , consists the two vectors equal each other , or $\bar{v} = \bar{r}$,

The Work produced during motion is Stored into the Surfaces , A_1, A_2 , *the Layers* in order that the System of - *Forces-Displacement* - is Stationary , differently IF-Not and Stored in force F , System would be in motion . The total Kinetic Energy is as

$$E = \frac{1}{2}.m_1.v_1^2 + \frac{1}{2}.m_2.v_2^2 \quad , \text{ and because } v_1 = v_2 = v , \text{ then } E = \frac{v^2}{2} [m_1 + m_2]$$

and since $m_1 = \frac{F}{g_1}$, $m_2 = \frac{F}{g_2}$, $\bar{v} = \bar{r}$, and Unit Work $E = 1$, then becomes ,

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

The Unit force F , between Two masses of constant Distance r , is Proportional to a Constant and Minimum Acceleration g , where $g \equiv 9, 8076941$, and is inverse square to the distance as , $F = \frac{g}{r^2}$, and thus **Gravitational-Constant Force $\equiv G$, is Spread on a minimum-Surface that of , g , the Layer of masses becoming from the **M-Points-centripetal-acceleration** , and is acting on all masses of the universe .**

Gravity constant g was proved to be **The minimum Granular-Quantized Energy** , becoming from the *Gravity-frequency* f_g , and is frequency representing the Basic-Quantum-Raw material of the Energy structures .

It was shown that the Momentum vector \bar{B} , and because it is following the Stationary Wave - Nodes Principle in Material -Point , creates the minimum quantized Energy which is conserved in lobes . This Property is extended also to the Number of lobes as well as to , π , number which is the min-Unit-Number relating Lines and Surfaces . From above is defined that → $G = g . k$ and $g = G / k \dots(1)$, where , 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 $\rightarrow k = \frac{\text{System Area}}{\text{System Mass}} G$ where $\rightarrow \frac{1}{g} = \frac{k}{G} = \frac{\text{System Area}}{\text{System Mass}} \dots\dots(2)$

From (2) is seen that at **Relative - Systems** Specific-Unit-proportional-coefficient k_R , is always constant and related to the Universal constant gravity g .

Taking **[1/g]-Earth-Unit-coefficient, 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 $g_G = 9,8076925$, of Equation (5) is Universal, and issues for all Systems of Granular universe, while the values of Unit k , k_R depends on location and issues for any System separately, and this because of the Periodic Excitation. With this logic, Newtonian constant, G also, issues for Coulomb-Dipole Systems and is in these Systems as above related to g_G as $\rightarrow G = k_E g = g \cdot k_R g_R$

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 $k_E = \frac{[6,378 \cdot 10^6]^2}{5,9723 \cdot 10^{24}} = 6,811551810^{-12}$ and

$$G = g k_E = 9,8076925 * 6,8115518 \cdot 10^{-12} = \mathbf{6,680561 * 10^{-11}}$$

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 = $2,440 \cdot 10^6$ m then , Mercury-constant $k_{Me} = \frac{[2,44 \cdot 10^6]^2}{3,3 \cdot 10^{23}} = 18,041212 \cdot 10^{-12}$ 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 = $6,073 \cdot 10^6$ m then , Venus-constant $k_{Ve} = \frac{[6,073 \cdot 10^6]^2}{4,867 \cdot 10^{24}} = 7,5778362 \cdot 10^{-12}$ and

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

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

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

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 $\rightarrow g_{Mw} = \mathbf{1,892. g_E}$

i.e. nearly twice that of earth .

For Andromeda-Galaxy-System mass $M_{AG} = 3,4 \cdot 10^{38} \text{ Kg}$ and for the Area
 Black-hole Radius $5 \cdot 10^{11} \text{ m}$, then

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

$$g_{AG} = \frac{k_E}{k_{AG}} = 6,81155 \cdot 10^{-12} / 7,353 \cdot 10^{-16} = \mathbf{9,264 \cdot 10^3 g_E = 9264. g_E}$$
 i.e.

For Earth-Unit-coefficient $k_E = 6,81155 \cdot 10^{-12}$ and the Andromeda-Unit
 coefficient $k_{AG} = 7,353 \cdot 10^{-16} \text{ m}^2/\text{Kg}$ and Gravity acceleration of
 Andromeda-Galaxy is $\rightarrow g_{AG} = \mathbf{9264. g_E}$

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

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

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

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

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

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

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

$$g_{BH} = \mathbf{2,872 \cdot 10^{-10} g_E}$$
 , an expected explanation .

For all Planes issues $G = k_E g = g \cdot k_L g_L$, and for Black-holes also where ,
 $G = g \cdot k_{BH} \cdot g_{BH} = 9,8076925 * 2,3716 \cdot 10^{-2} * 2,872 \cdot 10^{-10} = \mathbf{6,6805605 * 10^{-11}}$

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 , $\mathbf{2 \cdot dS = constant =}$

$\mathbf{k} = \bar{\mathbf{r}} \times \mathbf{d}\bar{\mathbf{r}}$ and *Energy is Stored into its area* .

Since Photon is Particle as $[\bar{\mathbf{v}} = \bar{\mathbf{c}} = \lambda f]$, then **Energy** \equiv **Work** produced in motion is stored into its , **Velocity-vector** $\equiv \bar{\mathbf{c}} = \lambda f \equiv \mathbf{f}_R = [\mathbf{B}_{PH} \equiv \mathbf{f}_{1=N} , \mathbf{f}_2 , \mathbf{f}_3 , \mathbf{f}_R \equiv \mathbf{W}^2]$ $\equiv [E^2 + H^2] = 2(2r).c.\sin 2\varphi$, where $\mathbf{f}_R \equiv \mathbf{f}_N$ is the **Natural-Frequency** $f_n = \frac{n.v}{4r} = \frac{n\sigma}{4r} [1 + \sqrt{5}]$ and consists the moving Storage of Photon . *The carrier of Body*

\mathbf{B}_{PH} is the **Outward** $\bar{\mathbf{c}} = \lambda f$, **Electromagnetic-Wave** $\rightarrow \{[\varepsilon E^2 + \mu B^2] = 2.\lambda c.\sin.2\varphi\}$ and the Resonance for communication with all other .

- 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 Conic-sections , and kept in its Wavelength-Tank $2r = n \lambda$, the Linear motion , continued by the Propagating Electromagnetic-Wave \equiv The conveyer of storage.*
- 3.. Since Gravity force results to Gravity-acceleration $\mathbf{g} = 9,8076925 \text{ m/s}$ and to the Gravitational-constant $G = 6,680561.10^{-11} \text{ N.m}^2 / \text{Kg}^2$, then is proved that becomes as acceleration of the Material point i.e. from the first mass .In order that Force G act on masses is needed to create a pressure coefficient \mathbf{k}_E in order that , $G \rightarrow \mathbf{g}.\mathbf{k}_R \mathbf{g}_R = \mathbf{g}_G = s[\frac{\pi r v^4}{2}]$ of Material-point in [MFMF] Chaos and , *therefore , \mathbf{g} , Is The only one Universal minimum quantized Energy-Stress-Quantity* , The Energy Quanta as the Layer Granular-Row-material , *a Constant in all the Rotating and Periodic Excitation Systems , while G which is related to \mathbf{g} , is the Universal Force acting on all masses of Universe* , and the between them , *through the local and Constant manifestation Stress on masses* , \mathbf{g} , a Unit-Force quantity, \mathbf{g} , the Stress , *in all moving and Stationary Systems as equation $G = \mathbf{g} . \mathbf{k}_E = \mathbf{g} . \mathbf{k}_R \mathbf{g}_R$*

G.. 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 Dis placement 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 $[(+)\cup\cup(-)]$. *Revolving motion* may exist between Space (+) and Anti-Space (-) so Revolving of Two-Points $A[\oplus \equiv +]$ and $B[\ominus \equiv -]$ 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 Dipole acceleration and is equal to the **Gravity** $\mathbf{g} = \sigma$. Periodic excitation between Space (+) and Anti-Space (-) may exist only as collision of opposite , or **Tack-Geometry** so Energy is captured in Box \mathbf{B}_P containing the three elements $[(+) , [\leftrightarrow] , (-)]$ without the inner acceleration \equiv Gravity \mathbf{g} , but the Material-extreme-case of the Periodic acceleration $[\leftrightarrow] = 0$ and which is the , *Reciprocating-Spin-motion* . Since motion \equiv Work \equiv Energy and is continually produced in , The Material-point \mathbf{B}_R 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 the Gravity $g \equiv \pm \sigma$ is altered Locally by changing the Principal-stress σ with an Inverse-Local-uniform-Pressure $\mathbf{g}_L \equiv g k = g \sigma = g \cdot [\text{Force} / \text{Area}] = G$, i.e. G is the minimum Locally manifested , *force on masses*, which is the known as the
 \rightarrow **Universal Gravitational constant** $G = g k = g k_E = g \cdot [g_L k_L] = k_L \sigma \leftarrow$

So ,The External-stress , \mathbf{g} , of Box- \mathbf{B}_R , acts on the Internal-Spin , $S=\bar{\mathbf{p}}$,of Box- \mathbf{B}_P .

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

In **Tack-Geometry** ,Energy is captured as **Dipole-Angular-Momentum-Vector-Spin** containing the three elements [(S =+),[E = \leftrightarrow],(A-S = -)] while vibration \mathbf{f}_n , in the Energy-Space-monads , \mathbf{g} , π , creates the *Electron* , e , and *Charges* , q .

In *Newton`s law* , \mathbf{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* ,the standard Universal gravity Stress-constant \mathbf{g} ,was theoretically proved to be the Granular-Layer-acceleration $g \equiv 9,8076941 \text{ m/s}^2$ as the **minimum quantized-Work** and **Stress** in Material point of any , \mathbf{r} , cave . [72] Constant $\mathbf{G} = \mathbf{k}_E g$, is a Force **acting through** \mathbf{g} and as the **Stress** , $\mathbf{g} \rightarrow$ **is acting** on Monads \equiv [Quaternion \equiv Reaction to motions \equiv masses] , which interference \mathbf{g} , is the centripetal acceleration of the **Rotation** of \rightarrow Positive \oplus to the Negative \ominus constituent which is created in M-Point and not in Static Periodic motion [$\oplus \leftrightarrow \ominus$] of Box- \mathbf{B}_L .The Work produced from the **Golden-ratio-frequency** of **Photons** , **is equal to M-Point** and continuously **Kicked by** \mathbf{G} , to Start *everything in this world*.

i.e. The External-stress , \mathbf{g} , of Box- \mathbf{B}_R , acts on the Internal-Spin , $S=\bar{\mathbf{p}}$, of Box- \mathbf{B}_P .
 markos 30/12/2018

a.. 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 $G = g k = \mathbf{k}_L g = \sigma$ 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 $\mathbf{k}_E = \mathbf{r}_E^2 / \mathbf{m}_E = 6,8115518 \cdot 10^{-12} \text{ m}^3 / \text{N} \cdot \text{s}^2$ 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 $a = v^2/r \equiv 9,8076925$.

Gravitational constant $G = g k = 6,6805605 \cdot 10^{-11} \text{ m}^3 / \text{N} \cdot \text{s}^2$, is a force *becoming from* g , k *of each Relative-System* \mathbf{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** $\bar{\mathbf{B}}$, and which is equal to the **Golden-ratio-Spin** and stored in the r cave fix-ends , *as a* \mathbf{r} - **Stationary Wave** with the infinite **Golden ratio-frequencies** f_n , \mathbf{f}_{PH} , [$f_1 \dots f_n \rightarrow f_\infty$] $\equiv B_{PH} \equiv$ The Box $B_{PH} \equiv$ is 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 $\mathbf{a} = v^2/r \equiv 9,8076925$. in Material-point . [72]

Photon is a *Material-point*, Box B_R , with fix-ends **Inward-cave** \mathbf{r} , and which is the **Energy Storage** B_R , **Outward-cave**- \mathbf{r} is an **Electromagnetic-Radiation** on wavelength $\lambda = c T = c / f_p$ which EM-Radiation, *carries* the Box B_R .

Universal Gravitational constant $G = g k$ related to g, k_R , is a Force and through the **Static** g becomes 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 and which Coulomb inverse law is as $[\oplus \leftrightarrow \mathbf{r} \leftarrow \ominus]$ and or,

$F = k_c [q_1 \cdot q_2 / r^2] = k_c [\oplus \rightarrow \leftarrow \ominus] / r^2 = \frac{8}{\pi r(1+\sqrt{5})} \left[\frac{B}{r^2} \right]$, and Coulomb constant $k_c = 9.10^9 \text{ Nm}^2/\text{C}^2$, i.e.

Because of the Periodic excitation, between the **Space (+) and Anti-Space (-)**, $[\oplus \leftarrow \rightarrow \leftarrow \ominus]$, *would exists only collision of opposites*, But because of the Twin Task-Geometry, *it is the Material-Extreme-case of the Periodic-motion*, **issues the Coulomb Dipole-law where Static-Stress** g , *becomes from the Stationary constant Dipole moment* $\bar{\mathbf{p}} \equiv \bar{\mathbf{B}} \equiv$ as **momentum** analogous in the Revolving motion where

issues $\rightarrow G = g k = \mathbf{k}_E g = g \cdot \mathbf{k}_R \mathbf{g}_R = \bar{\mathbf{p}} \cdot \mathbf{g}_c = \sigma = \frac{\text{Force}}{\text{Area}} = \frac{\text{Mass}}{\text{Area}}$

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

$= 6,378 \cdot 10^6 \text{ m}$, then Earth-constant $\mathbf{k}_E = \frac{R_E^2}{M_E} = \frac{[6,378 \cdot 10^6]^2}{5,98 \cdot 10^{24}} = 6,811551810^{-12}$ and

$G = g \mathbf{k}_E = [9,8076925] \cdot 6,8116 \cdot 10^{-12} = 6,680561 \cdot 10^{-11} \text{ m}^3/\text{N} \cdot \text{s}^2$ becoming from g, \mathbf{k}_E only, i.e. G as force pushes $\rightarrow g$ as Stress energy in $\rightarrow \mathbf{k}_E$.

Summary :

1.. Gravitational Force ,G, is the Force which every Object in the Universe exerts on every other, *whether small or big* and is equal to $F_{\text{grav}} = \frac{G \cdot M \cdot m}{d^2} = \frac{g \cdot R_E^2 \cdot M \cdot m}{M d^2} =$

$\frac{g \cdot R_E^2 \cdot m}{d^2} = \frac{m g \cdot R_E^2}{d^2}$, and $G = \frac{g \cdot R_E^2 \cdot M \cdot m \cdot d^2}{M d^2} = \frac{g \cdot [R_E^2]}{M} = g \cdot k_E$ where $k_E = \frac{g \cdot [R_E^2]}{M}$

$g =$ 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) $\rightarrow k_E = r_E^2 / m_E$, For Bodies (B) $\rightarrow k_B = r_B^2 / m_B$,

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

2.. Coulomb Electrical Force , $F_{\text{elect}} = k_c \frac{Q_1 Q_2}{d^2} = \frac{[\oplus \rightarrow \leftarrow \ominus]}{d^2} = \frac{8}{\pi r(1+\sqrt{5})} \left[\frac{B}{r^2} \right]$, where Coulomb constant $k_c = 9 \cdot 10^9 \text{ Nm}^2/\text{C}^2$, in where issues the Tack-Geometry.

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

4.. The Work done in Material points, needs a Path to exit from Box $\mathbf{f}_R = [\mathbf{B}_{PH}] \equiv [\mathbf{f}_{1=N}, \mathbf{f}_2, \mathbf{f}_3, \mathbf{f}_R = \mathbf{w}_N^2] \equiv [E^2 + H^2]$, and from where is then 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 Storage** \mathbf{r} , in **System**, and change the Inner-Structure of this System to another or destroy it .

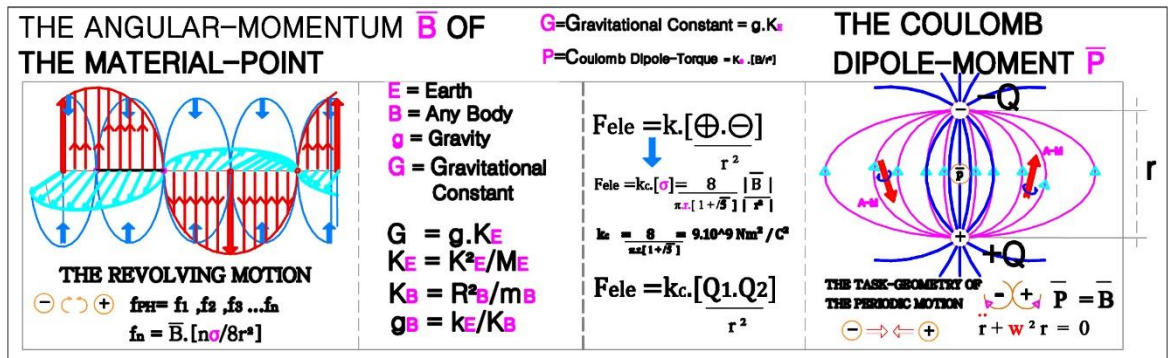


Figure – 9 .

The Two types of motions , for The Space \oplus and Antispace \ominus , to form , g and G .

In (1) , is shown how Centripetal acceleration , $\vec{a} = v^2/r$, creates in cave r , Spin S , Gravity g , and Newtonian constant of Gravitation G .

In (2) , issues the Tack-Geometry , and is shown How Spin is created in Electric field from Gravitation $G = k_e \cdot g$, Charge-equation $\rightarrow \vec{q} \equiv \frac{m_e c^2}{2} = \frac{g c^2}{8\pi f^2}$ and Voltage

$\vec{V} \equiv V_p \equiv \frac{c \cdot \vec{q}}{h}$. The Spin = B / π and Electrons-equation of motion of $\oplus \rightarrow \ominus$ is $\ddot{\vec{r}} + \omega^2 \vec{r} = 0$ and the Solution of equation is $\rightarrow 4\pi \cdot f_e^2 \cdot m_e = g$, which is **Electron** .

b.. The Golden-ratio – frequency Φ .

In the next Figure-10 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 .

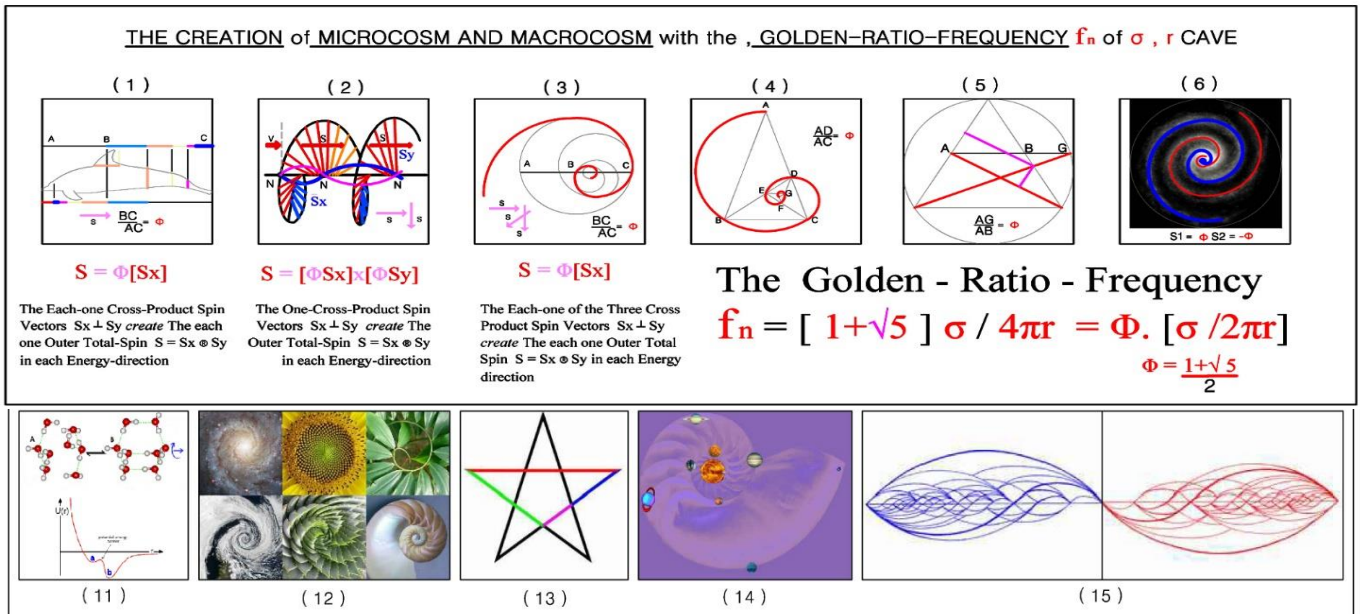


Figure-10. The How **Golden-ratio-frequency** is kicking microcosm and macrocosm.

In F- 10 , 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 the 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 \rightarrow From velocity vectors , to Animals , to comets to all expanding universe
- (2) Two-Vectors \rightarrow From Photons , to Pine-cone , Plants , to Galaxies , to expanding universe ...
- (3) Three-Vectors \rightarrow From Sub-atomic particles , to DNA molecules , to Inorganic Chemistry, to Elliptical Galaxies , to expanding universe
- (4) Three -Vectors \rightarrow From Elements ,molecules ,Fruits , to Milky-Wave , Galaxies , Galaxies-Cluster to
- (5) Tree -Vectors in a Circle \rightarrow From Elements , molecules , to Fruits , to Milky-Wave Galaxies , to all caves and to expanding universe ...
- (6) N-Vectors in a Circle \rightarrow 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 Pattern* .

- (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** .

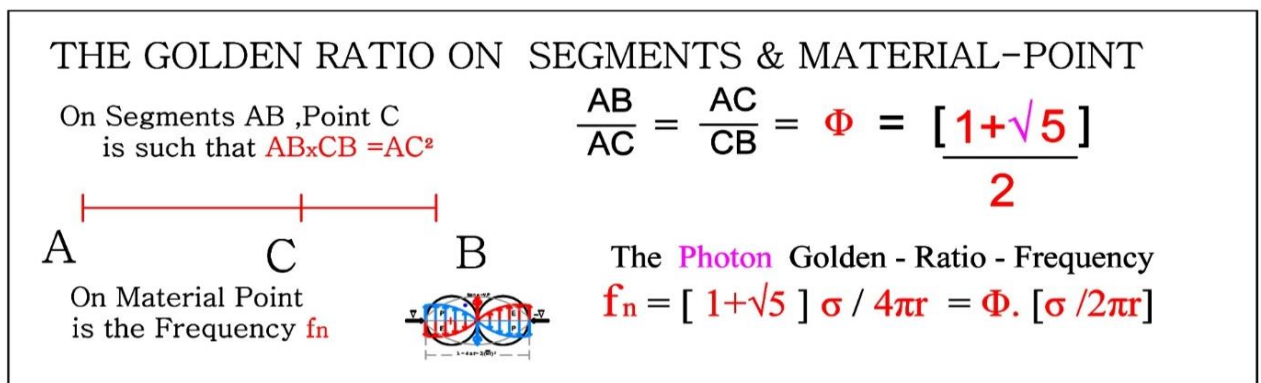


Figure - 11 . The Golden ratio Φ on Segment AB , is at point C , while on the

Material point $[\oplus \cup \ominus]$ is on Principal Stress σ , as frequency

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

in Material-point and cave 10^{-62} m exists as **The-Golden-ratio pattern**. **and Under-Planck`s-level 10^{-35} m** .

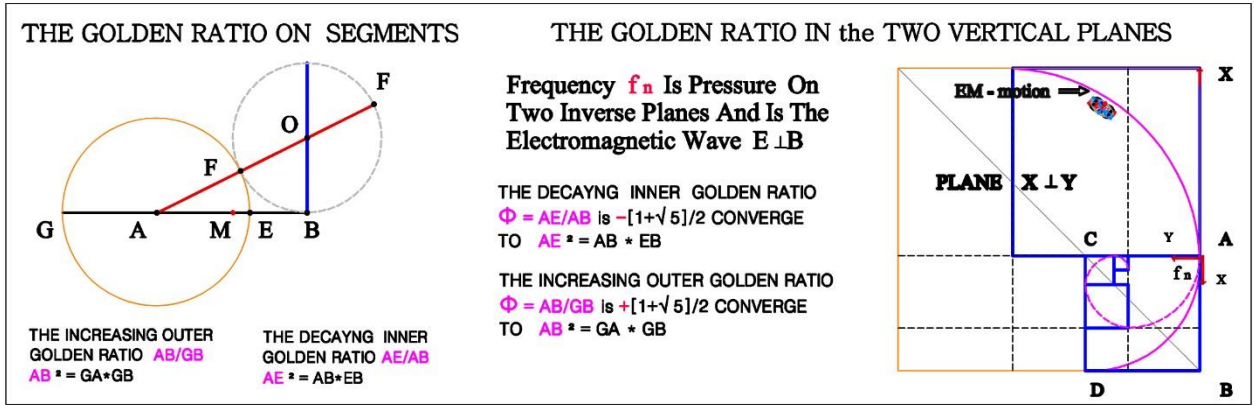


Figure - 12 . The Golden ratio Φ on Segment AB , and on Perpendicular-Planes .

c.. The Extreme and Geometric-Mean ratio :

In figure - 11 , 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 $AC^2 = AB.CB$
 $= AB.[AB-AC] = AC^2 = - AC.(AB) + AB^2 \rightarrow AC^2 + AC (AB) - AB^2 = 0$ (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 , and Shear stresses τ_{12} are as equation $\sigma = \sqrt{(\sigma_1 - \sigma_2)^2 + 4 \tau_{12}^2}$, and

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

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

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

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

Equation (4) denotes the way that Stresses $\sigma_{1,2}$ are shaped on any Volume according to the Principal Stress σ , and which **is the Golden-ratio** $\Phi = \frac{\sigma}{2} [1 \pm (\sqrt{5})]$ of Stress σ . Since also **Stress σ** eternally exists in Material point and **is of the Golden-ratio-pattern** Φ , therefore microcosm and sequence all macrocosm follows , **the Stress σ , Property** , of the \rightarrow Growing-Golden-ratio-pattern Φ as this is in ,

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

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

d.. 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** ,

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

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

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

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

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

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

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

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 $\rightarrow \mathbf{1} \equiv \text{New Quaternion}$ and the first continuous to be of the same Identity , **frequency f_n** , as before and from Euler`s , *rigid body dynamics work* $W = 2L = \bar{B} . \bar{w} = J . w^2 \equiv h . f_n \leftarrow$ i.e.

The Frequency of Photon , embodied with the \rightarrow Growing-Golden-ratio-pattern Φ Uses the Vibrating Physical Structures , the Granular Material-Instruments , to Kick Start all of them and everything in this world . The How is in Figure – 11-20 .

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. $b^n = b.b.b.b.....b$, **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 $\bar{z} = x+iy$ issues $\rightarrow \ln \bar{z} = \ln r + i\theta = \ln |\sqrt{x^2 + y^2}| + i \cdot \text{atan2}(y/x)$
 From logarithm Property $\log(z^{-1}) = \ln(1/z) = -\ln z$, and angular velocity $w = 2\pi \cdot f$
 issues, $\log([-1]^{-1}) = -\ln[-1] + 2\pi \cdot i = -\pi \cdot i + 2\pi \cdot i = \pi \cdot i = \ln[-1] = \frac{w}{2f}$ (8)
 From relation $x = e^{\ln(x)}$ then $x^n = e^{\ln(x) \cdot n}$ 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 **AE² = AB.EB** and
AB² = GA . GB(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, \rightarrow **becomes the Outer AB**, as the Whole.
This Augmentation-Property, the Geometrical-Growth, **of the Part-to-Whole**, of
 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 k_E** = 9,8076925.6,8116.10⁻¹² = **6,680561.10⁻¹¹** m³/ N.s²

and from relation **1 = c . r³ . f_p²** $\rightarrow f_p = \sqrt{1/cr^3}$ 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.

Golden-Ratio Property belongs to Geometry and is Followed by nature in all extend of
 microcosm and macrocosm because Geometry is the Stationary-Space-Part.

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-unit-Layer 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** $\{ [\pm s^2] \equiv [\text{MFMF}] \equiv \text{The Chaos} \}$, 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 $k_L = \frac{\text{System Area}}{\text{System Mass}}$ G
 Gravity **g** is of the **Golden-ratio-pattern Φ** .

From relation $\rightarrow g_L = k_E / k_L = [g/G] / [k_L]$, *issues* $\rightarrow \mathbf{g} \cdot \mathbf{g}_L \cdot \mathbf{k}_L = \mathbf{G}$, i.e.

Newtonian Constant of Gravitation is equal to the product of Gravity and Local-gravity or $\rightarrow \mathbf{g} \cdot \mathbf{g}_L \cdot \mathbf{k}_L = \mathbf{G} \rightarrow \text{Gravity} \times \text{Local-gravity} \times \text{Local constant}$ where *The-Local-Gravity* \mathbf{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 $\mathbf{g} = \frac{T^2}{a^3}$, $\mathbf{G} = \mathbf{g} \cdot \mathbf{g}_L \cdot \mathbf{k}_L$, $\mathbf{f}_P \equiv [\frac{1+\sqrt{5}}{2}] \frac{\sigma}{2\pi r} = \sqrt{1/cr^3}$, $\mathbf{T}_P = \sqrt{cr^3}$, $T_P^2 = c r^3$
issues $\mathbf{G} = \mathbf{g} \cdot k_E = \mathbf{g} \cdot [\mathbf{g}_L k_L] = [\frac{T_P^2}{a^3}] \cdot [\mathbf{g}_L k_L] = [\frac{c \cdot r^3}{a^3}] \cdot [\mathbf{g}_L k_L]$ (G)

and because exists $\rightarrow \text{Force} = \text{Mass} \cdot \text{Acceleration}$ then , \mathbf{G} is the only Force where

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

e.. The Acceleration Growth in Material point :

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

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

Then $w = \sqrt{2\pi f_R} = 2L / \bar{B}$ and Wave Equation is $y = 2A \cdot \sin(\frac{2\pi \cdot x}{\lambda}) \cdot \cos wt$ (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 ,

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

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

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

Equation (b) is the equation of the Outer Electromagnetic wave ,denoting that the Electric field travels with light velocity $c \rightarrow$ directed to \vec{k} . Magnetic field travels with light velocity also , $c \rightarrow$ directed to \vec{k} , and is in phase with Electric field .

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

$w = \frac{2\pi}{T} = 2\pi \cdot f_N \equiv [\frac{1+\sqrt{5}}{2}] \frac{\sigma}{2\pi r}$, which continuous to follow *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 $k = \frac{1}{f_n^2 \cdot a^3} \rightarrow$ or $1 = k \cdot f_n^2 \cdot a^3$ then cave-Semi-major-axis

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

From (c) is seen that Resonance-frequency f_R follows the

Growth-Golden-Ratio-Pattern .

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

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

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

a.. The Planck`s length L_p :

Why Rotational energy $\bar{A} \equiv$ **Angular momentum vector** , is Elastically damped in monad $\lambda_2=10^{-35}$ m as \rightarrow mass \mathbf{m} , velocity $\bar{\mathbf{v}}$, angular velocity $\bar{\mathbf{w}}$, and finally as a **Constant Frequency** , \mathbf{f} , which is dissipated in the fundamental particles (Fermions and Bosons) by altering the two variables , velocity $\bar{\mathbf{v}}$ and wavelength λ , only ???

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

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

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

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

where \mathbf{z}^w =The Space , and $\mathbf{z}^{1/w} = \mathbf{z}^{-w}$ The Anti-space of Monad \equiv Quaternion \bar{AB}
Above equations define the Wave-nature of monads in all Levels or Sub-levels .

From above monads ($s + \bar{\mathbf{v}} \nabla i$) $^{1/w} = |z_0|^{-w} . e^{-i.(\varphi+2k\pi).w}$, where $\cos \varphi = s / |z_0|$ and for **the Rotated Energy case** , where $s = 0$ and $\cos \varphi = 0$, exists for angle $\varphi = \pi / 2$ quaternion ($s + \bar{\mathbf{v}} \nabla i$) $^{1/w}$ **as dimension power** $\rightarrow \mathbf{w} = \mathbf{b} \leftarrow$ **and for $\mathbf{k} = \mathbf{1}$** becomes ,

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

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

Equation (3) is the smallest **Energy-Unit of Space** , and this because of $\mathbf{s} = \mathbf{0}$ and $\mathbf{k} = \mathbf{1}$ It was shown [31] that Space and Energy is quantized and measured on the two Constant and Natural numbers , e , π , where for base the natural logarithm , e , and exponent the decimal base , $b = 10$.

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

for $\cos.(\varphi+k\pi)/w = 0$ then exists only the Imaginary part of monad , ($\bar{\mathbf{v}} \nabla i$) $\neq 0$, where $\varphi = \pi / 2$ and then ,

$$\mathbf{z}^{1/w} = |z_0|^{-w} . e^{i.(\varphi+k\pi)/w} = e^{-i.(\frac{\pi}{2}+k\pi).10}$$
 and it is the **Diffraction Energy mechanism**

for all Space Levels of quantization which are **Energy Particles only** i.e.

The Energy particles in Stationary caves as

$$z^{1/w} = |zo|^{-w} \cdot Lv = \text{Energy Monads} .$$

Extending quantization of Energy according to exponential formula ,

$$L_v = e^{-i.(5\pi/2).10^k} , \text{ on the decimal base } b = 10 \text{ then for } k = \pm 0 \rightarrow \pm \infty ,$$

is found the Energy caves as

$$\text{For base } e = 2,71828 \text{ and base } b = 10 \text{ then } e^{-13,8155} = 1 \cdot 10^{-6} \text{ m}$$

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

$$\text{For base } e = 2,71828 \text{ and base } b = 10 \text{ then } e^{-16,1181} = 1 \cdot 10^{-7} \text{ m}$$

$$\text{For base } e = 2,71828 \text{ and base } b = 10 \text{ then } e^{-46,0517} = 1 \cdot 10^{-20} \text{ m}$$

$$\text{For base } e=2,71828 \text{ and } k = 1 \text{ } L_v = e^{i.(- 3.\pi/2)b} \text{ then } e^{-47,12389} = 5,344 \cdot 10^{-21} \text{ m}$$

$$\text{For base } e = 2,71828 \text{ and base } b = 10 \text{ then } e^{-48,3543} = 1 \cdot 10^{-21} \text{ m}$$

$$\text{For base } e = 2,71828 \text{ and base } b = 10 \text{ then } e^{-78,2879} = 1 \cdot 10^{-34} \text{ m}$$

$$\text{For base } e=2,71828 \text{ and } k = 2 \text{ } L_v = e^{i.(- 5.\pi/2)b} \text{ then } e^{-78,5398} = 8,906 \cdot 10^{-35} \text{ m}$$

$$\text{For base } e = 2,71828 \text{ and base } b = 10 \text{ then } e^{-80,5905} = 1 \cdot 10^{-35} \text{ m}$$

$$\text{For base } e = 2,71828 \text{ and base } b = 10 \text{ then } e^{-108,221499} = 1 \cdot 10^{-47} \text{ m}$$

$$\text{For base } e=2,71828 \text{ and } k = 3 \text{ } L_v = e^{i.(- 7.\pi/2)b} \text{ then } e^{-109,9956} = 2,295 \cdot 10^{-48} \text{ m}$$

$$\text{For base } e = 2,71828 \text{ and base } b = 10 \text{ then } e^{-110,524085} = 1 \cdot 10^{-48} \text{ m}$$

$$\text{For base } e = 2,71828 \text{ and base } b = 10 \text{ then } e^{-140,457691} = 1 \cdot 10^{-61} \text{ m}$$

$$\text{For base } e = 2,71828 \text{ and } k = 4 \text{ } L_v = e^{i.(- 9.\pi/2)b} \text{ then } e^{-141,372} = 3,969 \cdot 10^{-62} \text{ m}$$

Which is the Gravity length .

$$\text{For base } e = 2,71828 \text{ and base } b = 10 \text{ then } e^{-142,760276} = 1 \cdot 10^{-62} \text{ m}$$

$$\text{For base } e = 2,71828 \text{ and base } b = 10 \text{ then } e^{-172,693882} = 1 \cdot 10^{-75} \text{ m}$$

$$\text{For base } e=2,71828 \text{ and } k = 5 \text{ } L_v = e^{i.(- 11.\pi/2)b} \text{ then } e^{-172,7876} = 9,593 \cdot 10^{-76} \text{ m}$$

$$\text{For base } e = 2,71828 \text{ and base } b = 10 \text{ then } e^{-174,996467} = 1 \cdot 10^{-76} \text{ m}$$

$$\text{For base } e = 2,71828 \text{ and base } b = 10 \text{ then } e^{-202,627488} = 1 \cdot 10^{-88} \text{ m}$$

$$\text{For base } e=2,71828 \text{ and } k = 6 \text{ } L_v = e^{i.(- 13.\pi/2)b} \text{ then } e^{-204,204} = 7,155 \cdot 10^{-89} \text{ m}$$

$$\text{For base } e = 2,71828 \text{ and base } b = 10 \text{ then } e^{-204,930073} = 1 \cdot 10^{-89} \text{ m}$$

$$\text{Planck's Length } L_p = e^{-i.(\frac{\pi}{2} + 2k\pi).b} = e^{i.(- 5\pi/2).10} = e^{i.(- 5\pi/2).10} = e^{-78,5398} = 8,906 \cdot 10^{-35} \text{ m}$$

$$\text{For base } e = 2,71828 \text{ and base } b = 10 \text{ then } e^{-78,2879} = 1 \cdot 10^{-34} \text{ m}$$

$$\text{For base } e = 2,71828 \text{ and base } b = 10 \text{ then } e^{-78,5398} = 1 \cdot 10^{-34} = 8,906 \cdot 10^{-35} \text{ m}$$

$$\text{For base } e = 2,71828 \text{ and base } b = 10 \text{ then } e^{-80,5905} = 1 \cdot 10^{-35} \text{ m}$$

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

$$= 1,616199 \cdot 10^{-35} \text{ m and Planck's cave } L_p = e^{i.(\frac{\pi}{2} + 2k\pi).b} = e^{-i.(\frac{5\pi}{2}).b} = e^{i.(- 5\pi/2).10} =$$

$$e^{-(78,5398)} = 8,906 \cdot 10^{-35} \text{ m} = \{ \sqrt{3} \cdot \pi \cdot 1,616199 \cdot 10^{-35} \text{ m} \} \equiv L_p = \text{Planck's Length} .$$

Extending quantization of Space and Energy according to exponential formula for min-

$$\text{acceleration then } \text{Planck's Length } L_s = e^{-i.(-\pi + k\pi).b} = e^{-i \cdot \pi \cdot (k-1) \cdot 10} \rightarrow e^{-(29,933606)}$$

$$\text{For base } e = 2,71828 \text{ and base } b = 10 , \text{ then } e^{-(29,933606)} = 1 \cdot 10^{-13} \text{ m Particles}$$

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

$$L_s = e^{i(-\pi).b} = e^{-i(-31,41593)} = 3,56237 \cdot 10^{-14} \text{ m}$$

For base $e = 2,71828$ and base $b = 10$ then $e^{-(32,236191)} = 1 \cdot 10^{-14} \text{ m length}$.

For base $e = 2,71828$ and base $b = 10$ then $e^{-(92,103404)} = 1 \cdot 10^{-27} \text{ m length}$

For base $e = 2,71828$ and $k = 1$,then $L_s = e^{i(-2\pi).b} = e^{-i(-62,83185)} = 9,31289 \cdot 10^{-28}$

For base $e = 2,71828$ and base $b = 10$ then $e^{-(94,405989)} = 1 \cdot 10^{-28} \text{ m length}$

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]

Extending quantization of the Massive Part according to the above exponential formula

$L_s = e^{i(-\pi \pm k\pi).b}$ on the decimal base $b = 10$ then for $\rightarrow k = \pm 0 \rightarrow \pm \infty$ becomes ,

$L_s = e^{-i(\pi \pm k\pi).b} = e^{-i.\pi(1 \pm k\pi).b} = e^{-i.\pi(1 \pm k\pi).10}$ and then ,

For base $e = 2,71828$ and base $b = 10$ then $e^{-(29,933606)} = 1 \cdot 10^{-13} \text{ m}$

Particles length

For base $e = 2,71828$ and $k = 0$ $L_s = e^{i(-\pi).b}$ then $e^{(-31,41593)} = 3,56237 \cdot 10^{-14} \text{ m}$

Proton

For base $e = 2,71828$ and base $b = 10$ then $e^{-(32,236191)} = 1 \cdot 10^{-14} \text{ m}$

For base $e = 2,71828$ and base $b = 10$ then $e^{-(92,103404)} = 1 \cdot 10^{-27} \text{ m}$

For base $e = 2,71828$ and $k = 1$ $L_s = e^{i(-2.\pi).b}$ then $e^{(-62,83185)} = 9,31289 \cdot 10^{-28} \text{ m}$

For base $e = 2,71828$ and base $b = 10$ then $e^{-(94,405989)} = 1 \cdot 10^{-28} \text{ m}$

For base $e = 2,71828$ and base $b = 10$ then $e^{-(156,575786)} = 1 \cdot 10^{-40} \text{ m}$

For base $e = 2,71828$ and $k = 2$ $L_s = e^{i(-3\pi).b}$ then $e^{(-94,24778)} = 7,81183 \cdot 10^{-41} \text{ m}$

For base $e = 2,71828$ and base $b = 10$ then $e^{-(158,878371)} = 1 \cdot 10^{-41} \text{ m}$

For base $e = 2,71828$ and base $b = 10$ then $e^{-(218,745584)} = 1 \cdot 10^{-54} \text{ m}$

For base $e = 2,71828$ and $k = 3$ $L_s = e^{i(-4.\pi).b}$ then $e^{(-125,6637)} = 4,93666 \cdot 10^{-55} \text{ m}$

For base $e = 2,71828$ and base $b = 10$ then $e^{-(221,048169)} = 1 \cdot 10^{-55} \text{ m}$

For base $e = 2,71828$ and $k = 4$ $L_s = e^{i(-5.\pi).b}$ then $e^{(-157,07963)} = 7,8118 \cdot 10^{-69} \text{ m}$

For base $e = 2,71828$ and $k = 5$ $L_s = e^{i(-6.\pi).b}$ then $e^{(-188,49555)} = 1,3742 \cdot 10^{-82} \text{ m}$

For base $e = 2,71828$ and $k = 6$ $L_s = e^{i(-7.\pi).b}$ then $e^{(-219,91148)} = 4,9365 \cdot 10^{-96} \text{ m}$

For base $e = 2,71828$ and $k = 4$ $L_s = e^{i(-8.\pi).b}$ then $e^{(-251,32740)} = 8,4989 \cdot 10^{-110} \text{ m}$

For base $e = 2,71828$ and $k = 5$ $L_s = e^{i(-9.\pi).b}$ then $e^{(-282,74333)} = 2,0613 \cdot 10^{-123} \text{ m}$

For base $e = 2,71828$ and $k = 4$ $L_s = e^{i(-10.\pi).b}$ then $e^{(-314,15926)} = 5,6236 \cdot 10^{-137} \text{ m}$

For base $e = 2,71828$ and $k = 5$ $L_s = e^{i(-11.\pi).b}$ then $e^{(-345,57518)} = 9,1860 \cdot 10^{-151} \text{ m}$

i.e. on the Natural base ,e, and decimal base b = 10 , the Total Energy [$\bar{z}^{1/w} = |\bar{z}_0|^{-w} \cdot L_0$] Stored in the quantized Space $L_0 = 3,56 \cdot 10^{-14}$ m, is then passing through the Regulating Valves , massive – energy , the $3,56 \cdot 10^{-14}$ and $9,31 \cdot 10^{-28}$ m, is quantized as , $2 \cdot 3^2 = 18$, Particles (the Fermions and Bosons) in the Planck's length $L_p = 8,906 \cdot 10^{-35}$ m. which create all others . On the same Sub-Spaces and on the same exponential base exist also the infinite Spaces Anti-spaces and Sub-spaces , i.e. the infinite monads in one monad . The How Diffraction , Massive – Energy , and Mechanism in [29] .

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

b.. The Minimum Energy Quantization :

From space equation ,

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

and Anti-Space \rightarrow

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

is seen that for $\varphi = 0$ and , $k = -\infty$ to 0 , then $z = 0 \rightarrow 1$ | for $\varphi = 0$ and , $k = \pm 0$ to ∞ , then $z = 1 \rightarrow \infty$ for $\varphi = \pi/2$ and $k = -\infty$ to 0 , then $z = 0 \rightarrow 1$ | for $\varphi = \pi/2$ and $k = \pm 0$ to ∞ , then $z = 1 \rightarrow \infty$

i.e. The Quantum Zero Oscillations of the Gravitational field Do-Not Distort the Euclidean Spaces . Although Gravity field is consisted of infinite Stationary- Material points , producing both motions , $|\oplus \cup \cup \ominus|$, $|\ominus \leftrightarrow \oplus|$ and performs Zero-point oscillations from the Material-Geometry associated with it , and this because of the chains of Spins , is thus created a Magnetic field due to LRC-circuit of infinite Spins , and which is tuning to the critical Quantum-critical-State \mathbf{g}_G .

The chains of Spins are pointy vibrating with their characteristic frequencies.

Minimum Acceleration happens for Particles in , *Cave \equiv Recession \equiv Wavelength*, and Energy $E_a = \frac{1,24}{3,56237 \cdot 10^{-14+6}} = 3,481 \cdot 10^7$ eV = $5,576 \cdot 10^{-10}$ Joules , while Redshift

Energy happens $E_R = \frac{1,24}{0,7495} = 1,6542$ eV = $2,65 \cdot 10^{-19}$ Joules [Kg.m²/s²]. [31]

Electrons-equation , $\oplus \rightarrow \ominus$, of motion in Planck`s length $r = 1 \cdot 10^{-35}$ is $\ddot{\mathbf{r}} + \mathbf{w}^2 \mathbf{r} = \mathbf{0}$ the solution of which is $\rightarrow 4\pi \cdot \mathbf{f}_e^2 \cdot \mathbf{m}_e = \mathbf{g} \leftarrow$ which is *The Electron equation* . Oscillations with $r < 1 \cdot 10^{-33}$ happen to Material-Points and to other Energy-Quanta.

c.. Numeric Analysis :

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

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

Total-Energy $E = h \cdot f = \frac{hc}{\lambda} = \frac{6,62606957 \cdot 10^{-34} \cdot 2,998 \cdot 10^8}{\lambda} = 1,99 \cdot 10^{-25} \text{ m} \cdot (10^6 \mu\text{m}/\text{m}) = \frac{1,2398}{\lambda(\mu\text{m})}$ (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 $\lambda = \frac{c}{f} = \frac{2,998.10^8 \text{ m/s}}{4.10^{14} \text{ Hz}} = 7,495. 10^{-7} \text{ m} (10^6 \mu\text{m}) = 0,07495 \mu\text{m}$ and

Total-Energy $E = \frac{1,24}{\lambda(\mu\text{m})} \text{ (eV)} \dots\dots\dots(a)$

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

Because Photon may have any wavelength and also that of Planck cave $1,616.10^{-35} \text{ m}$, then its energy is ,

Energy $E_P = \frac{1,24}{1,616.10^{-35+6}} = 7,673.10^{28} \text{ eV} = 1,229. 10^{21} \text{ Joules}$.The difference in

Energy is $E = E_P - E_R = 7,673.10^{28} \text{ eV} = 1,229. 10^{21} \text{ Joules}$, \rightarrow *zero i.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 $r = 4,453.10^{-35}$ then to observe this length we need the wavelength to be smaller than this cave r , being viewed .

The frequency is as $f_P = c/\lambda = (3. 10^8 \text{ m/s}) / (4,453. 10^{-35} \text{ m}) = 6,73 .10^{42} \text{ s}^{-1}$ corresponding to an Energy $E = h.f_P = [6,6260696.10^{-34} \text{ Js}] . [6,73 .10^{42} \text{ s}^{-1}] = 4,459.10^9 \text{ J} = 2,783.10^{28} \text{ eV}$.

Planck`s constant h , is the ratio of a Quantum of Energy to its frequency and equal to $h=[6,6260696.10^{-34} \text{ Js}]$ where $\rightarrow 1 \text{ eV} = 1,6022. 10^{-19} \text{ Joules} \rightarrow 1 \text{ J} = 6,24141.10^{18} \text{ eV}$

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 $\text{nm} = 1.10^{-9} \text{ m}$, and energy in eV as ,

Red $\rightarrow 700$, **Orange** $\rightarrow 620$, **Yellow** $\rightarrow 580$, **Green** $\rightarrow 530$, **Blue** $\rightarrow 475$, **Indico** $\rightarrow 450$, **Violet** $\rightarrow 400 \text{ nm}$,
 $f = 4,29.10^{14}$, $f = 4,84.10^{14}$, $f = 5,17.10^{14}$, $f = 5,66.10^{14}$, $f = 6,32.10^{14}$, $f = 6,67.10^{14}$, $f = 7,50.10^{14} .\text{s}^{-1}$
 $E = 1,77.10^0$, $E = 2,00.\text{eV}$, $E = 2,14.\text{eV}$, $E = 2,34.\text{eV}$, $E = 2,64.\text{eV}$, $E = 2,76 \text{ eV}$, $E = 3,10.\text{eV}$.
 From above is seen the large size of energy difference .

The Three ***Energy-Space*** constants in Nature :

$L_P \equiv e^{-i(\frac{\pi}{2}+2k\pi).b} \equiv e^{i.(-5\pi/2).10} \equiv e^{i.(-5\pi/2).10} \equiv \{ \sqrt{3}.\pi. 1,616199.10^{-35} \text{ m} \} \rightarrow$
 The Planck`s length cave ,

$g \equiv \frac{T^2}{a^3} \equiv \frac{1}{f_n^2 . a^3} \equiv 9, 8082381 \rightarrow$ ***The minimum Granular Quantized Energy*** ,
 from the gravity frequency f_g ,represents the ***Quantum-Stress-material-Layer-Stress*** of force ***G*** , on all Energy structures. *Raw is such because is acceleration.*

$G \equiv g . k_E \equiv g . [g_L k_L] \equiv [\frac{T^2_P}{a^3}] . [g_L k_L] \equiv 9,8076925 * 6,8116.10^{-12} \equiv$
6 , 68056.10⁻¹¹ m³/ N.s² Which is The Attracting and Cohesive Bond , Force on all Quantized-Energy-Structures of all Spaces through g .

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

$\lambda_N = \frac{8.r.c}{n\sigma^2.(1+\sqrt{5})} = \frac{8 r^2 c}{n\sigma \bar{B}}] \}$, ***The Amount*** , the meter of motion as the ***Kick-Start frequency in the Augmented-Golden-Ratio-Pattern Φ*** .

L. THE KICK-START FORCES OF UNIVERSE :

a.. The Gravitation Force G , and Kick-Start :

The G - Kick-Start , on frequency $\rightarrow f_p = 1 / T_p = \frac{w}{2\pi} = \sqrt[2]{\frac{1}{g \cdot a^3}}$, in this world is , the How this frequency can **Enter , Format and cohesive , the first or any other Energy-Rim in Planck`s length** , using relation $1 = g \cdot f_n^2 \cdot a^3 = \left[\frac{4\pi^2}{GM} \right] \cdot f_n^2 \cdot a^3$

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

$$T = \sqrt{g \cdot a^3} = \sqrt{9,8076925 \cdot (2,1145016 \cdot 10^{-11})^3} = 3,04513 \cdot 10^{-16} \text{ s} , \text{ since for}$$

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

a = $2,1145016 \cdot 10^{-11}$ m , and frequency $T^{-1} = f_p = 3,28393 \cdot 10^{15}$ /s , which corresponds to a loop in Planck`s scale $(4/3) \cdot \pi \cdot r^3 = 3,96 \cdot 10^{-32}$ m , and then the Energy in this Planck`s loop is the minimum quantized .

$$\text{Energy } E = h \cdot f_p = [6,6262 \cdot 10^{-34} \text{ J.s}] \cdot [3,28393 \cdot 10^{15} / \text{s}] = 2,176 \cdot 10^{-18} \text{ J} ,$$

$$\text{and in eV } \rightarrow [2,176 \cdot 10^{-18}] / [1,6 \cdot 10^{-19}] = \mathbf{13,6 \text{ eV}} = h f = h/T = h/\sqrt{g \cdot a^3} .$$

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

$$\text{from equation } a = \sqrt[3]{T^2/g} = \sqrt[3]{\frac{[3,04513 \cdot 10^{-16}]^2}{9,80769251}} = 2,1145016 \cdot 10^{-11} \text{ m} , \text{ for unit}$$

energy quantity . From Newtonian Constant of Gravitation relation ,

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

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 $E = 13,6$ eV in Hydrogen-Plane-orbit corresponds to the **minimum-energy-cave** \rightarrow **The Phys-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 $G = g \cdot [g_L k_L] \equiv g \cdot [1 * 1] \equiv \rightarrow g$, 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-Stress-Layer , **g** , to formulate in that orbit , **a** , into Planck`s cave the lightest and the less-energy mass Particle of this universe , which is the Hydrogen with the minimum **Quantized-energy** of **13,6 eV** .

1.. For a frequency $f = 3 \cdot 10^9 < 3 \cdot 10^{15}$ then from Energy $E = h \cdot f$,

$$E = [6,6262 \cdot 10^{-34} \text{J} \cdot \text{s}] \cdot [3,10^9 / \text{s}] = 1,98786 \cdot 10^{-24} \text{J} / 1,6 \cdot 10^{-19} = 1,2424124 \cdot 10^{-5} \text{ eV}$$

Semi major axis a , *the cave r*, is $a = \sqrt[3]{\frac{1}{g \cdot f^2}} = \sqrt[3]{\frac{1}{9,8076925 \cdot 9 \cdot 10^{18}}} = 2,245986 \cdot 10^{-6} \text{ m}$

i.e. is a cave 10^6 times greater than, *the critical*, to Unit-energy-cave 10^{-11} .

2.. For a frequency $f = 3 \cdot 10^{21} > 3 \cdot 10^{15}$ then from Energy $E = h \cdot f$,

$$E = [6,6262 \cdot 10^{-34} \text{J} \cdot \text{s}] \cdot [3,10^{21} / \text{s}] = 1,98786 \cdot 10^{-12} \text{J} / 1,6 \cdot 10^{-19} = 1,2424124 \cdot 10^{-7} \text{ eV}$$

Semi major axis a , *the cave r*, is $a = \sqrt[3]{\frac{1}{g \cdot f^2}} = \sqrt[3]{\frac{1}{9,8076925 \cdot 9 \cdot 10^{42}}} = 2,245986 \cdot 10^{-14} \text{ m}$

and is a cave 10^{-3} times greater than, *the critical*, to Unit-energy-cave 10^{-11} m .

i.e. exists the *critical-Space-cave* $a = 2,1145016 \cdot 10^{-11} \text{ m}$, 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 .

b.. The Orbital - Geometry and Orbital - Physics :

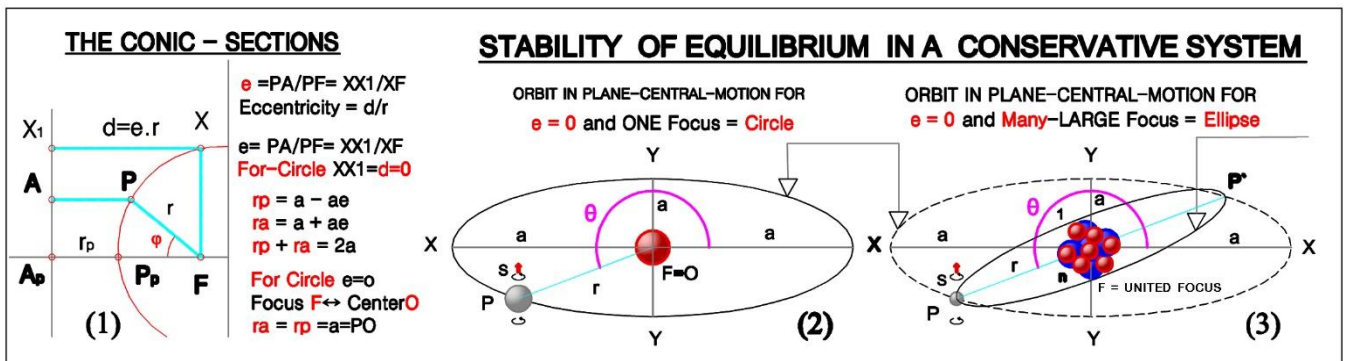


Figure-13 The Two Points Problem Stability of Equilibrium with One-Two Planets.

In (1) is presented the Mechanism of the Conic-sections .

In (2) is presented the Plane Central-motion , where for eccentricity $e = 0$

The Shape of the Orbit is a Circle .

In (3) is presented the Plane Central-motion , where for eccentricity $e = 0$ and the Shape of the Orbit is a Circle , and for Large - Unity of Heavy-mass-Focus $e < 0$, the Shape of the Orbit is an ellipse with the same constant energy .

The Two-Body-Problem F-13.(2-3) :

It was shown before that *in Conservative Systems* of Central-Force *the Shapes of the Orbits* are the four Conic-sections , the Circle , the Ellipse , the Parabola and the Hyperbola in the Plane Focus-Planet Velocity-vector .

At periapsis .. (f3) $r = \frac{L^2/GMm^2}{1 + e \cdot \cos\theta}$, simultaneously from geometry , $r = \frac{a(1-e^2)}{1 + e \cdot \cos\theta}$

From relation $a(1-e^2) = a(1-e).(1+e) = [a(1-e) = r_p].(1+e) = r_p.(1+e)$, where $r_p = a(1-e) = a - ae$, is *the periapsis* ,the closest point of the orbit in terms of ,a ,e then above equations become $r = \frac{a(1-e^2)}{1+e.\cos\theta} = \frac{r_p(1+e)}{1+e.\cos\theta}$ (f3a)

The Geometrical elements in orbit is the semimajor axis **a** , and eccentricity **e** .

It was proved that \rightarrow **Energy on Orbit** $E = \frac{GMm}{2a}$, or and $\frac{2E}{m} = \frac{GM}{a}$

For Circle-radius $r = a$, issues $\frac{2E}{m} = \frac{GM}{r}$ and solving for , a , e then

$$a = \frac{GMm}{2E} , \text{ and } e = \sqrt{1 + 2EL^2/G^2M^2m^3} \text{(g)}$$

$$\text{For } r_p (1+e) = L^2 / GMm^2 \text{ the radius of Planet } r_p = \frac{L^2}{(1+e)GMm^2} \text{(g1)}$$

Equations (f3) , (f3a) , (g) , (g1) give the allowed *Shapes of Orbits* in a Central Gravitational Field dependent on radius , **r** , semi-major axis **a** , and eccentricity **e** .

The Physical parameters in orbit is Total energy $E = K_E + P_E$, where for *Circle* $e = 0$, *Ellipse* $0 < e < 1$, and Angular-momentum $L = \bar{r} m \bar{v}$.

$$\text{From above Total } E = - \frac{GMm}{2a} \text{ and } L = \sqrt{(1-e^2).GMm^2.a} \text{(e)}$$

$$\text{Energy in Orbit } E = - \frac{GMm}{2r_p}(e-1) \text{ and } L = \sqrt{(1+e).GMm^2.r_p} \text{(e1)}$$

For $e = 1$, issues for *Parabolas* and $e > 1$ for *Hyperbolas* ,

$$\text{Radius } r_p = L^2 / [(1+e).GMm^2] \text{ and } e = \sqrt{1 + 2EL^2/G^2M^2m^3} \text{ (p)}$$

$$\text{Energy in Orbit } E = - \frac{GMm}{2r_p}(e-1) \text{ and } L = \sqrt{(1+e).GMm^2.r_p} \text{ (p1)}$$

The simple Method of the Two-points Problem :

From *classical-mechanics* and for Two bodies of mass m_1, m_2 , of Polar radius r_1, r_2 , from a Center of mass coordinate system lying on line 1-2 , exist ,

a.. The interacting via a Gravitational force , is mathematically equivalent to the single body motion and has the absolute value $F = k (m_1. m_2) / (r_1 + r_2)^2$ (1) where $k = a$ constant

$$\text{b.. By setting } m'_1 = \left[\frac{m_1}{(1+m_2/m_1)^2} \right] , \text{ then } F_{21} = k \frac{m'_1.m_2}{r_2^2} \text{(2)}$$

$$\text{c.. By setting } m'_2 = \left[\frac{m_2}{(1+m_1/m_2)^2} \right] , \text{ then } F_{12} = k \frac{m'_2.m_1}{r_1^2} \text{(3) .i.e.}$$

motion is exactly as , An attractive force m'_1 exists at the center of mass , and mass m_2 is revolving in elliptic trajectory around this point of mass .

From the mass proportion is seen that , the center of mass is on line (1-2) and very close to the big mass a property of the Central - Rotation of masses issuing in our Solar-system .

d.. If motion of any point P is expressed in orthogonal coordinates as $x = a \cos ft$, $y = b \sin ft$, to show the Orbit of P , where a, b, f , are constants .

From relation $\cos ft = \frac{x}{a}$, $\sin ft = \frac{y}{b}$, using Pythagoras theorem gives ellipse

$$\cos^2 ft + \sin^2 ft = 1 = \frac{x^2}{a^2} + \frac{y^2}{b^2} . \text{ If } X, Y \text{ are the components of forces then ,}$$

$$X = m \frac{d^2x}{dt^2} = -m.af^2. \cos ft = -mf^2.x \text{ and}$$

$$Y = m \frac{d^2y}{dt^2} = -m \cdot b f^2 \cdot \sin ft = -m \cdot f^2 \cdot y \quad \text{and by division}$$

$X : Y = x : y$ *i.e. the Force is directed to the center of rotation and is proportional to the distance .*

For rotational motion after t' , moment of time mass is at the same position issuing, $\cos f't = \cos ft$ and $\sin f't = \sin ft$, so $t' - t = k \frac{2\pi}{f} = T$, where k is an integer and $T = \frac{2\pi}{f}$, which is the Period of the rotation. In times t , radius r , sweeps out the same area S_n and, $S_n = \pi ab / T = \pi ab f / 2\pi = (ab / 2) \cdot f \rightarrow$ *is constant* since $f = (2 \cdot S_n) / ab$, *is constant, Kepler Law.*

c.. The Unique-Three-Body-Problem and Electron F-14.(3) :

Orbital Shapes and Physics is analogous to Energy-Space Material Geometry of the four Dimensions namely, Energy and the three coordinates of the Material-Point \equiv Quaternion in Space. Material Geometry issues in all levels of classical Mechanics, *D'Alembert, Euler, Lagrange*, either that of microcosm or of macrocosm.

It was shown before that *in Conservative Systems* of Central-Force, Total energy E is conserved and at periapsis energy $E = \frac{GMm}{2a}$ and $e = \sqrt{1 + 2EL^2/G^2M^2m^3}$ and for $e = 0$ $E = -\frac{G^2M^2m^3}{2L^2}$, i.e. energy is always Negative.

In order that Energy becomes Positive, then velocity and force must be zero, or *velocity and acceleration are zero*. Question?, where this can happen??

Because in Cartesian-coordinates this Energy-Rim is a *Phase-Plane* of $x, \dot{x} = y$ which represents a point on the Phase-Plane, its trajectory with state speed is $V^2 = \dot{x}^2 + \dot{y}^2$.

In this way, $\frac{\text{acceleration}}{\text{velocity}} = \frac{dy}{dx}$ for the Phase-Plane, and a State of equilibrium exists for $\dot{x} = y = 0$ and $\ddot{x} = \dot{y} = 0$. For a single DOF oscillator where $\rightarrow \ddot{x} + w^2 x = 0$..(1) the two first-order equations are $\dot{y} = -w^2 \cdot x$, $\dot{x} = y$ and \rightarrow slope $dy/dx = -\frac{w^2 x}{y}$

By integration $y^2 + w^2 x^2 = C = \text{constant}$ or $[y^2 / C] + [w^2 x^2 / C] = 1 \dots\dots (2)$

Equation (2) is a series of ellipses, the size of which is determined by C ,

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

The *Spring-like central-force* from a fix point, *the Source*, on an attached, *probe*, mass is $F = -k r = -k r \cdot \bar{r}$ as equation (1) $\ddot{x} + w^2 x = 0$ with a general solution $x = A \sin w_n t + B \cos w_n t$, where A, B are constants and evaluated from initial conditions and which become $x = [\dot{x}(0) / w_n] \cdot \sin w_n t + x(0) \cdot \cos w_n t \dots\dots(3)$.

The Natural-frequency in Planck's length for the **Primary particle** occupying the less *Negative-charge--frequency*, *is the electron*, and is as equation (3) with solution as,

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

where $k = \text{Unit-Spring-Force} \equiv [\text{meter of area}] \cdot [\text{meter of force} \equiv \text{stress}] \equiv \pi g \dots(4a)$

From Planck's equation $f_e = E / h = [-13,6 \times 1,6 \cdot 10^{-19} = 2,176 \cdot 10^{-18} \text{ Joule}] /$

[6,626.10⁻³⁴ J.s] = **3, 283998.10¹⁵/s** , where min-energy -13,6 eV is Hydrogen-atom
 Substituting all the *minimum-meters of Planck's scale* then , *Electron mass is* ,

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

$$\mathbf{f}_e = 3, 283998.10^{15} /s , \text{ and } \mathbf{L}_e = 2, 3762992.10^{-16} \text{ m} \dots\dots\dots(4c)$$

The Primary Forces :

Force $F_1 = A_1 \sin(\omega t + \varphi)$ colliding with another rest-force $F_2 = A_2 \sin(\omega t)$, by *cross product*, gives Power . Power is $D = F_1 F_2 = A_1 \sin(\omega t + \varphi) \cdot A_2 \sin(\omega t) = A_1 A_2 [\sin(\omega t + \varphi) \cdot \sin(\omega t)]$ and by using Trigonometry , the Power

$$D = A_1 A_2 [\cos(2\omega t + \varphi) \cdot \cos \varphi] = A_1 A_2 / 2 [-\cos(2\omega t + \varphi) + \cos(-\varphi)] = [A_1 A_2 / 2] \cdot [\cos(-\varphi) - 2\cos \frac{2\omega t + \varphi}{2} \cdot \cos \frac{-\varphi}{2}] = \frac{A_1 A_2}{2} [-\cos(\varphi) + 2 \cos^2 \frac{\varphi}{2}] , \text{ and by analyzing}$$

Power $D = \frac{A_1 A_2}{2} [-\cos^2 \frac{\varphi}{2} + \sin^2 \frac{\varphi}{2} + 2\cos^2 \frac{\varphi}{2}] = \frac{A_1 A_2}{2} [\sin^2 \frac{\varphi}{2} + \cos^2 \frac{\varphi}{2}] = \frac{A_1 A_2}{2}$, and since wave is twice of the frequency this represents the fluctuating component of Power , meaning that the average value of which is zero , and are ,

$$D = -\frac{A_1 A_2}{2} [\cos(2\omega t + \varphi) + \cos(\varphi)] , \text{ and at } t = 0 , D = -A_1 A_2 [\cos \varphi] \text{ i.e.}$$

By collision at perihelion , r_p , with another object with velocity , v , then velocity becomes v_p^2 , or $v_p^2 = 4\pi^2 \frac{a^3}{T^2} [\frac{1+e}{r}] = 4\pi^2 a^3 \cdot f_p^2 [\frac{1+e}{r}]$,

$$\text{acceleration } \mathbf{a}_p = -\frac{32\pi}{T^2 r^5} , \text{ and } \mathbf{L} = 0 , \mathbf{e} = 1 , \mathbf{D} = -A_1 A_2 \dots\dots(pe)$$

From Energy-State-equations (pe) is transparent that ,

Any moving Particle when is Tangentially-colliding with Any Material-Point , P , executing Circular motion on a circle of radius , r , then the Total Energy , E , is Negative , and the Particle follows constant Elliptical – Energy - Orbits on the same semimajor axis , and of the same constant Energy .

If the New Orbit is of eccentricity $e = 0$, and Zero Total Energy , then is a Circle , If it is $0 < e < 1$, and Zero Total Energy , then is the Ellipse , If it is $e = 1$, and Zero Total Energy , is a Parabola and If it is $e > 1$, and Positive Total Energy , is the Hyperbola .

So all Planets move in this way , either in Atoms or in Planetary-System , obey Newton's equations of motion , such in microcosm as in macrocosm .

$$\text{From equations (f3a) radius } r , \text{ at perihelion is } r = \frac{a(1-e^2)}{1+e \cdot \cos \theta} = \frac{r_p(1+e)}{1+e \cdot \cos \theta}$$

- 1.. For the Two-Body problem for $e = 0$ the shape is Circle as Fig-12.[1-2] .
- 2.. For the Three-Body problem for $e = 0$ the Shape is Near-Ellipse because $r_p \neq a$ and this because Forces $F_{1 \rightarrow 2}$ and $F_{1 \rightarrow 3}$ do not coincide and radius $r_{p2} = r_{p3}$ meaning that orbit follows the resultant of radius and $\cos \theta \neq 0$ as Fig-14.[3] . Because of the Slit in nucleus and the Dipole –Magnet , Orbits are of ∞ Shape .

i.e. **The Three-Body problem \equiv The Two-Body problem with Slit-Focus .**

- 3.. For the Two-Body problem for $e < 1$ the shape is an Ellipse as Fig-13.[1]
- 4.. For the Two-Body problem for $e = 1$ the shape is a Parabola as Fig-13.[1]
- 5.. For the Two-Body problem for $e > 1$ the shape is a Hyperbola as Fig-13.[1] .

From above is seen the Harmony between Material-Geometry and Nature.

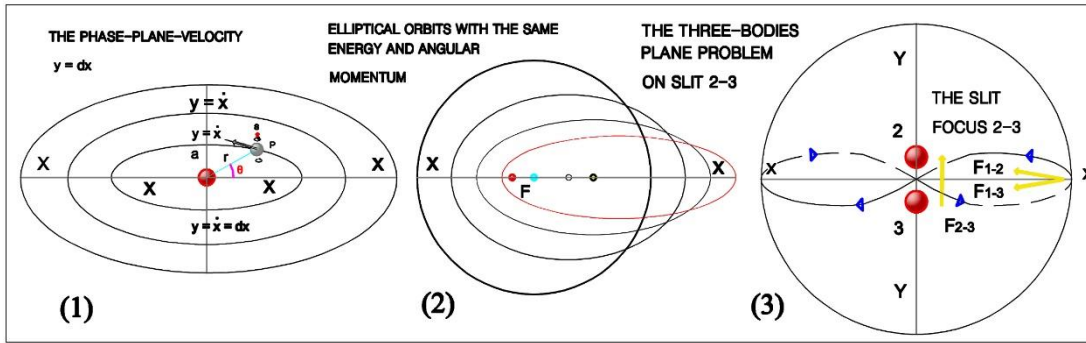


Figure-14 The Two , Points-Problem with Stability of Equilibrium the Slit-Focus.

In (1) is presented the Phase-Plane and the plot appears as ellipse . When y / w is plotted in place of , $y = \dot{x}$, the ellipse reduces to circle .

In (2) is presented the Circular and the Elliptical motion , where the constant Total-Energy E , maybe on the same diameter $r_p + r_p = a(1-e) + a + ae = 2a$.

In (3) is presented the Three-Points Plane-problem where the Two points are very near each other . Planet passes through the , **SLIT of the two Focus**.

C.. The Phase-Plane is a velocity-Vector-Cartesian System , $x \perp \dot{x}$, F-13.(1) :

The Total-energy for Unit-mass is $E = K_E + P_E = (\frac{1}{2}) \cdot \dot{x}^2 + U(x) = \text{constant} \dots(a)$ and solving for $y = \dot{x}$ this Ordinate of the Phase-Plane is given by Planar equation ,

$$y = \dot{x} = \pm \sqrt{2[E - U(x)]} \dots\dots(b)$$

denoting that trajectories of a Conservative-System are symmetric about , x , axis .

The differential equation of motion is of the form $\ddot{x} = f(x)$ and because $\ddot{x} = \dot{x} \cdot (d\dot{x}/dx)$ then $\dot{x} \cdot d\dot{x} - f(x)dx = 0 \dots\dots(c)$. By integrating , $\frac{\dot{x}^2}{2} - \int_0^x f(x)dx = E$, and from (a)

$U(x) = - \int_0^x f(x)dx$, and $f(x) = - \frac{dU}{dx}$, i.e. \ddot{x} is equal to the Negative- Gradient of the Potential-energy . Placing $y = \dot{x}$ from (c) then becomes , $\frac{dy}{dx} = \frac{f(x)}{y} \dots (d)$

Equation (d) denotes that equilibrium points occur at $y = \dot{x} = 0$, or is $f(x) = 0$.

The Stability of Equilibrium :

By examining (b) the value of energy E , is determined by the initial-conditions of $x(0)$, and $\dot{x}(0)$ and if these are large , E will be also large and the Face-Plane plots are **open-loop** trajectories .

If $x(0)$, and $\dot{x}(0)$ are very small then , as this happens at Slit 2-3 , E is also small and Face-Plane plots are **closed-loops single or jointed** trajectories as in F-14.(2-3).

Remarks :

- 1.. From equation on Orbit $E = - \frac{GMm}{2r_p} (e - 1)$ and $r_p = - a(e - 1)$, is seen that Circle and Ellipse **occupy the same Total-Orbital-energy E** on diameter **2a** . Because Hydrogen- atom , was proved to be **an Conservative Systems** of Central-Force therefore its Orbitals are **Circles** and **Ellipse also** . F-14.(2)

- 2.. The Shapes of the Orbits of Central-Forces , in the Conservative Systems ,are the four Conic-sections . The Shape of the **Two-body problem is the Circle** ,when its

eccentricity $e = 0$, while *the Ellipse* when $0 < e < 1$, as F-14. (2-3), and this because **Radius** $r_p = L^2 / [(1 + e) \cdot GM m^2] \rightarrow 0$, and where $M = m_1 + m_2 + \dots m_n$

3.. The Shapes of the Orbits for the *Three-Body Problem with SLIT-Focus* is a Plane Harmonics of, *Eight-Shape*, as ∞ . In F-14. (3) the Singular points, $x = 0, y = 0$, become from equation (d) corresponding to $f(x)=0$, and $y = \dot{x} = 0$, and as Energy when $P_E = U(x) = 0$, which are the stable-equilibrium minima - positions.

Orbitals are Plane-Rims which thickness is the Phase-Plane of a single DOF Oscillator.

J.. A NEW – ENERGY - SPACE ATOM – MODEL :

The what this was and what is proved .

1.. **The Work** produced from the Gravitational-force, **G**, { Force G, is constant in all universe therefore becomes from an Conservative –System} **in the Undamped Planck`s - Conservative -System, IS** for free vibration \rightarrow [Party-Kinetic-energy $\equiv K_E$ and Party Potential-Energy $\equiv P_E$] \leftarrow and The Kinetic-energy $\equiv K_E$ *is stored in* the Mass \equiv The-Energy-moving-storage \equiv **Photons**, by virtue of its velocity-vector **c**, whereas the Potential-Energy $\equiv P_E$ *is stored in* the form of Strain-energy in Elastic Deformation which is the **Material-Points**, or Work-done in a *Force field* such as **Gravity-field** g_F . **Constant G is a Force, the Mould**, for the **First-kick-Start** also, upon this **Unit-Stress** and Granular-Layer, **g**, **the mechanism**, to formulate in 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.

2.. Since the Total-Energy of, -13,6 eV, of Hydrogen cave is constant, *the Hydrogen Cave-System is Conservative*, and the differential equation of motion can also be established by the principle of conservation of energy and for the free vibration of this undamped-system-cave the energy which is Party-kinetic and Party-potential. The Kinetic-energy K_E is stored in the mass by virtue of its outer velocity, where as the Potential - energy P_E , is stored in system-cave in the form of strain-energy in Elastic-deformation, or as *Work done into the Hydrogen-Force-field* in orbits or as Work \equiv Energy transported from orbit to orbit, in this less-mass Particle.

3.. In the Undamped **Planck`s -Conservative -System**, the Total-Energy of, -13,6 eV, of Hydrogen-cave, corresponds to the Natural-frequency of the **Primary-Particle** with the less *Negative-Charge-frequency*, which is **The electron** and which mass m_e and frequency f_e follow $\min g$.

Electrons-equation of motion is $\ddot{x} + w^2 x = 0$, with solution $4 \pi f_e^2 \cdot m_e = g$, where *the Reaction to the Change of motion*, electron-mass $m_e = \frac{g}{4 \pi f_e^2}$ and the Primary equation of Electron is $\rightarrow w^2_e \cdot m_e = \pi g = \text{constant} \leftarrow \dots (m)$

4.. In the constant, **Hydrogen Conservative-Cave-System**, which creates only closed Orbit-shapes as Circles, Ellipses and Eight-shape, ∞ , are placed the above elements $\pi g \equiv \text{Energy} \equiv [\text{meter of area} * \text{meter of force}] \equiv \text{Electrons on Orbits}$, and also the **Unit-Space** $\equiv \text{Massive-United-Unit-Space} \equiv \rightarrow [+v \cdot s^2] \leftarrow$ jointed through the Neutral Material-Points [(+) [\leftrightarrow] (-)] with the **Strong-force** $\rightarrow S_F = h \cdot f_n \equiv h \cdot [S \equiv B_p \equiv \text{EM-R} \equiv f_{1=N}, f_2, f_3, f_D, f_n \equiv w^2] \equiv h \cdot n \cdot \frac{(1+\sqrt{5})\sigma}{4\pi r} \equiv h \frac{n\sigma \cdot B}{8 r^2} \dots (mg)$

Equations (m), (mg) are the *Energy-Space-constituents* in Hydrogen-System.

a.. The Protons and the Nucleus Structure :

From above MP $\equiv [(+)\leftrightarrow(-)] \equiv \text{Neutral} = \mathbf{n}$, and

- a.. For 1 Proton $[(+)\leftrightarrow(-)]\leftrightarrow(+)$ $\equiv \text{Neutral} \rightarrow \begin{matrix} n = 1 & p = 1 \end{matrix}$
- b.. For 2 Proton $(+)\leftrightarrow[(-)\leftrightarrow(+)][(+)\leftrightarrow(-)]\leftrightarrow(+)$ $\equiv \text{Neutral} \rightarrow \begin{matrix} p & n \\ n & p \end{matrix}$
- c.. For 3 Proton $(+)\leftrightarrow[(-)(+)](+)[(-)(+)](+)[(-)(+)] \equiv \text{Neutral} \rightarrow \begin{matrix} n & p & n \\ p & n & p \end{matrix}$
- d.. For 4 Proton $(+)\leftrightarrow[(-)(+)](+)[(-)(+)](+)[(-)(+)](+)[(-)(+)] \rightarrow \begin{matrix} p & n & p \\ n & 0 & n \\ p & n & p \end{matrix}$
- h.. For \mathbf{k} Proton $(\mathbf{k1})\leftrightarrow[(-)(+)](\mathbf{k2})[(-)(+)](+)[(-)(+)](+)[(-)(\mathbf{h_k})]$ $\rightarrow \begin{matrix} kp & kn & kp \\ kn & 0 & kn \\ kp & kn & kp \end{matrix}$

Remarks :

In Fig-15. Are Placed Protons , \mathbf{p} ,and Neutrons , \mathbf{n} ,following Material-Geometry rules.

- 1..In (1) is shown One-Proton Fixed on One-Neutron on line $x = [+ (- +)]$. Electron , \mathbf{e} , follows an Circular-Orbit ,and in Separation is Consistent to the parts Proton-Neutron
- 2..In (2) is shown the Two-Protons Fixed on Two-Neutron in Plane $[+, (- +) ,+(- +)]$. Electron , \mathbf{e} , follows a Circle-Orbit and Three Eight-Shape , and in Separation is Consistent to the two parts , and this because of the *Slit-Focus* which becomes a Bipolar-System . The number of Neutrons determines the number of Isotopes .
- 3..In (3) is shown the Three-Protons Fixed on Three-Neutron in Plane $[3p\leftrightarrow 3n]$. Electron , \mathbf{e} , follows One Circle-Orbit and Three Ellipse-Orbit , and in Separation is Not-Consistent to the two parts because of the Un-symmetric of the shape . The number of Neutrons determines the number of Isotopes .
- 4..In (4) is shown the Four-Protons Fixed on Four-Neutron in Space $[4p\leftrightarrow 4n]$. Electron , \mathbf{e} , follows One Circle-Orbit , Three Eight-Shape , and in Separation is Consistent to the two parts , and this because of the Slit-Focus and because of the Symmetric shape .The number of Neutrons determines the number of Isotopes .
- 5..In (5) is shown the Five-Protons Fixed on Five-Neutron in Space $[5p\leftrightarrow 5n]$. Electron , \mathbf{e} , follows One Circle-Orbit and Three Ellipse-Orbit , and in Separation is Not-Consistent to the two parts because of the Un-symmetric of the shape . The number of Neutrons determines the number of Isotopes .
- 6.. In (6-7-8) is shown the Protons equal to Neutrons following that of (5) properties.
- k.. In (k) is shown the k-Protons Fixed on k-Neutron in Space $[kp\leftrightarrow kn]$. Electron , \mathbf{e} , follows One Circle-Orbit , $(k-2)/2$ - Ellipse-Orbit , and in Separation is Not-Consistent to the two parts because of the Un-symmetric of the shape , and from \mathbf{p} obstacles .

THE NEW-ATOM FROM ENERGY- CAVE-STRUCTURE

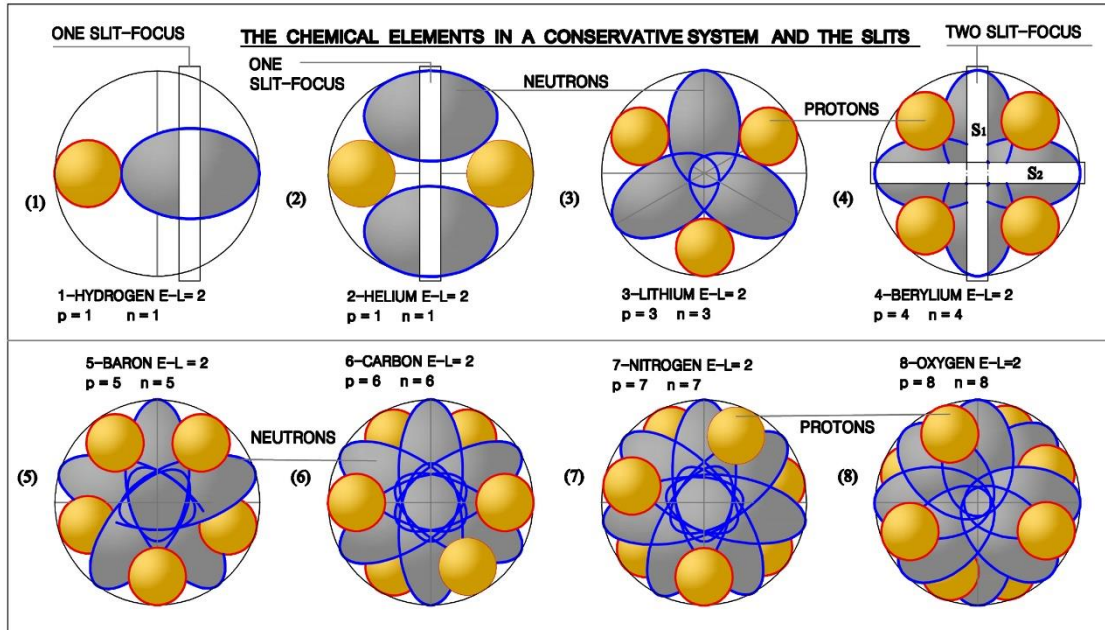


Figure-15. The Energy-Space-Geometrical explanation of Atom-Nucleus-Structure.

In (1) is shown the One-Proton Fixed on One-Neutron on line $x = [p - n]$. Two Electrons , e , exist on each Orbit , symmetric to the center of mass , because of the Torsional-Stability . The first-Orbit is always a Circle , and in collision is Consistent to the parts Proton-Neutron . All Properties are dependent on , e , p , n , number .

In (2) is shown Two-Proton Fixed on Two-Neutron on Surface $[p-p] \perp [n-n]$. Slit $n-n$ between Protons $p-p$, allows Electrons , e , to orbit through Slit in three coordinates. The first-Orbit is always a Circle , and in collision is Consistent to the parts , Proton – Neutron .All Properties and Configuration anomalies dependent on , e , p , n , number. Because of the Double-Vector massive Protons and the Perpendicular-Slit Nucleus , is the most radioactive in case of electron absence.

In (3-k) is shown k-Proton Fixed on k-Neutron on Surface $[kp-p] \perp [kn-n]$. Slit $n-n$ between Protons $k p-p$ if exists ,allows Electrons , e , to orbit through Slit in three coordinates. The first-Orbit is always a Circle , and in collision is Consistent to the parts , Proton – Neutron . All Properties and Configuration anomalies dependent on the , e , p , n , number of elements .

The Strong-force S_F in the nucleus becomes from the \ominus constituent of Neutron which is acting on the Fixed Protons \oplus of the nucleus , and at a lower distance r as equation,
 $S_F = h.f_n \equiv h \cdot \{ [S \equiv B_P \equiv \mathbf{EM-R} \equiv f_{1=N}, f_2, f_3, f_D, f_n = w^2] \equiv h.n \frac{(1+\sqrt{5})\sigma}{4\pi r} \equiv h \frac{n\sigma.\bar{B}}{8 r^2}$
 Gravitational force G is the same in all Space scales as in Planck`s length because it was shown that Gravity-Acceleration is $g_G = s[\frac{\pi r v^4}{2}]$ and $G_p = g.k_E = s[\frac{\pi r v^4}{2}].g = s[\frac{\pi L_p c^4}{2}].g$, where $L_p =$ The Planck`s length . For Gravity length $G_g = s[\frac{\pi L_g c^4}{2}].g$,
 By division $G_g = [\frac{L_g}{L_p}].G_p$, and **Gravitation $G_S = [\frac{L_S}{L_p}].G_p$ for any Space-scale L_S**

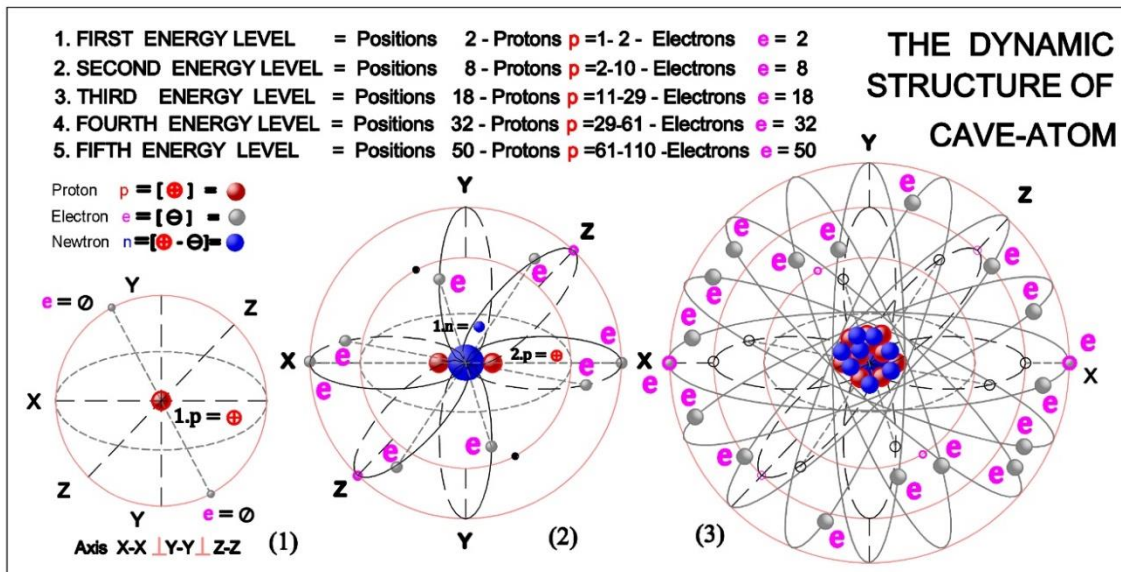


Figure-16 The New Energy-Atom-Cave Pattern , with minimum Energy-Space e , p .

In (1) is presented Energy-Level , 1 , where the Phase-Plane and the Plot appears as Circle with One-Nucleus and One-Planet and for Stability of Equilibrium Two-Planets symmetric to Focus .

In (2) is presented Energy-Level , 2 , where the Phase-Planes and the Plot appears as Three-Ellipses which are perpendicular each other , and this for the Stability of Equilibrium of each orbit which has only Two-Planets symmetric to common Focus. In the three SLIT Orbits exist $3 \times 2 = 6$ positions .Since each orbit occupies only Two Planets for the equilibrium of the orbit therefore the Two-Residuary positions are occupied by the First energy level which is the Unite-Nucleus for the Two-Planets.

In (3) is presented Energy-Level , 3 , where the Phase-Planes and the Plot appears as the Eight-Ellipse-Orbits which are perpendicular each other , and this for Stability of Equilibrium of each orbit which has only Two-Planets symmetric to their common Focus. The Two-Residuary positions from 18 are occupied by the First energy level which is the Unite-Nucleus for the Two-Planets. i.e. $(1 \times 2) \times 2 + (8 \times 2) = 18$

In (4) is presented Energy-Level , 4 , where the Phase-Planes and the Plot appears as the Fifteenth-Ellipse-Orbits which are perpendicular each other on the vertices of a Regular-Fifteenth-Spherical shape , and this for Stability of Equilibrium of each orbit which has only Two-Planets symmetric to their common Focus.

Also the Two-Residuary positions from 32 are occupied by the First energy level which is the Unite-Nucleus for the Two-Planets. i.e. $(1 \times 2) \times 2 + 30 = 15 \times 2 = 32.e$.

In (5) is presented Energy-Level , 5 , where the Phase-Planes and the Plot appears as the Twenty-fourth-Ellipse-Orbits which are perpendicular each other on the vertices of a Regular- Twenty-fourth -Spherical shape , and this for Stability of Equilibrium of each orbit which has only Two-Planets symmetric to their common Focus.

Also the Two-Residuary positions from 50 are occupied by the First energy level which is the Unite-Nucleus for the Two-Planets.

Euclidean's Geometry Quantized Spaces		Euclidean Geometry	Material Geometry	Material Dimensions	Permitted Units $\oplus\ominus$	MOULDS Permitted Positions	S L U	The Full Orbital Units
1		2		3		4		
1	Point			The First ONE Dimension Point - Space	2	2 P ²		
2	Line Segment			The First ONE Dimension Line - Space	4	1		H = 1s Hydrogen
3	Plane Reg.3gon			The First TWO Dimension Plane - Space	6	2		He = 1s Helium
4	Volume Reg.4gon			The First THREE Dimension Volume - Space	8	8		Ne = 2p Neon
5	Space Reg.5gon			The First FOUR Dimension Volume -Space	10	18		Ar = 3p Argon
6	Space Reg.6gon			The First FIVE Dimension Volume - Space	12	32		Kr = 4p Krypton
7	Space Reg.7gon			The First SIX Dimension Volume - Space	14	50		Xe = 5p Xenon
8	Space Reg.8gon			The First SEVEN Dimension Volume - Space	16	72		Rn = 6p Radon
9	Space Reg.9gon			The First EIGHT Dimension Volume - Space	18	98		U _{uo} = np Ununoctium
10	Space Reg.10gon			The First NINE Dimension Volume - Space	20	128	P = Number of Positives = N-2 and N=Spaces = The Number of Points	
N	Space Reg.Ngon			The First N - 1 Dimension Volume - Space	2 N	162		
						2 N ²		

Figure-17. The Euclidean and *Material Geometry* in Particles and monads in Monad

The Uniform Circular motion is the First Possible Position of Monads.

The Number of Neutrons in Space represent Isotopes in Nucleus $\rightarrow [s + \bar{v} \bar{v} i]$

In 1. Euclidean Geometry is defined on the Number of Points which can define a Space i.e. The Point is defined from one Point ,The Line Segment consisted of two Points The Triangle consisted of three Points , The regular Tetragon consisted of four Points in , The regular Pentagon consisted of five Points in Space and so on , represent the Steady , *Regular and stable* , formations of Geometry.

In 2. Are shown the Material-Points , Positives and Negatives on each Point which is Zero and can be added to any other Positives and Negatives , and which represent Protons and Electrons in Physics.

In 3. Are shown the Permitted number of Units and of Moulds , which represent the

Electron Positions.

In 4. Are shown the Number of Neutrons in Space and the satiation states of electrons $\pi \mathbf{g} = \mathbf{w}^2 \mathbf{e} \cdot \mathbf{m}_e$. From the definition of Work, **Work = Force x Displacement = Energy** results the where this Energy as, **Momentum Vector** $\bar{\mathbf{B}} \equiv \text{Spin} \equiv \text{Energy}$, is stored in \mathbf{r} , cave of $\text{KK}_1 = \bar{\mathbf{q}} = [\mathbf{s} + \bar{\mathbf{v}}\nabla\mathbf{i}] \equiv \text{Quaternion}$. Cave, \mathbf{r} , **IS**, *Outward a moving Stationary Box*, *Inward a Stationary Wave*, with infinite frequencies $f_1 \dots f_n \rightarrow f_\infty$ and with Energy, $E = h \cdot f_n = \frac{h(1+\sqrt{5})}{4\pi} \cdot \left[\frac{\sigma}{r}\right] = \left(\frac{n\sigma}{8r^2}\right) \cdot \bar{\mathbf{B}} = W_d = 8 \cdot k \cdot f_n A_r$.

$\pi \mathbf{g} \equiv \text{Energy} \equiv [\text{meter of area} * \text{meter of force} \equiv \text{stress}] \equiv \text{Electrons on Orbits}$, and the **Unit - Space** $\equiv \text{Massive-United-Unit-Space} \equiv \rightarrow[+\bar{\mathbf{v}} \cdot \mathbf{s}^2] \leftarrow$ jointed through the Neutral Material-Points $[(+) [\leftrightarrow] (-)] \equiv \mathbf{g}$, with the **Strong-force** S_F which is, $S_F = h \cdot f_n \equiv h \cdot \{ [S \equiv B_p \equiv \mathbf{EM-R} \equiv f_{1=N}, f_2, f_3, f_D, \dots, f_n] \} \equiv h \cdot n \frac{(1+\sqrt{5})\sigma}{4\pi r} \equiv h \frac{n\sigma \cdot \bar{\mathbf{B}}}{8r^2} \dots (\text{mg})$

b.. The Physical and Mechanical explanation of Forces, G and stress g :

Since force **F** is a Vector, then its only Properties are the **Magnitude** and **Direction**. **A force is acting on a surface A when is spread in the whole surface, differently is acting on a Point of the Surface**. Two Equal and Opposite forces acting on the same Point of a straight line can move across this line **Penetrating** each other, and continue to move forever on line, because **The Reaction to this motion is Zero**.

This Reaction to the motion is presented in all bodies having mass either are solids, or a Liquid or Gas, or Electromagnetic wave or any other Resistance to a motion. It was cleared that Work is motion is Energy, is Force moving a Material-point from one position to another, always under the Laws of Mechanics.

Because this Energy is conserved and not annihilated, therefore is needed a Closed Box to be prisoned and carried any-where in microcosm and macrocosm.

Gravitational force **G**, in order to communicate with another velocity-vector $\bar{\mathbf{v}}$ which is axial also, **is needed to Have Reaction to this motion**. In Mechanics this reaction is the stiffness **k** in a $d\mathbf{x}$, formulation, and in Electricity is when a **Charged** object (q) creates an Electric-field **E**, and **E** acting on another charged object q , produces a force $\mathbf{F} = q \mathbf{E}$. What is then this Reaction ?

As in Electricity, **Electric Energy, E**, to flow needs a **Conductor with charges, C, q**, and to a, **Stationary-charged-Electron, f_e , Electric-Field with Lines**, is the Space in order that Positive (+) moves to Negative (-) in closed loops, and **Electron's Compton frequency oscillatory** as Energy, The same to **Gravitation Force G**, which needs Material-Point as **Layer**, Space with **Spin, S**, as **Charge** in order to act as Gravity $\bar{\mathbf{g}}$. The above analogous is as below.

Force	F	\rightarrow [Unity $dx - k = \text{Reaction of } dx] \rightarrow$ k Tension in length dx
Electric-Energy	E	\rightarrow [Conductor C - charges $q = \bar{\mathbf{e}}$] \rightarrow Flow current I = V / R
Electron-Charge	$\bar{\mathbf{q}}$	\rightarrow [Electric-Field-Electric-Lines] \rightarrow Flow (+) to (-)
Gravitational-Energy	G	\rightarrow [Material-Point Unit Spin $\mathbf{S} \approx \mathbf{g}$] \rightarrow $\bar{\mathbf{g}}$ from Waves f_n

Force **G is Spread in a Layer** - a **Field**- which is the Stable-Ocean-Spins **S** becoming from the **Periodic motion of opposite**, and thus Communicates through stress **g** on $\bar{\mathbf{S}}$, which **g**, becomes from the Revolving motion of vector \mathbf{f}_n in M-P.

The How and Why follows.

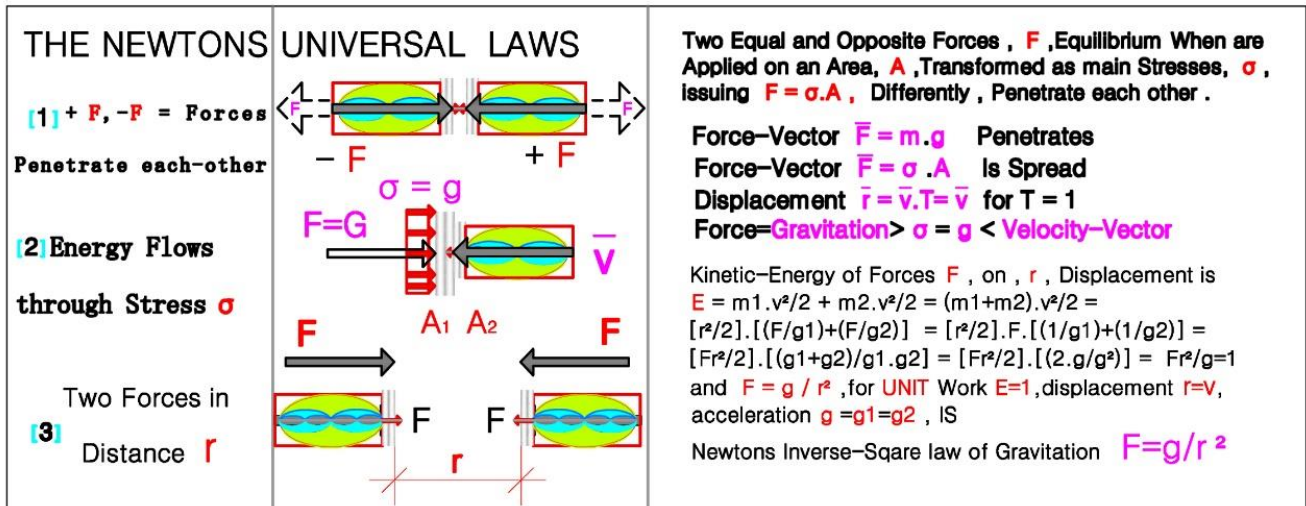


Figure – 18. The Physical and Mechanical explanation and Elucidation of ,
Newton`s Inverse Square Law of Gravity :

Question ??? How can Two Opposite and equal forces can continuously act each other without moving but only rotating .

The answer is that , \rightarrow is Needed a Small - Surface , a Layer , a Conductor , a bed an Intermediate , in which Work as Energy Produced can be Spread and Stay .

Stress σ , is the Unit-Force spread on the surface A , called Conductor-Layer-a Field where issues $F = \sigma A$. From Newton`s second Law of motion , force $F = m g$, where m , is the mass of an object on which force is applied ,and g is the acceleration of the mass . The small Surface is not Zero , but a Quantum as the Material-point is .

The above notation agrees with Euler - Cauchy Stress Principle Stress-Vector where each **Surface-force** σ , and **Body-force** G , formulate a Tensor-field where σ denotes the Normal to the Surface and , S , the Spin equilibrium with anti-Spin , so issues ,

Body-Force \rightarrow is Spread-Out in a Layer \rightarrow becomes Surface-Force as ,

Force F -Over-Field - $E \rightarrow$ [The Field is Quantum e^+] \rightarrow q -charge creating E .

Force G -Over-Layer- $A \rightarrow$ [The Layer is Quantum g] \rightarrow g -Stress on Wave and or

Force G -Over-Layer- $A \rightarrow [m * S \equiv \text{Surface - force}] \rightarrow g \equiv \text{Stress} \rightarrow$ from Wave f_n where , $m \equiv$ is the meter of the Reaction to the motion at Point \equiv The named mass and g , is the acceleration of this mass , **the Intermediate Layer** ,

- i.e..**
1. The Gravitational-force G , is the motion , **as pressure** , on G -Stress = g ,
 2. The Material-points with Spin S becoming from the Periodic acceleration $[\leftrightarrow \leftarrow] = 0$, or $\rightarrow S_{P-M}$ { of the Dipole-moment \vec{p} } is the called mass \equiv **the Reaction to motion** , while Spin S becoming from the Revolving motion $[\oplus \cup \ominus] = S_{R-M} \rightarrow f_1$, the frequency of the **Golden-ratio-Pattern** = g .
 3. Orientation-Reorientation of Spins is due to acceleration $\rightarrow g \equiv f_1 \rightarrow \vec{B}$ and ,
 4. Frequency $f_n = f_1$ in Material-point ,is the **Golden-ratio-Pattern** becoming from the Revolving motion $[\oplus \cup \ominus]$ { of momentum $\vec{B} = \text{Spin}$ } and is the **Energy** ,the **Strength** acting on g ,which is the Photon Kick-Start on masses.

In figure-18 , are shown the three cases of two Equal and Opposite forces F .

In (1) the two equal and opposite forces F and $-F$, are linearly acting on the same point of contact. The two forces with opposite vectors \vec{F} , \vec{F} penetrate in Vector - line, and do not Interact each other because these are *mass-less*, *un-stiffness*.

In (2), surfaces A_1 , A_2 , belong to each Force in order that forces can Interact, through the UNIT forces which are the equal stresses $\sigma_1, \sigma_2 = -\sigma_1$, *opposites*, on their surfaces and which Unit-Stresses exercise a pressure on surface. It is the same as in Piezoelectric effect where pressure is transformed into electric-current.

The Gravitational force G , which is a Vector $\equiv G$ - Wave, is Spread in Material Points-Ocean, as the Stresses in Layers g , consisting the Pressure of Layer, where the acceleration of Spins happens due-to The Pointy-Reorientation of Spins S_{R-M} which is called \rightarrow the Gravity, g , \leftarrow i.e. Gravity, g , is a Surface-Force-Pressure with Tensor, the infinite Spins of the Reoriented-Material-points by, \bar{g} , and is the Communication which happens between the two Forces G and g . [72]

In (3), The two opposite Forces acting on surfaces, move to a distance r , between them with a velocity vector \bar{v} such that $\bar{r} = \bar{v} \cdot T$, where T is the needed time and which for Unit time $T = 1$ then $\bar{r} = \bar{v}$ (c) i.e.

The distance r , becoming from the UNIT velocity - vector-magnitude \bar{v} and the Unit Scalar time T , consists the two vectors equal each other. The Work produced during motion is *Stored into the Layer, Surfaces*, A_1, A_2 , in order that the System of Forces-Displacement is Stationary, differently **IF Stored in force F** , System would be in motion. The Unit Work produced is considered from all other Unit monads.

The total Kinetic Energy is $E = \frac{1}{2} \cdot m_1 \cdot v_1^2 + \frac{1}{2} \cdot m_2 \cdot v_2^2$, and because $v_1 = v_2 = v$, then $E = \frac{v^2}{2} [m_1 + m_2]$, and since $m_1 = \frac{F}{g_1}$, $m_2 = \frac{F}{g_2}$, $\bar{v} = \bar{r}$, and Unit Work $E = 1$, becomes,

$$E = \frac{v^2}{2} [m_1 + m_2] = \frac{r^2}{2} \left[\frac{F}{g_1} + \frac{F}{g_2} \right] = \frac{F \cdot r^2}{2} \left[\frac{1}{g_1} + \frac{1}{g_2} \right] = \frac{F \cdot r^2}{2} \left[\frac{g_1 + g_2}{g_1 \cdot g_2} \right] = \frac{F \cdot r^2}{2} \left[\frac{2 \cdot g}{g^2} \right] = \frac{F \cdot r^2}{g} = 1$$

i.e. **The Unit force, F , between Two masses of constant Distance r , is Proportional to a Constant and Minimum Acceleration g , the Layer, Stress $g \equiv 9, 808238$, and is inverse square to the distance as $F = \frac{g}{r^2}$ (r) Newton's and Coulomb Laws.**

Gravitational-Constant Force $\equiv G$, is Spread over a minimum-Surface, the Layer or Conductor or, a-Surface, or a-Permissible path, in-where exists this Reaction to the motion and which, is called mass, so \rightarrow the Surface-force, g , becoming from the inner acceleration f_n of Material-Points, is acting on Spins \bar{B} , of all masses and consequently to all masses of the universe, as, Action $G \rightarrow$ on $\bar{g} \rightarrow$ on $\bar{B} \rightarrow$ on g_G

Remarks :

Equation (r) issues and for other Physical quantities that vary as $[1 / r^2]$ law. The Electric field of a **Point-charge** is not Uniform because it strongly weakens when the distance from the charge increases. It weakens is proportional to $(1/r^2)$ and its Field-lines, or **The Material-lines**, diverge or open-up very quickly in space. Question ?? Is it Possible to be an Electric-field that does not change with distance? Yes but how.

It was shown before that \rightarrow **a Force is acting on a surface A , when is spread in the whole surface, differently is acting on a Point of the Surface \leftarrow so**

The Electric-Field with , **Infinite-Point-charges** is Uniform , and its Strength does not change with distance . From (r) is seen also Orientation of force F ,and is g-stress, i.e. The Electric-field Orientation of a $[\oplus]$ and a $[\ominus]$ **Material-Point-charge** , separated by a distance , r , is oriented with g - orientation , and when a Unit of g-charge = \mathbf{g}_G is on a Field-line then is constantly repelled from the $[\oplus]$ and attracted toward the $[\ominus]$ a continuous **Communication which happens between the two Forces F and g** . From equation of Gravitation $G = k_E g = g \cdot [k_R g_R]$ seems that the two constants are related i.e. **act each other through Local-coefficients or through Field-lines** ,called the Medium or the **Permissible Path** . It was shown that the first Path is Gravity \mathbf{g} . Above defines that original Field-lines of Force , G , are distorted by these separate **Charges , Local-coefficients , the Layers** . The Original Field-lines terminate at the surface on one side of the Medium , and new field lines originate from the other side of it . For the **Dipole-Periodic-motion , a Pair of Field-lines Originate from the \oplus constituent and Terminates at the \ominus constituent** .

It was shown that the Momentum vector , $\bar{\mathbf{B}}$, and equal to spin \mathbf{S} , *because it is following the Stationary - Wave - Nodes - Principle in Material-Point* , creates the minimum quantized Energy which is conserved in lobes . This Property is extended also to the Number of lobes as well as to , π , number as velocity { $v = n \cdot \pi \cdot c$ } which is the minimum Number relating Lines and Surfaces .

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

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

Equation (π) shows that velocities in lobes are , $\mathbf{n \cdot \pi}$ times that of light ,following , π , number in circle , i.e. **in Material-points exist velocities multi-times that of light** and the minimum **Surface-constant** , the Unit π , or the **Growth of the velocity-vectors** occurs in lobes by following the logarithm laws of Energy-constant \mathbf{c} which is acting on Space constant π . From velocity , $v = n \cdot \pi \cdot c$, is seen that **light-velocity is the Quantum Unit-velocity** in Planck`s length . The Why velocity \mathbf{c} and π , is such in [42-51-63] . **The Minimum Total-Energy** exists in Conservative Systems , as in Planck`s system where the sum of the , Kinetic and Potential Energies , is constant in which are used Lagrange`s generalized coordinates .

The Extreme case , where surface is interchanged as line or line-segment , and is the same as the infinite small , ds ,in Calculus , where stresses $\sigma_2 = 0$ and τ_{12} are very small is equation of stresses $\sigma_{1,2} = \sigma_1 / 2 \pm (1/2) \cdot \sqrt{\sigma_1^2 + 4 \cdot \sigma_1^2} = \sigma_1 \cdot [1 \pm (\sqrt{5})] / 2$, which is the **Golden-ratio-Pattern** of Material-Point as type of a vanishing-shear due to layers laterally shifted . This minimum quantized energy σ , was proved that is going out the Material point as acceleration and creates gravity \mathbf{g} as f_n acting on Spin \mathbf{S}_{PA} .

From relation $f_n = \frac{[(1+\sqrt{5})\sigma]}{4\pi r}$ and $\bar{\mathbf{B}} = \frac{\pi r^3 \sigma}{8} [1 + \sqrt{5}]$ then force f_n **orients Spin $\bar{\mathbf{S}}$ to $\bar{\mathbf{B}}$** as $\rightarrow \bar{\mathbf{g}} = f_n \times \bar{\mathbf{B}} = |f_n| \times |\bar{\mathbf{B}}| \cdot \sin \theta = \frac{[(1+\sqrt{5})\sigma]}{4\pi r} \cdot \frac{\pi r^3 \sigma}{8} [1 + \sqrt{5}] \cdot 1 = \frac{[\sigma^2 r^2 (1+\sqrt{5})^2]}{32} = \frac{\sigma^2 r^2 \cdot \Phi^2}{8} \dots (g)$

Equation (g) which is Gravity constant \mathbf{g} , is the permeable Path for inner stress σ , to **pass the Material`s-point** surface $4\pi r^3 / 3$ and to **expenditure its energy** . The same exists also to the **Electromagnetic force** which is **associated with a fundamental property** of matter which is the **Electric-charge** . **It is a clue to the ubiquity of Electromagnetism** .

Question ??? From where **G** , is produced ? It was prior referred that ,
 Periodic excitation between **Primary Space** (+) and **Anti-Space** (-) may exist only as
 collision of opposite , so Energy is captured in Box-**B_p** containing these three constitute
 elements [(+) , [↔] , (-)] without the inner acceleration but the Material-extreme case of
 the Periodic acceleration [→ ←] = 0 , and which is the *Reciprocating motion* . So ,
 above property of **Primary Space** , exists also and for all **Primary Complex- Spaces** .
Complex Spaces either at [(+) or [(-)] constitutes may be realized , exist , *separately*
 because of the → **Primary-Opposites which Pull each other** ← therefore *the Initial*
Property of Attraction , G , between Primary-Opposites continue issuing and for All
the other infinite Composite and Complex Structures , and in all Groups of them .
 Since Force **G** is a Uniform-Pointy-Force , therefore needs a Conductor , a Layer , a
 kind of mass , to be spread and act on it as **Surface-force** , a Layer which is the **Base**
 or the **Conductor Spin** , **S** , or the **Stress g** , as an **Growing-Golden-ratio-pattern** Φ .
 Because of this **Stress-Layer g** , *all the Energy-Structures present* → Reaction to any
 motion ← i.e. *mass* . Gravity acceleration **g** , produced from the in Material-points
 acceleration is equal to the pressure σ , is the Conductor to all Waves as ,

$$\text{Force } G - \text{Over-Layer} - A \rightarrow [A \equiv \text{mass} * g] \rightarrow G_{\sigma} \equiv G - \text{Stress} = \mathbf{g} = \frac{\sigma^2 r^2 \cdot \Phi^2}{8}$$

From Figure -18(3) is seen that **Gravitational Force is Attractive** following Newton
 inverse square law, and it is an Attractive-force [↔] , *on any two opposite-elements*
 [(+) , (-)] realized **through a Layer of Unit-Stresses** [$\sigma = g$] .

c.. The Hydrogen -Structure and Onion :

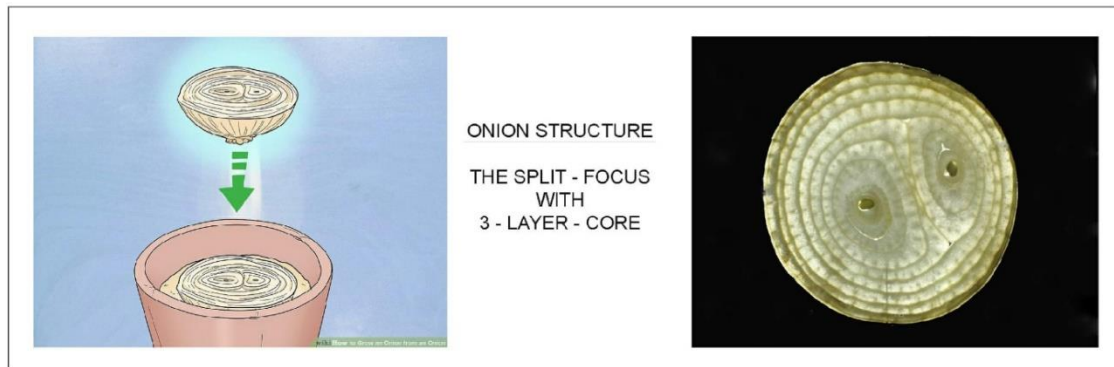


Figure – 19. The Newton`s Universal Laws in Atoms and in Onion - Structures .

The Slit-Focus-Atom structure with the three Hydrogen – Orbitals .

The Neutral Material-Points [(+) [↔] (-)] with the **Strong –Nuclear - Force**

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

are so because $f_n = [\frac{n\sigma}{8 r^2}] \cdot \bar{B}$, it is the DNA of all Energy-Structures.

In Hydrogen-Atom exists the **Minimum-Energy** of - 13,6 eV = 13,6.1,6.10⁻¹⁹ J =
 - 2,176. 10⁻¹⁸ J , and in it exists the less **Negative-charge-frequency the Electron**

with frequency $f_e = \sqrt{\frac{g}{4\pi \cdot m_e}} = 3,28399 \cdot 10^{15} / s$, mass $m_e = \frac{g}{4 \pi f_e^2} = 7,2373 \cdot 10^{-32} \text{ kg}$

from equation $4\pi \cdot f_e^2 \cdot m_e = g$. In this Minimum-Energy-cave , **H** , are Placed the

Energy-Rims by the **Electron-Planets** , following the Newton-Kepler Energy-Orbit Laws . **Energy-Rims in , H** , are the **Energy-Levels** and are trajectories with a fixed amount of Energy . This logic denotes a Potential difference between Energy-Rims , which by definition are , *the difference in electric Potential-energy of any charge $\bar{q} = \bar{e}$ at positions , A, B is the product of the charge and the difference in Electric-Potential between A,B* . Since $\bar{q} = \bar{e} = - 1,6.10^{-19}$ C and $1\text{eV} = 1,6.10^{18}$ Cx1V = $1,6.10^{-19}$ J, $[P_5 - P_4] = \bar{e} \cdot [E_{L_5} - E_{L_4}] = (-1,6.10^{-19}\text{J}) \cdot (0,850 - 0,544 = 0,306 \text{ eV}) = 4,896.10^{-20}$ J ,

The Total Energy of \bar{e} is the Kinetic and the Potential as , $E_e = E_{ke} + E_{pe}$ where $E_{ke} = [P_5 - P_4] = 4,896.10^{-20}$ J , and $m_e = 7,23732.10^{-32}$ kg . Kinetic energy ,

$$E_{ke} = m_e \cdot v_e^2 / 2 , \text{ and solving to } v_e = \sqrt{\frac{-2P_{5-4}}{m_e}} = \sqrt{\frac{2,4,896.10^{-20}}{7,237315.10^{-32}}} = 1,163182.10^6 \text{ m/s}$$

Following the above then , Atom-Energy-Levels $\equiv \Delta[E_{L_5} - E_{L_4}]$, and the velocity v_e between the Orbits become as ,

$$\begin{aligned} E_{L_1} &= 13,600 \text{ eV} , \\ E_{L_2} &= 3,400 \text{ eV} , \quad \Delta[E_{L_1} - E_{L_2}] = 10,20 \text{ eV} , \quad v_{e_{2-1}} = 6,715623. 10^6 \text{ m/s} \\ E_{L_3} &= 1,511 \text{ eV} , \quad \Delta[E_{L_2} - E_{L_3}] = 1,889 \text{ eV} , \quad v_{e_{3-2}} = 2,890029. 10^6 \\ E_{L_4} &= 0,850 \text{ eV} , \quad \Delta[E_{L_3} - E_{L_4}] = 0,661 \text{ eV} , \quad v_{e_{4-3}} = 1,709571. 10^6 \\ E_{L_5} &= 0,544 \text{ eV} , \quad \Delta[E_{L_4} - E_{L_5}] = 0,306 \text{ eV} , \quad v_{e_{5-4}} = 1,163182. 10^6 \\ E_{L_6} &= 0,378 \text{ eV} , \quad \Delta[E_{L_5} - E_{L_6}] = 0,166 \text{ eV} , \quad v_{e_{6-5}} = 8,567209. 10^5 \\ E_{L_7} &= 0,278 \text{ eV} , \quad \Delta[E_{L_6} - E_{L_7}] = 0,100 \text{ eV} , \quad v_{e_{7-6}} = 6,649457. 10^5 \text{ i.e.} \end{aligned}$$

a.. The velocities of electrons between the Higher-Energy-Orbits Decrease $\approx 0,1$ and this because the Potential-Energy between the Energy-Rims decreases .

b.. The Total-kinetic-energy of Electrons in an , **n** , Orbit is $E = (m_e \cdot v^2/2) \cdot 2n^2 = m_e \cdot v^2 \cdot n^2$, and for the First-Energy-orbit $E_1 = m_e \cdot v^2 \cdot n^2 = [m_e \cdot v^2] \cdot 1 = - 13,6 \text{ eV}$

$$\begin{aligned} E_1 &= m_e \cdot v^2 \cdot n^2 = [m_e \cdot v^2] \cdot 1 = [- 13,6 \text{ eV}] \cdot n^2 \text{ with max. } e = 2 \cdot n^2 = 2 \text{ e-Positions} \\ E_2 &= m_e \cdot v^2 \cdot n^2 = [m_e \cdot v^2] \cdot 4 = [- 13,6 \text{ eV}] \cdot n^2 \text{ with max. } e = 2 \cdot n^2 = 8 \\ E_3 &= m_e \cdot v^2 \cdot n^2 = [m_e \cdot v^2] \cdot 9 = [- 13,6 \text{ eV}] \cdot n^2 \text{ with max. } e = 2 \cdot n^2 = 18 \\ E_4 &= m_e \cdot v^2 \cdot n^2 = [m_e \cdot v^2] \cdot 16 = [- 13,6 \text{ eV}] \cdot n^2 \text{ with max. } e = 2 \cdot n^2 = 32 \\ E_5 &= m_e \cdot v^2 \cdot n^2 = [m_e \cdot v^2] \cdot 25 = [- 13,6 \text{ eV}] \cdot n^2 \text{ with max. } e = 2 \cdot n^2 = 50 \\ E_6 &= m_e \cdot v^2 \cdot n^2 = [m_e \cdot v^2] \cdot 36 = [- 13,6 \text{ eV}] \cdot n^2 \text{ with max. } e = 2 \cdot n^2 = 72 \\ E_7 &= m_e \cdot v^2 \cdot n^2 = [m_e \cdot v^2] \cdot 49 = [- 13,6 \text{ eV}] \cdot n^2 \text{ with max. } e = 2 \cdot n^2 = 98 \\ E_8 &= m_e \cdot v^2 \cdot n^2 = [m_e \cdot v^2] \cdot 64 = [- 13,6 \text{ eV}] \cdot n^2 \text{ with max. } e = 2 \cdot n^2 = 128 \\ E_9 &= m_e \cdot v^2 \cdot n^2 = [m_e \cdot v^2] \cdot 81 = [- 13,6 \text{ eV}] \cdot n^2 \text{ with max. } e = 2 \cdot n^2 = 162 \\ E_{10} &= m_e \cdot v^2 \cdot n^2 = [m_e \cdot v^2] \cdot 100 = [- 13,6 \text{ eV}] \cdot n^2 \text{ with max. } e = 2 \cdot n^2 = 200 \\ E_{11} &= m_e \cdot v^2 \cdot n^2 = [m_e \cdot v^2] \cdot 121 = [- 13,6 \text{ eV}] \cdot n^2 \text{ with max. } e = 2 \cdot n^2 = 242 \end{aligned}$$

The difference of Energy between any two orbits is , $E_n - E_{n-1}$, or

$$E_n - E_{n-1} = [m_e \cdot v^2 \cdot n^2] - [m_e \cdot v^2 \cdot (n-1)^2] = [m_e \cdot v^2] \cdot [n^2 - (n-1)^2] = [m_e \cdot v^2] \cdot [2n-1] \dots (d)$$

Equation (d) denotes the **Energy in Hydrogen-cave-Rims** for the permitted-positions of the Electrons in Rims . This frequency is the Kick-Start-Energy which applied in the **Onion-Structure** is as in Figure -19 with the **Slit-Focus** of two or four Protons . Applying above Principles , **issuing in all Energy-Structures** onto Figure -20-then

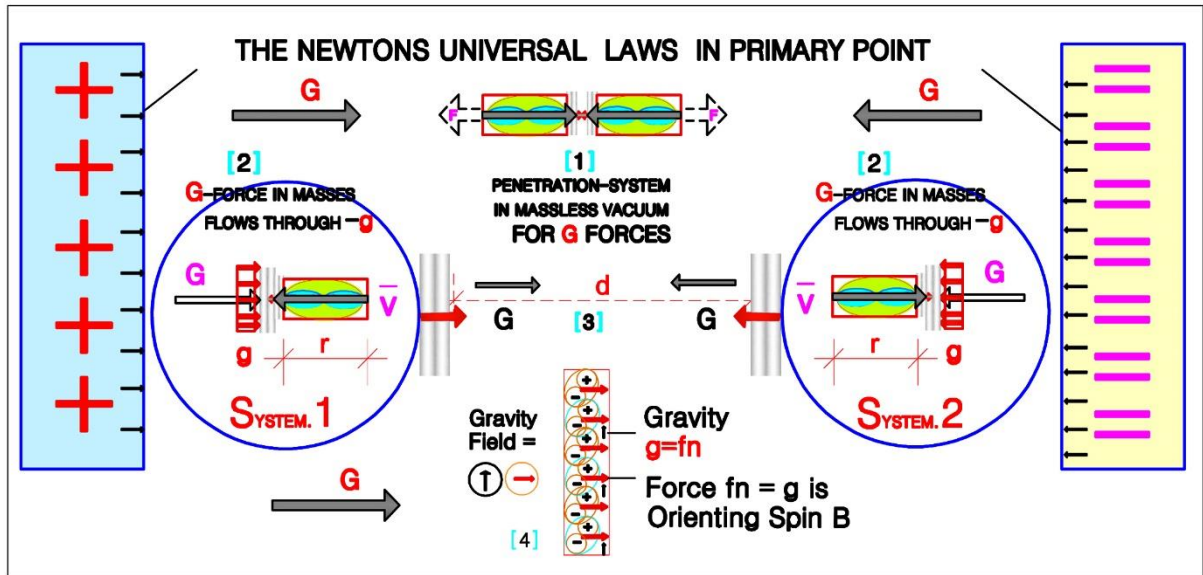


Figure – 20. The Newton`s Universal Laws in **Primary-Material-Point** ,

Above , is consisted of the Two-Primary-Opposite-Spaces , {+} {-} , Poles , with infinite points and Parallel-lines such that **G** is a **Uniform-Pointy-Force** . The STPL - Mechanism is for constructing the Elementary Particles . while Material-Points , Photons , Gravitational constant **G** , gravity **g** and Relative gravities g_E , g_L are becoming from relation ,

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

The two possible motions in the closed System of Material-point was prior remarked with Spin **S** becoming from the Periodic acceleration $[\rightarrow \leftarrow] = 0$, or $\rightarrow S_P$, and that Spin becoming from the Revolving motion $[\oplus \cup \cup \ominus] = S_R$, or $\rightarrow S_R$. Since all motions in Planck`s Space is composed of the [MFMF] Field $\rightarrow [\pm s^2] \equiv [\oplus \cup \cup \ominus] \equiv [\rightarrow \leftarrow]$, **then The Spins** S_R , produced from the **Revolving motion** $[\oplus \cup \cup \ominus]$ **of the Ocean of Material-Points** due to the [MFMF] - Layer , **create the Pressure g** , which becomes from the in-storages acceleration $f_n = a = v^2/r$, of the infinite Material-points . Frequencies f_R **Exert their Interactions** on **the Spins** S_P , due to the dipole from the **Periodic motion** $[\rightarrow \leftarrow] = 0$, **and** { This Ocean of Material-Points is due to [MFMF] Neutral Field \equiv The Stationary Periodic -Spin-Ocean } **are then Orienting this Stationary-Spin-Field** , S_P , to their **Spins** S_R , **Orientation** , i.e.

Orientation of S_P to $\rightarrow S_R \equiv$ is realised from Stress $\sigma \equiv g$.

In [1] , **The Vacuum** , { [PNS] \equiv Primary-Neutral-Space [23] } , the Space under Planck`s scale such in microcosm as in macrocosm , is the Ocean of the Spins of the Material-Points of [PNS]-Layer due to the \rightarrow Primary - Vibrations \equiv **Neutral attractive Field** \equiv Electrostatic $[\oplus \leftrightarrow \ominus]$ field \leftarrow **IS a Uniform - Electric-Field with Field-lines Parallel and Strength the same everywhere on Field - lines .**

This Property of Attractive-Forces is issuing in the **Primary-Material-Point-Layer**. Above Property of a Uniform-Electric-Field ,clues an Electrostatic force in Vacuum.

The Zero-Periodic-acceleration $[\leftrightarrow \leftarrow] = \mathbf{0}$, which issues also in all Complex and all Groups of these Energy-Structures , is on **Unpaired-M-Points-Spins** so that Spins produce a net Magnetic-field that lined between the Two-Primary-Poles $[(+),[\leftrightarrow],(-)]$, and turn the whole Universe into a **Huge-Magnet** differently if ,in a pair, the opposite directions cancel-out the effect of their partners , therefore the called , **Gravitational Constant , G , is a force , F** , which **Strength is constant** between the Primary-Poles That of Existence and That of Non-existence $[\oplus \leftrightarrow \ominus]$ *Opposites* . **i.e.**

That we call Vacuum is the Electric-Field of a Huge-Electrostatic-Magnet.

In Mechanics the only-possible continuous motion in a Finite Space is The Periodic excitation $[\leftrightarrow]$ and The Revolving motion $[(+)\cup\cup(-)]$. **Displacement** in Primary-Point is Zero for Periodic excitation , while exist Two Equal and opposite Torsional-vectors *Torque* needed for the Revolving motion .The two Torques with the same magnitude are in Stable when applied on the same axis , and when the **Net Torque is zero** .

From Newton`s law of torque $F_T = J\omega^2$ which presupposes Inertia-momentum **J** which exists after a linear-motion ,is seen that opposite Torques , **with Net Torque to be zero** , occur in Un-similarity of Space , *as are the Whirlwinds* .

When two opposite Whirlwinds , *wind turbines* , collide , their content is breaking and if their content is of a velocity vector \vec{v} , then are the velocities Breakages as in STPL [59] , where is seen how Elementary-particles Fermions and Bosons are created .

In Zero-Periodic-motion $\{\oplus \rightarrow \mathbf{d} \leftarrow \ominus\} = 0$, of a Distance , **d** , motion as Pressure CANNOT act instantly between the two Stationary constitutes , unless a Mean **d** , is mediated to transfer the Pressure of the \oplus constituent , to the \ominus constituent . This Mean is a Stationary-Primary-Material-Point $[\oplus \leftrightarrow \ominus]$ becoming from Zero-Periodic motion where the two constituents equidistant $d = n \cdot [\oplus \leftrightarrow \ominus]$, where $n = 1, 2 \dots n$

i.e. There is Not Vacuum , instead exist the Infinite Material-points created from the Periodic excitation and which are Spinning in Opposite-Pairs for Stability.

In [2] , *The Energy Chaos* , are the Elementary-particles becoming from [STPL] , i.e.

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

$[\bar{c} \cdot \nabla i]$ (©) $\rightarrow \{ (\nabla i), (+s^2), (-s^2), (+cs^2), (-cs^2) \}$, **produces** the Stationary

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

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

$[\bar{v} \cdot \nabla i]$ \rightarrow Bosons , $[\bar{c} \cdot \nabla i] \equiv$ DE \rightarrow Dark Energy **c x** (©) $[\nabla i]$

\rightarrow Gravity Force DE $\equiv [\bar{c} \cdot \nabla i] = \bar{c} [\nabla i] =$ The Travelling-Energy with **c** ,light

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

Obey Newton`s Laws of motion in all Scales , as was prior proofed .

It was prior shown that , The Inside Material - Point-pressure , **σ** , as **acceleration f_R** , gets-out M-P , and as Unit Force , the **Stress g** on dipole S, **Orients** dipole = Spins **S_P** to \rightarrow a common-Orientation **$S_P \rightarrow S_R$** and the created Stress **$\sigma = g$** .

In Energy-Chaos , exist also forces G , of Primary-Uniform-Electric-Field , therefore \rightarrow Spin S_R is oriented to $S_G \leftarrow$ which is the direction of , G .

Because Gravity - Force F_G and forces $[\nabla i]$ are stationary , and this because of above Periodic excitation $[\leftrightarrow]$ of Material-Points , then **The two Layers coincide** .

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

It was shown before that Both motions , Periodic and Rotational , exist as the Mean between the Two Primary-Opposite in PNS \equiv Primary-Neutral-Space . This Mean is the Ocean of the ,two kinds of Spins created from the inner motion in Material-points both Oriented by the acceleration \mathbf{g} , created from the Rotational-motion and which \mathbf{g} ,continually effects on Spins through which force \mathbf{G} ,Flows to all Energy structures

On this Layer exist all motions of universe.

In [64-70] is analyzed The How Energy from Chaos $[\pm s^2 \nabla i] \equiv$ MFMF Field , Becomes Spin $S \equiv \pm \Lambda \nabla i \equiv \bar{B}$ of the Discrete Elementary monads which are the three constituents of the Breakage-Principle as is , [Space \leftrightarrow Anti space Energy \equiv motion] \equiv *Periodic* $[\oplus \leftrightarrow \ominus] - [\bar{v} \cdot \nabla i]$, **and** , *Revolving* $[\oplus \cup \cup \ominus] - [\bar{v} \cdot \nabla i]$,

In [65-70] is analyzed ,The Spin $S \equiv \bar{B} \equiv$ Angular momentum of monads and their Energy Stores as frequencies , $f_n = (\frac{n\sigma}{8r^2}) \cdot \bar{B}$, $f_R = (\frac{1\sigma}{8r^2}) \cdot \bar{B}$.

In [66-70] are analyzed , The Energy-Stores in monads which are the \mathbf{n} loops \rightarrow

$$W_{n(n+1)} = [\frac{4\pi r^2 f_1}{3}] \cdot n \cdot (n+1) , f_1 = \frac{(1+\sqrt{5}) \cdot \sigma}{4\pi r} = \frac{E}{h} \text{ and } n = 1,2,3,4 \dots w_n = w^2$$

$$w_n = w^2 = [2\pi f]^2 \dots \infty , \text{ and Storages } [\mathbf{B}_p \equiv \text{EM-R} \equiv f_{1=N} , f_2 , f_3 , f_R , f_n = w^2] .$$

In [70] is analyzed , Energy-Structure of Atoms-Photons, where Kinetic-Energy as Electromagnetic wave moves Outward the cave ,following Breakage-Principle which is $\rightarrow \{ (+)E\text{-Force} \perp (-)M\text{-Force} \leftarrow \text{ and } \lambda = \frac{c}{f} \equiv E - \text{loop} \}$,

Photon is a Material-point ,the moving Storage or box $B_p \equiv [\mathbf{B}_p \equiv c / f_1 \equiv \text{EM-R} \equiv f_{1=N} , f_2 , f_3 , f_R , f_n = w^2]$ where $f_R =$ Resonance frequency w^2 , with the fix-ends of a standing wave *Inward-cave* r the Energy-Storage B_p , and *Outward-cave* , r , as an Inverse -Electromagnetic-Radiation on wavelength with wavelength $\lambda = cT = c / f$, which Electromagnetic-Radiation *carries* the **Energy-Storage** B_p , as the wings of an insect which carry their body , as the Wave-Particle-Duality . [70-72]

In [3] Any mass M between two Systems in Planck`s scale exists in the Two-motion Layers which coincide and is \rightarrow **The Spins from the Revolving motion** $[\oplus \cup \cup \ominus]$, S_R which is an Ocean of Material-Points producing acceleration f_R ,and from acceleration f_R the **Unit-Pressure** \mathbf{g} and $\rightarrow \rightarrow$ **The Spins from Periodic motion** $[\leftrightarrow] = 0$, S_p which is an Ocean of Material-Points , a **Stationary-Spin-Field** a Tensor , **Oriented** by this **Pressure** \mathbf{g} , and directed to \mathbf{g} , and \mathbf{G} -Field-orientation $.\leftarrow \leftarrow$

Any mass M of Local-gravity , g_M , k_M ,passing through this Layer between the two Systems S_1, S_2 , then on this mass M is executed a force $F_1 = M \cdot g_{M1} = M \cdot [G/g \cdot k_{M1}]$ and $F_2 = M \cdot g_{M2} = M \cdot [G/g \cdot k_{M2}]$, and for two masses $M_{1,2}$, is the three bodies Problem $[M , S_1 , S_2]$ already solved .

i.e. **Masses in Planck-System are under Newton-Forces-Laws** $\rightarrow F = G \cdot m_1 \cdot m_2 / r^2$.

In [4] , The Planck`s-System-Vacuum , $\{ [MFMF] \text{ Field } \rightarrow [\pm s^2] \equiv [\oplus \cup \cup \ominus] \equiv [\rightarrow \leftarrow] \}$ **The Spins from the Revolving motion** $[\oplus \cup \cup \ominus]$, S_R which is an Ocean of **Material Points** produce acceleration f_R , and from acceleration f_R the **Unit-Pressure** \mathbf{g} and \rightarrow **The Spins from Periodic motion** S_p , $[\oplus \leftrightarrow \ominus]$ which is an Ocean of **Material Points or Electrons** , produce **The-Stationary-Pointy-Spin-Field** , or a Tensor , is **Oriented or Re-Oriented** by this **Pressure** \mathbf{g} , of S_R and directed to \mathbf{g} . Gravity \mathbf{g} is oriented from Gravitational \mathbf{G} - Field \leftarrow Because in this Vacuum \rightarrow the Uniform-Electric-Field $[\oplus \leftrightarrow \ominus] \leftarrow$ is oriented to \mathbf{g} and \mathbf{G} ,therefore any mass M in this field is effected by \mathbf{G} force only as $F = M \cdot E_G = k_E \mathbf{g} = \mathbf{g} \cdot k_L g_L$,

Summary :

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

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

Markos-Spaces → Explain the WHY by filling the Gap with a **Double-Ocean** of the **Pointy-Spinning-Material-Points** , *becoming from the Stationary-Material-Points* , *Photon or Electron* , and from the **moving-Energy-Storages** , *the Photons* , which Orientate and Re-orientate the Stationary-Spins , and explain the HOW and the WHY all motions follow the **ubiquity** of **Electromagnetism** , starting from the Primary – Material-Points , *Photons* , and through the **Golden-ratio-frequency-Growth** effect and conserve the Whole of the Natural-World from microcosm to macrocosm .

The Electromagnetic Wave - Properties .

- 1.. **A Charged-Particle** , *it is a Particle with an electric charge* , \oplus or \ominus , produces an Electric-field \vec{E} , which exerts a force \vec{F} on other charged Particles \vec{e} .Positive charges $+\vec{e}$ accelerate in the Direction \leftarrow of the field $\vec{E} \leftarrow$ and Negative charges $-\vec{e}$ accelerate in a Direction opposite \rightarrow to that of the field \vec{E} .
- 2.. **A moving Charged-Particle** , \oplus or \ominus , produces a Magnetic-field \vec{B} , which exerts a force \vec{F} on other moving charges \vec{e} . The force \vec{F} of these charges is always perpendicular to the Direction of their Velocity-vector , therefore *Velocity* does not change and only the *Direction* of the Velocity-vector changes .
- 3.. **An accelerated-Charged-Particle** , $\vec{\oplus}$ or $\vec{\ominus}$, produces an Electro-Magnetic-Wave $\vec{E} \perp \vec{B}$, *perpendicular each other* , which are Electric and Magnetic fields travelling through empty space with the speed of light , c , and which is as a Charged-Particle oscillating about an fixed equilibrium position .The oscillation frequency , f , is the same to the E-M-Wave and which wavelength $\lambda = c / f$. E-M-Waves transport Energy through space and may be delivered any distance away from the Source .
- 4.. **Accelerated-Charges** produce changing Electric and Magnetic-fields alternately , which leads to the Propagating-Electromagnetic-Waves .

d.. The Energy-Space Constants in Nature :

A.. The Spaces :

In nature exists **Geometry** and **motion** , i.e. **Space** and **Energy** which in Mechanics is expressed as a Quaternion $\mathbf{z}^w = (\mathbf{s} + \bar{v} \nabla \mathbf{i})^w$ where , \mathbf{s} = the Space = the Stationary Geometry , \bar{v} = the Energy = the motion and , w = Index of the Spaces, **Power or Root** combined as , **Power x Root = 1** , related as $\rightarrow w$ = the Space-Power and , $1/w$ = the Anti-Space- Root .

From Mathematics , the Solution of this Complex twin is as ,

$$\begin{aligned} \mathbf{z}^w &= (\mathbf{s} + \bar{v} \nabla \mathbf{i})^w = [z_0 (\cos \varphi + i \sin \varphi)]^w = |z_0|^w \cdot [\cos (\varphi + 2k\pi)w + \boldsymbol{\varepsilon} \cdot \sin(\varphi + 2k\pi)w] \\ &= |z_0|^w \cdot \mathbf{e}^{i.kw\varphi} \quad \text{where } \rightarrow |z_0| = \sqrt{\mathbf{s}^2 + v1^2 + v2^2 + v3^2} , \quad \text{and} \\ \boldsymbol{\varepsilon} &= [v1.i + v2.j + v3.k] / [\sqrt{v1^2 + v2^2 + v3^2}] , \quad \cos \varphi = \frac{s}{|z_0|} \quad \dots\dots (s) \text{ and} \\ \mathbf{z}^{1/w} &= [\mathbf{s} + \bar{v} \nabla \mathbf{i}]^{1/w} = |z_0|^{-w} \cos (\varphi + 2k\pi)/w + i \cdot \sin(\varphi + 2k\pi/w) = |z_0|^{-w} \cdot \mathbf{e}^{-i \cdot (\varphi + 2k\pi) \cdot w} \end{aligned}$$

Above equations (s) are composed of , the Geometrical-Real-Massive-First Part , and of the Energy-Imaginary-Non-Massive-Second Part , i.e. it is the Way that motion exists in Space and which is the Massive-Box conveying the Energy which is motion.

Constant, \mathbf{k} , and Phase, ϕ , defines the **Type of Space**, where for $\phi = 0$, exist only the **Massive-Spaces** as these are the Primary-Particles. for $\phi = \pi/2$, and $k = 1$, exist **Anti-Space -caves** one of which is Planck`s-cave as $L_p \equiv e^{-i(\frac{\pi}{2}+2k\pi).b} \equiv e^{i \cdot (-5\pi/2) \cdot 1} \equiv e^{i \cdot (-5\pi/2) \cdot 1} \equiv \{ \sqrt{3} \cdot \pi \cdot 1,616199 \cdot 10^{-35} \text{ m} \}$. The Planck`s length, is an **Energy-cave**, and is the smallest **Energy-Unit of Space** and this because of Space, $s = 0$ and $k = 1$. It was proved that in these caves, motion happens as [(+) [\leftrightarrow] (-)] following equation $\ddot{x} + \omega^2 x = 0$ with solution the frequency $\frac{\omega_n}{2\pi} = f_e = \frac{1}{2\pi} \sqrt{\frac{k}{m}}$, and the Infinite motions in Sub-caves, $1 = g f_n^2 a^3 = [\frac{4\pi^2}{GM}] \cdot f_n^2 a^3$. where $k =$ The Unit-Spring-Force $\equiv [x, y, z]$ - Stress. Above solutions in Planck`s-cave are the Infinite-moving-Particles in this cosmos.

B.. The Forces :

It was Proved that **Force G** is communicating to all **Its-Done-Work**, i.e. **to all other Spaces Anti-spaces Sub-spaces and Energies, By-Pressure-on** $\rightarrow \rightarrow$

- a.. \rightarrow The light-velocity, c , to create **Stress - g** - in min-Planck-length cave - L_p ,
- b.. \rightarrow Stress g , to Enter the Critical-cave a_c , in L_p , with minimum-Energy and create the **Hydrogen-cave, L_H** ,
- c.. \rightarrow Critical cave a_c , the Unit-Energy-Space-meters, g, π , and through Photon vibration f_n , to create the **Electron, e**, and **Charges, q**. as follows,

1.. The Gravitation Constant G :

In universe **exists Only-One-Force, The Gravitational-force G**, which is constant in all universe, therefore being constant, becomes from an Conservative -System. In Mechanics, a force **F** produces the Work **W**, when it removes the point of action from a Position, A, to another Position, B, as the equation, **W = F.ds**, where ds = the displacement |AB|. This right definition automatically defines that all this work in universe, **which is Space and Energy**, has been produced by this Unique force **G**. It was prior proved, that one of the smallest **Energy-Unit of Space** is the Planck`s length, and **is an Energy-cave**, and this because from (s) Space $s = 0$ and type $k = 1$. Energy which is motion is kept in a Massive-Box- B_p called **Photon** or **Energy-Storage**. As wave the Storage $B_p \equiv EM-R \equiv f_{1=N}, f_2, f_3, f_D, f_n = \omega^2 \equiv n \frac{(1+\sqrt{5})\sigma}{4\pi r} = \frac{n\sigma \cdot B}{8 r^2} = \frac{[\sqrt{5}+1]}{2} \cdot \Phi$ travels with light velocity, c , as the Electromagnetic Wave $[\epsilon E^2 + \mu B^2] = 2 \cdot \lambda c \cdot \sin 2\phi$ and as Particle $[\bar{v} = \bar{c} = \lambda f]$. **In both cases carry the in box Golden-ratio-frequency Φ , everywhere and anywhere such in microcosm and in macrocosm.**

Gravitational force **G**, in order to communicate with another velocity-vector \bar{v} which is axial also, **is needed to Have Reaction to this motion**, i.e. Gravitational-Energy **G** through Waves $f_n \rightarrow$ [on Material-Point Unit Spin $S \approx g$] is acting on stress $g \rightarrow \bar{g}$. Force **G is Spread in a Layer - a Field** which is the Stable-Ocean-Spins **S** becoming from the *Periodic motion*, and thus Communicates through stress g on \bar{S} as stress g , It was proved that the **Electron-Spin** is $\rightarrow S/2 = 1,4603748 \cdot 10^{-34}$ Joules, which is the same to the Material-point-Periodic-motion-Spin following the **Tack-Geometry**. **So, Gravitational-constant G**, is shown to be the Electric-Field-lines, **i.e. the Space**, of a Huge Electrostatic-Magnet from the Two-Opposite-Primary-charges, **which is the Energy Part**, of Primary-Point \oplus to \ominus .

2.. The Gravity-Stress g :

The Centripetal acceleration in Photon cave , due to pressure σ , is the Golden ratio frequencies $\rightarrow \{f_n = [\frac{n\sigma}{8r^2}].\bar{B} \equiv \frac{(1+\sqrt{5}).\sigma}{4\pi r} = \frac{E}{h}\}$, **the box B_p** , carried with Light velocity c and pressed into the Planck`s cave , as $\mathbf{nc} = \mathbf{c.c.c}$, becomes the **Gravity g** , a stress by which Gravitational-force is communicating , as $g_G = s.[\frac{\pi r v^4}{2}].e^3 = 9,808238 \text{ m/s}$.

Gravity is the minimum Unit-Stress-monad in Planck`s scale becoming from M-Point which is Under -Planck`s - length region . 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 is

$k = \frac{\text{System Area}}{\text{System Mass}} G$ where $\rightarrow \frac{1}{g} = \frac{k}{G} = \frac{\text{System Area}}{\text{System Mass}}$ and $G = k g$, and for the Earth

$G \equiv g.k_E \equiv g.[g_L k_L] \equiv [\frac{T^2_P}{a^3}].[g_L k_L] \equiv 9,808238 * 6,8116.10^{-12} \equiv 6,68056.10^{-11} \frac{m^3}{Ns^2}$

And G , is The Pulling and Cohesive Force on all the Quantized-Energy-Structures which communicates with everything due to **Periodic excitation** on all Spaces .

From equation $g = G / [g_L k_L]$, is seen that g becomes from G under Local-laws ,

So, Gravity g , is the **Unit-Energy-Path** , *Quanta of Gravitation* , due to M-Point frequency $f_g \cong \sigma$ from the Revolving motion , and also the **Unit-Energy-Stress** per Surface and for Force - G , *is the Permitted path* , the communication Conductor on all Energy Wave Structures , In and Out Planck`s length .

3.. The Hydrogen cave H :

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

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

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

$f_N = n \frac{(1+\sqrt{5})\sigma}{4\pi r} = \frac{n\sigma.\bar{B}}{8r^2}$. For a Damping-cave $\rightarrow r(t) = r(t+w) \leftarrow$ as Planck`s scale is

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

in the min , r) issues this Unit-Stress-Gravity g , as $k = E = \frac{T^2}{a^3} = g = \frac{1}{f^2 . a^3}$, i.e. \rightarrow

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

Quantity of Energy-cave and is the Hydrogen-Atom , where $gf^2 \equiv$ the **Energy-Part** embodied with stress g , and cave a^3 , is the **Space-Part** , in 3-DOF space as \rightarrow

$T^2 = g a^3 = 9,808238.[2,1145016.10^{-11}]^3 = 9,2728158.10^{-32} \text{ s}$, and Period

$T = 3,04513.10^{-16} \text{ s}$, or frequency $f = 3,2839982.10^{15} /s$. From equation $E = h f =$

$6.62607.10^{-34} . 3,2839982.10^{15} = 2,175999. 10^{-18} \text{ J} / (1,6. 10^{-19}) = \mathbf{13,59999 \text{ eV}}$
Above Quantized Energy of 13,59999 eV correspond to Hydrogen-Atom-cave .

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

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

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

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

from Total-energy $E = -\frac{GMm}{2a}$, Rotational-Momentum $L = \sqrt{(1-e^2).GMm^2.a}$
 eccentricity $e = 0$, $GMm = -2aE$, and then $\rightarrow L^2 = GMm^2.a = -2aE[a] = -2a^2E$.

**i.e. Equation $L^2 = -2a^2.E$, denotes that Angular -Momentum L ,
 in Orbit - Rims is always Negative and equal to , $L = - a \sqrt{2E}$.**

So, Hydrogen-Atom, is the minimum-Energy-cave in Planck`s-Length, occupying
 the minimum **Negative-Energy** in Rims, *the Space*, where Quantum-Energy-Rims are
 the Plane Traces-Conductors in where can roll the \ominus charged Electrons .

4.. The Electron-charge e :

From relation $G \equiv g.k_E \equiv g.[g_L k_L] \equiv [\frac{T^2_P}{a^3}].[g_L k_L] = g k$, is seen that
 Gravitational-Force G , is **The Spring-like central-force** from a fix point, *the Source*,
 on an attached, *probe*, mass as $\rightarrow F = -k r = -k r.\bar{r}$, as 1-DOF equation, $\ddot{r} + \omega^2 r = 0$,
 where $k =$ The Unit-Spring-Force \equiv [*meter* of area].[*meter* of force \equiv *stress*] $\equiv \pi g \equiv$
 with a general solution $r = A \sin \omega_n t + B \cos \omega_n t$, where A, B are constants and
 evaluated from the initial conditions which become $r = [\dot{x}(0)/\omega_n].\sin \omega_n t + x(0).\cos \omega_n t$

Above equation represents the **Natural-frequency of the Celestial-Structures**, and
 for Planck`s length the only one **Primary-particle** occupying the less **frequency**
 and **Negative-charge**, and **is the electron** with equation having solution as ,

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

From Planck`s min-equation $f_e = E/h = [-13,6 \times 1,6.10^{-19} = 2,176.10^{-18} \text{ Joule}] /$
 $[6,6262.10^{-34} \text{ J.s}] = \mathbf{3, 283998.10^{15} /s}$, where in Hydrogen atom $E = hf = -13,6 \text{ eV}$
 Substituting all the *minimum-meters of Planck`s scale* then, **Electron mass is** ,

$$m_e = \frac{g}{4\pi f_e^2} = \frac{9,808238}{4.\pi.[3,28399.10^{15}]^2} = \mathbf{-7, 2373149. 10^{-32} \text{ kg}} \dots\dots\dots (4b)$$

$$f_e = \mathbf{3, 283998.10^{15} /s}$$
, and $L_e = \mathbf{2, 3762992.10^{-16} \text{ m}} \dots\dots\dots(4c)$

Relation $4\pi^2 f_e^2 . m_e = k = \pi g$, denotes that Electric-field generated by an electron has
 both, a component oscillating at the Electron`s - Compton - frequency f_e , **which is**
The Energy-part, and the Non-oscillating component, the Electric-field-lines as the
 Energy-Conductor, **The Space-part**, which is connecting Gravity with Electric-field.
So, Electron, is the minimum-Energy massive particle in Hydrogen-cave $\{-13,6 \text{ eV}\}$,
 becoming from Material-point In Planck`s-length, *minimum-cave*, occupying the less
 Unit **frequency in Planck`s -Length, with Negative-charge** $\{f_e = 3,283998.10^{15} /s\}$.
 Because of the **Negative-Energy** in Hydrogen-cave, and the less-Negative Energy of
 Rims which consist the Plane-traces-Conductors or the Paths in-where electrons roll so
 Energy Rims consist the Energy-minimum-Paths in Hydrogen-cave-Potentials as ,
 $E_n - E_{n-1} = [m_e.v^2] . [2n-1]$, where the electrons, **the Electric-Charges**, roll .
 It was proved that the **Electron-Spin** is $S/2 = E / \pi = 4,587903. 10^{-34} / 3,1415926 =$
 $\mathbf{1,4603748. 10^{-34} \text{ Joules}}$, which is the same to the Material-point- Periodic- motion
 Spin following the **Tack-Geometry** .

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

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

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

Because Gravitational Force is equal to \rightarrow the Geometric-Resultant of light-velocity **c**, acting on **Electron-Unit-Charge \bar{q}** \leftarrow or, $G = c \sqrt{2} \bar{q}$, then Electron-Charge, $\bar{q} = \frac{G}{c \sqrt{2}} = \frac{6,680561 \cdot 10^{-11}}{1,414292,9979346 \cdot 10^8} = 1,58 \cdot 10^{-19} C$.

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

$$\bar{q}_P = \frac{G}{\sqrt{2} \cdot f} = \frac{G \cdot h}{\sqrt{2} \cdot E} = \frac{[6,680561 \cdot 10^{-11}] \cdot [6,62606957 \cdot 10^{-19}]}{\sqrt{2} \cdot E} = 3,13 \cdot 10^{-44} C.$$

The Three-Types of motion are,

Linear-motion $\rightarrow f_n = \frac{1}{2\pi} \sqrt{\frac{k}{m}} \rightarrow 4 \pi^2 f^2 \cdot m = k \dots(1)$ and $f^2 = \frac{k}{4 \cdot \pi^2 \cdot m}$

Orbital-motion $\rightarrow a = \sqrt[3]{\frac{1}{k \cdot f^2}} \rightarrow \frac{1}{f^2 \cdot a^3} = k \dots(2)$ and $f^2 = \frac{1}{k \cdot a^3}$

Tack-Periodic-Orbital-motion $\rightarrow k = 4\pi^2 \cdot f^2 \cdot m = \frac{1}{f^2 \cdot a^3} \dots(3)$ and $f^2 = \frac{1}{k \cdot a^3} = \frac{k}{4 \cdot \pi^2 \cdot m}$

From (1) Spring-force $k \Delta = G = mg$ where Δ is the Unstretched-position \equiv The Statical deflection of mass and $w^2 = k / m$ with Natural-Period $T = 2\pi \sqrt{m/k}$ and the Natural

frequency $f_n = \frac{1}{2\pi} \sqrt{\frac{k}{m}} = \frac{1}{2\pi} \sqrt{\frac{g}{\Delta}}$, where f_n, w_n depend only on the mass and stiffness.

From (3) then $\rightarrow m = \frac{k^2 \cdot a^3}{4 \cdot \pi^2}$ and for $k = 1$, $m = \frac{[1,61622837 \cdot 10^{-35}]^3}{4 \cdot \pi^3} = 1,06942 \cdot 10^{-106} Kg$

From (3) in Planck-Length and $k = 1$, $m = \frac{1}{4 \cdot \pi^2 \cdot L_p^3 \cdot f^4} = \frac{[5,9997356 \cdot 10^{-102}]}{f^4} \dots Kg$

5.. The Electromagnetic Waves :

Photon is a Material-Point i.e. a Storage or a Packet of Energies $f_n = E / h$, travelling with the speed of light, Beyond or In Planck`s-Length as.

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

its Wavelength $\lambda_N = \frac{8 \cdot r \cdot c}{n \sigma^2 \cdot (1+\sqrt{5})} = \frac{8 r^2 c}{n \sigma \bar{B}} = \frac{c h}{E}$, **it is the Amount**, the meter of motion, **in the Augmented-Golden-Ratio-Pattern Φ** , which flows through the Stress the pressure

$\equiv g = \sigma$, and **Orients** the **Periodic** and **Stationary-Spin-Field**. The eternal motion of the \oplus constituent on the \ominus constituent creates the lobes in Photon, $f_n \equiv f_1$ in loop r , which gets out the cave and is the Golden-ratio-Pattern in all nature.

Because Electron is a Material-point with \pm **Spin** therefore Electrons are of, + and – **charge** and from equation $4\pi^2 f_e^2 \cdot m_e = k = \pi g$, and with $f_e \equiv f_n$ acting on m_e . Oscillating component happens from frequency, $f_n = E_n / h \equiv \pm$ **charge**, while the Non-Oscillating component happens in the Unit-Space, π , **as tracks \equiv Electric Field-lines**, for the Conservation of Energy. From equation $4\pi^2 f_e^2 \cdot m_e = k = \pi g$ then $4\pi \cdot f_e^2 \cdot m_e = g$, and $f_e^2 = g / [4\pi \cdot m_e]$, and $f_e = \sqrt{\frac{g}{4\pi \cdot m_e}} [E_{n=H} / h] = \pm$ Charge ..(c)

Equation (c) applied on Planck`s-System gives **Electron** as the **minimum-Energy Charge particle of Hydrogen-cave**, i.e. that Material-Point which has minimum Energy E_H , as that of Hydrogen-cave, where also frequency,

$$f_n \equiv f_{H \rightarrow e} = \sqrt{\frac{g}{4\pi \cdot m_e}} [E_{n=H} / h] \text{ and frequency } f_{H \rightarrow e} \text{ is in the minimum Hydrogen-cave.}$$

1.. A Stationary-Charged-Particle Generates an Electric-Field E, the same creates **Electron** also which has both a component Oscillating at the electron` Compton frequency and a Non oscillating Component which is the Electric-field-lines πg . **Energy is the motion** of the $[\oplus]$ + **charge** to the $[\ominus]$ - **charge**, in Electric-Field Lines which are **The Space**, π , and because Electric-lines are closed loops the Work done from this inner motion is always zero. Electron is a, $\pm q$, Charge frequency $f_e \equiv \text{Hz}$ and it is the number of waves per unit of time which creates an Electric-Field **E**, and in order that motion is conserved and which is in a bounded field, *the reaction to the motion of Electron and Electric-Field*, and it is mass m_e .

i.e. Because motion \equiv Energy or, the \oplus charge moves to \ominus charge, $\{+\} \leftrightarrow \{-\}$ and because this happens in Energy-Closed-lines, therefore this motion is the Harmonic Oscillation and oscillating about an fixed equilibrium position with a Period $T = 1 / f_e$, and which motion is conserved in the, πg – field.

The $k = \pi g$, denotes the \oplus **Space** \equiv Electric-field in-where exist the Electric-lines the tracks for the motion of electrons \ominus **Anti-space**. The Right-Angular momentum vector $AM \equiv \uparrow$ is the Produced Work and stored in Magnetic-field as motion while vector $AM \equiv \downarrow$ is the Produced Work and stored in the opposite Magnetic field as motion and both consist Dipole $[\oplus \cup \otimes \cup \ominus]$ vector directed to $[\oplus \rightarrow \ominus]$ as is **for Tack-Geometry**. For Material-Point, the chains of Spins due to Periodic excitation $[\leftrightarrow]$, is created in a Magnetic field due to LRC-circuit and which is tuning to the critical Quantum and critical-State g_G . The **chains of Spins** are pointy vibrating with their characteristic Golden-ratio-frequencies.

2.. A moving Charged-Particle, which is as the above Electric-field, produces an **Magnetic-field \vec{B}** , which exerts a Force \vec{F} on other moving charges \vec{e} . The force \vec{F} of these charges is always Perpendicular to the Direction of their Velocity-vector, and so *Velocity* does not change and only the *Direction* of the Velocity-vector changes. The **Generated-Electric and Magnetic-field** by a moving **Electron**, which has both components Oscillating at the electron` Compton frequency f_e , are Independent each other for the Electron Uniform-motion and Dependent for accelerating motion.

Oscillating components *derivate each other* by depositing the Work \equiv Energy which is Produced . Motion is conserved through the interchange of motion from Electric-field to the Transverse-Magnetic-field continually following the **Tack-Geometry** , i.e. that Mould which creates \pm Spin in the Uniform-Electric-Field [$\oplus \leftrightarrow \ominus$].

Since **Energy** is the motion of the [\oplus] + **charge** to the [\ominus] - **charge** , which follows the Electric-lines and which is , **The Space π** , and because Electric-lines are closed loops and the Work-Done is always zero , **Therefore is Needed** another equal to **E** System of Storage , in-where this Work is stored without producing Work , and which System in Vectors is the Perpendicular to Electric and Velocity-vector i.e.

Magnetic-Field , M , is the **Work-Done-Storage** , becoming from the Electric-Field or by any other charge for cases as that of Electron`s , but when Electric-Field becomes zero , and this happens when velocity is , $-v$, then **Electron - Storage is absorbed and is conserved** ,Not annihilated ,in contradiction to the Electric-Field of Photon which is automatically deputed by the Inner-Cave- frequencies as ,

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

3.. An Accelerated Charged-Particle , which is an Electric and an Magnetic-field , produces **Electro-Magnetic Field \bar{B}** exerting a Force \bar{F} on other moving charges. The **Generated-Electric and Magnetic-field** by accelerated **Electrons** , which has both components Oscillating at the electron` Compton frequency f_e , are Dependent and are derivative each other by depositing the Work \equiv Energy produced . As in (2) issues , **The Magnetic-Field** is the **Storage** for the **Work-Done** by an Electric-Field or by any other Charges . **Electron`s-Electric-Field** becomes zero only when the acceleration is annihilated and is as prior (2) , while for Photon-Electric-Field , which is a moving - Storage and instantly deputed by the inner frequencies as ,

$$f_n \equiv [B_p \equiv \mathbf{EM-R} \equiv f_{1=N} , f_2 , f_3 , f_D ,, f_n = w_n^2] .$$

The Work produced from the Gravitational-force **G** , { Force G ,exists as constant in all universe therefore becomes from an Conservative-System} **in the Undamped-Planck Conservative -System , IS** for free vibration \rightarrow [Party-Kinetic-energy $\equiv K_E$ and Party Potential-Energy $\equiv P_E$] \leftarrow and The Kinetic - energy $\equiv K_E$ **is stored in** the Mass \equiv The Moving-Energy-storage which is **Photons** , by virtue of its velocity-vector **c** , whereas Potential-Energy $\equiv P_E$ **is stored in** the form of Strain-Energy in Elastic Deformation which is the **Material-Point** , or Work-done in a **Force field** such as **Gravity-field g_F** . **Constant G is a Force** , *the Mould* , for the **First-kick-Start** upon this Unit-Stress and Granular-Layer , **g** , is **the mechanism** , to formulate in orbit , **a** , of Planck`s cave \rightarrow

*The lightest and the less-mass Particle of this universe , which is
The Hydrogen with The minimum Quantized - energy of 13,6 eV. \leftarrow*

Since the Total-Energy of , -13,6 eV ,of Hydrogen cave is constant , **the Hydrogen-cave System is Conservative** , and differential equation of motion can also be established by the principle of conservation of energy and for the free vibration of this undamped System the energy is Party-kinetic and Party - potential . The Kinetic-energy K_E is stored in the mass by virtue of its velocity , where the Potential-energy P_E , is stored in the form of strain-energy in the Elastic-deformation , **πg fields** ,or the **Work done in the Hydrogen-Force- field** , is such as that of the less-mass Particle of this universe. **Electron is the minimum -Energy massive particle becoming from Material-point in Planck`s-min-length-cave, occupying the less-Unit-frequency in Planck-Length with Negative-charge . The Negative-Energy in Hydrogen-cave , and the less**

Negative for Energy-Rims consist the Closed-Plane-traces-Conductors or the Paths in-where the electrons roll as is Rim-Voltage $E_n - E_{n-1} = [m_e \cdot v^2] \cdot [2n-1]$.

6.. Electron and Photon Charge :

The Electric charge is given by the equation $Q = I \cdot t \equiv \text{Charge}$ where , I = electric current , t = one second and are measured as , \bar{q} (Coulomb) = A (Ampere) . s (second) , or when a Negative Charge , q , moving with velocity , v , penetrates a Magnetic field M the charge ,*the Quantity of Energy* \equiv *the executed Work* ,is subject to a force as $F = qvB$. In Magnetic fields exist , *the Voltage electricity* , and not the current electricity.

The Kinetic-Energy of the Electron in a Magnetic-field is $K_E = \frac{m_e c^2}{2} = q V \dots(1)$, where V = the Voltage of Field , *the Electrical Field* E . Using Electron equation

$4 \pi f^2_e m_e = g$, then (1) becomes $V_P = \left[\frac{g}{4\pi f^2_e} \right] \frac{c^2}{2q} = \frac{g c^2}{8\pi f^2 \cdot q} \dots(2)$.Because Charge q in a

Magnetic Field M creates an Electric-Field E acting on Charge q ,and the acting Force per second creates Work which is conserved and coincide with the Planck`s constant h , and this because $h \rightarrow J s = N m s = \text{Power}$, then from relation , *Energy = Power x Time* , equation (2) becomes as the , Beyond Planck`s length q from (1) , and in-Voltage V as ,

$$\bar{q} \equiv \frac{K_E}{V_P = 1} = \frac{m_e c^2}{2} = \frac{g c^2}{8\pi f^2 \cdot 1} \quad \text{and} \quad \bar{V} \equiv V_P \equiv \frac{c \cdot \text{Charge}}{\text{Total-Energy} = h} = \frac{c \cdot \bar{q}}{h} \dots\dots (3)$$

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

$a = \sqrt[3]{\frac{1}{k \cdot f^2}}$, for **Unit-Energy-Space-frequency** $k = g$, $a = \pi$, then $\rightarrow g \cdot f^2 \cdot \pi^3 = 1 \dots(4)$

Frequency $f_n = \sqrt[2]{\frac{1}{g \cdot \pi^3}} = \sqrt[2]{\frac{1}{9,808238 \cdot \pi^3}} = 1,8133418 \cdot 10^{-3}$, i.e. **The Unit-Charge-Cave** \bar{q} into Hydrogen cave [$a = 1,82043047 \cdot 10^{-12} m$]. [$1,813342 \cdot 10^{-3} / s$] = **3,3010625** . 10^{-15} C

Using equation (1) then Charge and Voltage is the *Self-Growing* Property of frequency f_n in Material-point therefore and for Hydrogen-cave is equal to $\rightarrow \bar{q} \cdot \Phi$ as ,

$$\bar{q}_P = \frac{9,808238 \cdot (2,99799346)^2 \cdot 10^{16}}{8\pi \cdot (3,28399 \cdot 10^{15} / s)^2} = \mathbf{3,2524072 \cdot 10^{-15}} \quad \text{Kg m}^2 / s \text{ , and Voltage from (3)}$$

$$V_P = \left[\frac{3,252407 \cdot 10^{-15} \cdot 2,99798 \cdot 10^8 \text{ Nms}}{6,62606957 \cdot 10^{-34} \text{ Js}} \right] = \mathbf{1,4715588 \cdot 10^{27}} \quad \text{Volt} \quad \dots\dots(4)$$

It is the Electron-Charge-Voltage for Beyond Planck`s-length .

Remarks :

- 1.. Electron Charge follows the *Tack-Geometry* , which denotes the *Periodic excitation* as the motion of , \oplus constituent to the \ominus constituent , **Not** in loop ($\oplus \rightarrow \ominus$) **But** through the **Oneway-** N-Electric-Paths [$\oplus \ll \rightarrow \ominus$] , which formulate the **Electric Field-Pattern** , following charge-equation $\rightarrow \bar{q} \equiv \frac{m_e c^2}{2} = \frac{g c^2}{8\pi f^2} = \frac{G c^2}{8\pi k_e f^2}$
- 2.. Material-Point-Charge follows the same *Tack-Geometry* , which denotes the before *Periodic excitation* as the motion of , \oplus constituent to the \ominus constituent , **Not** in loop ($\oplus \rightarrow \ominus$) **But** through the **Oneway-** N-Electric-Paths [$\oplus \ll \rightarrow \ominus$] , which is formulating the **Material-Point-Pattern** , following the equation of charge as $\rightarrow E \equiv \frac{m_p c^2}{2} = \frac{m_p \omega^2 \cdot r^2}{2} = \frac{m_p r^2}{2} (2\pi f)^2 = 2\pi^2 r^2 \cdot m_p \cdot f^2 = 2\pi^2 r^2 \cdot m_p \cdot \left[\frac{\Phi \cdot \sigma}{[2\pi r]} \right]^2 = \frac{m_p \sigma^2 \cdot \Phi^2}{2}$ and since $\bar{B} = r \cdot \sigma \cdot [1 + \sqrt{5}] = 2r \cdot \sigma \cdot \Phi$, then **Charge** $\bar{E} = \frac{m_p \sigma^2 \cdot \Phi^2}{2} = \frac{\pi \cdot m_p}{2} \bar{B}$ **i.e. Charges in Stationary-Material-points** are the same as those of *Rotational-motion*

Equal to **The Self-Growing-Φ-Property of frequency f_n** in Photon-Material-Point. **Because Gravitational Force** is equal to \rightarrow the Geometric-Resultant of light-velocity c , acting on **Electron-Unit-Charge \bar{q}** \leftarrow or, $G = c \sqrt{2} \bar{q}$, then Electron-Charge,

$$\bar{q} = \frac{G}{c\sqrt{2}} = \frac{g \cdot k_e}{c\sqrt{2}} = \frac{6,680561 \cdot 10^{-11}}{1,414292,9979346 \cdot 10^8} = 1,58 \cdot 10^{-19} \text{ C} .$$

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

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

THE STATIONARY ELECTRON AND PHOTON CHARGE :

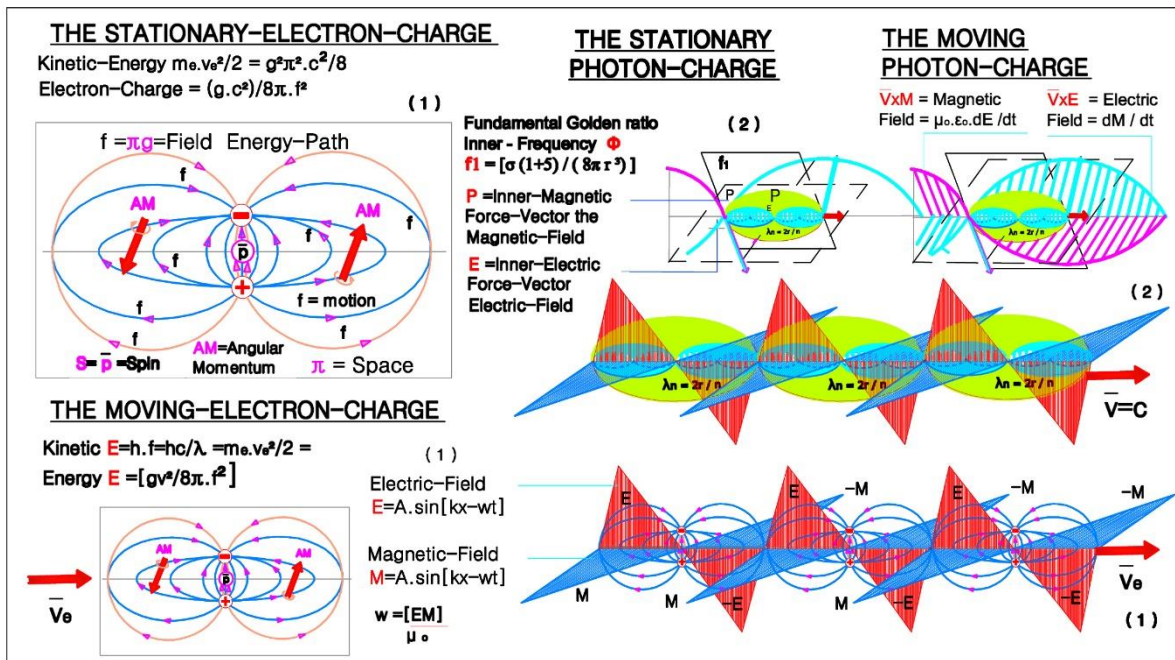


Figure 21. The Conservation of **motion \equiv Energy** in the **Primary-Material-Points** . The Stationary-Charged-Particle is as equation , $g \cdot f^2 \cdot \pi^3 = 1$, where π is the Closed Space , πg is the Stationary-Electric-Lines , and $f^1 = \sqrt[2]{g^{-1} \pi^{-3}}$, the motion = Energy = **the Stress** in the Two and Opposite-Spaces , $[\{ + \} \rightarrow \{ - \}]$, or in the consisted Poles , with infinite Points and Parallel-lines such as G which is an Uniform-Pointy-Force and Spin becoming from , $\uparrow \leftrightarrow \downarrow$ Antiparallel-Angular-momentum vectors \bar{B} . Electrons can be spinning clockwise or anti-clockwise and propagate on a Spiral trajectory A true definition of what is Electric-Charge and Electricity based on above follows .

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

which is constant and also from Unit-Voltage in Planck`s length . Since Energy is produced from motion , which is the continuous removal of $[\{ + \} \rightarrow \{ - \}]$ and because it occurs in Closed-loops , *The Electric-field-lines f* , in Space π and Energy-Field $\pi \cdot g$ in g cave , therefore is Zero , and this because Total-work $W = F \cdot s = F \cdot 0 = h f = 0$.

The Geometry of cave (Tack-Geometry) **controls the Electric-field** , so that Stability and equilibrium to exist by the two opposite closed-motions and created from the two opposite-parallel Angular Momentum vectors , M_u, M_d , at distance , r , and thus to be created the Electron-Spin $S = M_u \times [\{ + \} \rightarrow \{ - \}] / 2$ acting on the $[\{ + \} \rightarrow \{ - \}]$ axis . **i.e.**

The Stationary-Electron-Charge is the Storage in $r \equiv g$, cave in-where the *Space* and *Anti-space* , as πg , and as Stationary-Electric-Lines are creating Potential-Energy P_E , with such Geometry that , **to exist from the linear-motion stored in the form of Dipole-rotation with a changing-Spin , S , and of frequency $f = 1/T$ in the min-cave.**

Here is cleared that frequency $f_e = v/r = w$ of Electron is the Energy as angular-velocity motion in r cave and because in cave exists as , **the Natural-Frequency $f_n = \sqrt[2]{g^{-1}\pi^{-3}}$** of cave in Electric-Field-lines $E = g \pi$, and from Unit-Energy-Space relation $g.f^2.\pi^3 = 1$ frequency is the quantity of Energy-field \equiv the Electric-Charge \equiv **the Source of motion.** From equation (3) Charge \bar{q} multiplied to Potential V , produces the quantity of Unit Energy as m^3/π in , g , space .

Here is remarked , *what is a Force* also *what is Energy* and *what is the Work* , i.e.

Force is the Voltage $V = K_E/\bar{q} \equiv$ Energy / Unit-energy \equiv Energy , is acting on Electron mass $m_e = g / 4 \pi f_e^2$ and stores this Kinetic-Energy with light-velocity which is the Work in the Surface-Electric-Field $E = g \pi$. In (1) the **Electrostatic Unit of Charge \bar{q}_p** *the quantity which when concentrated at a point $\{+\}$ and placed at a unit distance from an equal and un-similarly concentrated quantity $\{-\}$, is **the Pulling with a Unit-force** .*

Mass m_e is the reaction to this Inner motion of [$\{+\} \rightarrow \{-\}$] and consists the **Granular-Storage of Energy motion** , *which is vibration in a closed loop* , and it is a measurable Physical-quantity denoting the Geometry of Electron in r , cave and Periodic-motion.

The Geometry of the Periodic motion issues the same such as for Electron and Material point with different the cave and the one-frequency as $f_e = \frac{(1+\sqrt{5}) \cdot \sigma}{4\pi r} \bar{B}$.

Electric-current is the flow of the Electric-Charges and which is the moving-quantity of Charges . Since **Electrons** and **Electric Charge** exists in , $g \pi$ level , therefore is the property that controls all interactions between Bodies through the **Electrical-forces** .

The-Moving-Electron-Charge Is consisted of the above **Energy - Storage** , the g in **min-cave** , occupying **All Properties of the Stationary-Electron-Charge** , additionally the Kinetic-energy $E = \frac{m_e v^2}{2} = g \cdot v_e^2 / 8\pi f_e^2 = \bar{q}_e V = h \cdot f_e$, and $g \cdot v_e^2 = 8\pi h \cdot f_e^3$ or

$[v_e^2/f_e^3] = 8\pi h / g = \text{constant}$, i.e. The **Electron-velocity squared to Electron`s- cube Frequency** is constant . This Kinetic-energy creates angular velocity $w = 2E/B = \frac{m_e v^2}{B}$

and the Inwards transverse Electromagnetic-Waves , $E \perp M$, travelling with v_e , velocity as $E = A \cdot \sin[kx-wt]$ and $M = A \cdot \sin[kx-wt]$, and $E = M = A \cdot [1 - \sin wt]$, since $\sin kx = 0$.

i.e. The Moving-Electron-Charge is The Electromagnetic-Wave , $E \perp M$, **which carries the Stationary-Electron-Charge** , **and which is The Storage of g , in min-cave** , in-where the Potential-Energy P_E , as linear-motion in $g \equiv r$ cave is stored in the form of Dipole-rotation , *Angular-momentum due to curved motion* , with Spin , **S** , directed to [$\{+\} \rightarrow \{-\}$] , and of frequency $f = 1/T$, which is the Source in cave r .

In [2] **The-Stationary-Photon-Charge** is the case of Material point with **Periodic Orbital-motion** where issues the **Tack-Geometry** i.e. the tracks of the Electric-lines Pattern are closed loops and not straight-lines , and also because of the Voltage between the ends , is created the motion as an **Eternal rotation** of the $[\oplus]$ *constituent towards* $[\ominus]$ *constituent* , [The opposite issues for Rotational motion where in the

Moving-Photon-Tank and because of Stress , σ , is created the Centrifugal-Force F_f].
 Because $f_n = (\frac{1\sigma}{8r^2}) \cdot \bar{B}$ so , Stress $\sigma = 0 \rightarrow \sigma$, and \bar{B} = Angular-Momentum = AM = 0
 \rightarrow AM , and Spin is equal to AM / Unit-Area = AM / π , and because of the Closed
One-way-loops , **Spin is either Positive or Negative** then is \rightarrow Electric-Charge E
 $\bar{E} = \pm AM/\pi$ = Electron-Spin =The \pm Electron and because of the closed One-way-loops
Spin is either Positive or Negative as this is \rightarrow **Spin = $\pm AM / \pi$** .

Above Spin disappears the ERP Paradox because is extended and actually filling up the entire universe .These Stationary-particles are permanently entangled ,with Wave packets becoming from M-P-Photons , which Orientate and Re-orientate their Spins.

The SI Space and Energy Unit Formulas :

Unit of **Length** is Meter $\rightarrow 1\mathbf{m}$ = Length , $1\mathbf{m}^2$ = Area, $1\mathbf{m}^3$ =Volume
 Unit of **Mass** is Kilogram $\rightarrow 1\mathbf{Kg}$
 Unit of **Time** is Second $\rightarrow 1\mathbf{s}$
 Unit of **Electric-current** is Ampere $\rightarrow 1\mathbf{A}$
 Unit of **Temperature** is Kelvin $\rightarrow 1\mathbf{K}$

SI Derived Units :

Space-Motion-Period

For Frequency is Hertz (Hz)	\rightarrow	\equiv	\mathbf{s}^{-1}	
For Force is Newton (N)	\rightarrow	\equiv	$\mathbf{m Kg s}^{-2}$	$1\mathbf{N} = 1 [\mathbf{Kgm} / \mathbf{s}^2]$
For Pressure-Stress is Pascal (Pa)	$\rightarrow \mathbf{Nm}^2$	\equiv	$\mathbf{m}^{-1} \mathbf{Kg s}^{-2}$	
For Energy = Work is Joule (J)	$\rightarrow \mathbf{Nm}$	\equiv	$\mathbf{m}^2 \mathbf{Kg s}^{-2}$	$1\mathbf{J} = 1\mathbf{Nm}$
For Power is Watt (W)	$\rightarrow \mathbf{J} / \mathbf{s}$	\equiv	$\mathbf{m}^2 \mathbf{Kg s}^{-3}$	$1\mathbf{W} = 1\mathbf{J} / \mathbf{s}$
For Electric-Charge is Coulomb (C)	$\rightarrow \mathbf{As}$	\equiv	$\mathbf{m}^{-1} \mathbf{Kg s}^{-2}$	$1\mathbf{C} = \mathbf{J} / \mathbf{V} = \mathbf{Nm} / \mathbf{V}$
For Electric-Potential is Volt (V)	$\rightarrow \mathbf{W} / \mathbf{A}$	\equiv	$\mathbf{m}^2 \mathbf{Kg s}^{-3} \mathbf{A}^{-1}$	$1\mathbf{V} = 1\mathbf{J} / \mathbf{C}$
For Electric-Resistance is Ohm (Ω)	$\rightarrow \mathbf{V} / \mathbf{A}$	\equiv	$\mathbf{m}^2 \mathbf{Kg s}^{-3} \mathbf{A}^{-2}$	
For Planck's Constant h is Joule (h)	$\rightarrow \mathbf{Js}$	\equiv	$\mathbf{m}^2 \mathbf{Kg s}^{-1}$	
For Gravity Constant g is Stress (g)	$\rightarrow \mathbf{T}^2 / \mathbf{m}^3$	\equiv	$\mathbf{m}^{-3} \mathbf{s}^2$	
For Gravitation , G is Force (G)	$\rightarrow \mathbf{g k}_E$	\equiv	$\mathbf{m}^{-1} \mathbf{s}^2 \mathbf{Kg}^{-1}$	

Planck constant , $h = 6,62606957 \cdot 10^{-34}$ joules , $1\text{ eV} = 1,60218 \cdot 10^{-19}$ J
 Light velocity $c = 2,99798 \cdot 10^8$ m/s , $1\text{THz} = 10^{12}$ Hz , $1\text{ nm} = 10^{-9}$ m , $1\mu\text{ m} = 10^{-6}$ m
 $1\text{ eV} = 1,6022 \cdot 10^{-19}$ Joules. $1\text{ cal} = 4,184$ Joules , $1\text{ KWh} = 3,6 \cdot 10^6$ Joules.
 $1\text{ Btu} = 251,9958\text{ cal} = 1054,3504$ Joules = 1055 Joules

Nature of **Energy** \rightarrow **Is motion**

Nature of **Space** \rightarrow **Material-Point-Geometry**

Nature of **Coulomb** \rightarrow Is a set **Amount of electrons** (a number in a litre).

$$1\mathbf{C} = \mathbf{J} / \mathbf{V} = \mathbf{Nm} / \mathbf{V}$$

Nature of **Ampers** \rightarrow Is the **Amount of electrons that travel** through a Coulomb in a second , or litres per second .

Nature of **Volts** \rightarrow Is the **Pressure** at which two electrons want to move in Space

Nature of **Joule** \rightarrow Is the Amount of **Motion** for one Volt to move through One Coulomb . $1\text{ J} = 1\mathbf{Nm} \equiv 1\mathbf{J} = 1\mathbf{V} \cdot \mathbf{C}$

Nature of **Ohms** \rightarrow Is the Resistance to the **motion of Electrons** in Space .

K.. QUANTIZATION :

Quantization of Geometry : [12-14-60]

Primary Point A , is nothing and it is the only Space without Position , *since the only Property of Points is only the Position A* , so this to be at another Position B ,then on this twin System , AB , exists the Principle of Virtual Displacements , $W = \int_A^B P. ds = 0$ or $[ds.(P_A + P_B) = 0]$, i.e. for any $ds = \text{vector} > 0$, Impulse $P = (P_A + P_B) = 0$ and $[ds.(P_A + P_B) = 0]$, therefore each **Unit AB = ds > 0** ,exists by this Inner Impulse (P) where $P = [P_A + P_B] = 0$, and which follows the vibrational motion $\dot{x} = w .ds$ i.e. The Position and Dimension of all Points which are connected across the Universe and that of Spaces exists because of this Static equilibrium and Inner-Impulse , on the contrary should be one point only (Primary Point $A \equiv \text{Black Hole} \rightarrow$ where $ds = 0$ and $P = \infty$) , as the repellency of A , B, points by P_A , P_B opposite forces as \leftrightarrow is the **Dipole** $[A.P_A \leftarrow 0 \rightarrow P_B.B]$. [17, 23] . All points may exist with $P = 0 \rightarrow$ (PNS) and also with $P \neq 0 \rightarrow$ (Spaces) , $[P_A + P_B = 0]$, for all points in Spaces and Anti – Spaces ,therefore [PNS] is self-created ,and because at each point may exist also with $P \neq 0$, then [PNS] is a (Perfectly-Homogenous-Isotropic-Elastic-Medium, in spatial and Temporal domain) Field with infinite points which have a \pm Charge with , $P = 0 \rightarrow \rightarrow P = \Lambda \rightarrow \infty$,and this Work (W) is quantized on material points as Spin $\pm (\bar{p})$,and from this equilibrium of the quantized Angular-momentum $\bar{\Lambda} = \bar{B}$, independently of time , is capable of forming the Wave nature of Spaces AB ,following the Boolean logic and distorting momentum $\bar{p} = \bar{\Lambda}$, as energy , on the intrinsic orientation position of points , $\dot{x} = w r$, on all points of the microscopic and macroscopic homogeneity , and since also in common circle rotational velocity , $\bar{w} = v / r$, and momentum , $\bar{\Lambda}$, are constants then consist a Pure Quaternion , so the conjugation of the two as $(\partial/\partial t , \bar{w}) \odot (0 , \Lambda) = (-\Lambda , wx\Lambda) = (-\overline{HxP}, \nabla x \bar{\Lambda}) = [\lambda , \nabla x \bar{\Lambda}]$. [13-15] The work W , of the two opposite Dipole \bar{AB} , \bar{BA} in the same plane is equal to $W = [n.P.ds] = [\lambda = \Lambda \Lambda , \Lambda x \Lambda]$ where, λ = displacement of , A to B point and it is a scalar magnitude called wavelength of the new dipole $\bar{AB} \rightarrow \Lambda$, is the amount of Rotation on Dipole \bar{AB} ,(this is the Angular momentum \bar{L} , and it is a vector parallel to a , axis. Momentum $\pm \Lambda = r m v = r m w r = m r^2 .w \equiv \bar{B}$ where , r , is the radius and angular-velocity \bar{w} , which maps velocity vector \bar{v} , on the perpendicular to a , axis Plane with the two components $\bar{v}_E \perp \bar{v}_B$. **Tangential velocity** $\bar{v}_E = \bar{w}.r$ is a quaternion $\bar{v}_E = \bar{w} r = \bar{z} = [s + \bar{v}.\nabla i]$ where , $s = |\bar{v}_E| = |\bar{w}.\bar{r}|$ and $\bar{v}.\nabla i = |\bar{w}x\bar{r}| = |\bar{w}|.\bar{r} \perp |\bar{w}|.r$ where the Two opposite **Biaxial-Ellipsoid equilibrium** and this is the Place , **The Where and the How all** conservations of Energy happen . [26] . All **above are holding** for any Point which is also nothing and has not any Position

and may be anywhere in Space , therefore , **the Primary point A , being nothing also is in No Space and it is the only Point and nowhere** , i.e. Primary Point is the only Space and from this all the others which have Position , therefore and since this is the only Space , so to exist point A , at a second point , B somewhere else , point A , must move towards point B , where then $A \equiv B$. **Point B is the Primary Anti-Space which Equilibrium point A** , and both consist the Primary Neutral Space \rightarrow PNS = $[A \equiv B]$. The Position of points in [PNS] creates the infinite Dipole and all Quantum quantities which acquire Potential difference and an Intrinsic momentum $\pm \Lambda$ in the three Spatial dimensions (x , y, z) , [26] and on the infinite points of the (n) Layers at these points , which exist from the other Layers of **Primary Space , Anti-Space and Sub-Space** , and this is because Spaces are monads i.e. Quaternion .

Because of above Properties of Quaternion in Material-Point , Units to be Magnetic at the Edges , A , B , **and because also** , motion \equiv Energy , **then \rightarrow anywhere exist DIPOLE- MAGNETS , from , M-Points , Atoms , Molecules , Crystals \rightarrow everywhere , and are embodied with the \rightarrow GROWTH-GOLDEN-RATIO- PATTERN \leftarrow** Any magnitude having Position , (x , y, z) , related to a coordinate System and also Direction ($\rightarrow \uparrow \leftrightarrow \downarrow \leftarrow$) is **characterized as Vector**, and extensively as quaternion [14].

The Straight line :

A o-----o **C**-----o **B**

In [15] , a point **C** is on a Straight line **AB** when $AC + CB = AB$, and continuous on dimensional Unit AB is when Unit $AC > 0$, or when $AC = ds \rightarrow AB$.

Unit $ds = AC$ and AC thus is a discrete-monad i.e. a Quantum of AB , so , Straight line AB is continuous with points as filling (is Infinitively divisible) .

Straight line AB is thus discontinuous (discrete) with **dimensional Units** , ds, as filling and that is made up of finite-indivisible-Parts , the Monads , $ds = AB / n$, where the Parts or Units are $\rightarrow n = 1,2,3, \dots, n, \rightarrow \infty$) .

Straight line **AB** is Discontinuous (discrete) also with dimensional Units , $ds = AB$, where $ds = \text{Quantum} \equiv AB / n$, { and $n = 1,2,3 \rightarrow \infty$, \equiv Quaternion $[a + b i] / n$ Infinitively divisible keeping the conservation of properties at end points A , B } as filling and continuous with Points as filling (for $n = \infty$ then $ds = 0$ i.e. a Point) . i.e. Monads $ds = 0 \rightarrow \infty$ are simultaneously (Actual infinity) and (Potential infinity) in Complex number form , and this defines that **Infinity exists between all points** which are not coinciding and because , ds , comprises any two edge points with Imaginary-Part where then this property differs between the infinite points .

All above referred , is the way of , **Euclidean-Geometry-Quantization** (from Point , to Sector , to Line , to Plane , to Volume) **to the Physical world** , to Physics , based on the Geometrical logic alone , which is **Point and Unit** according to *Pythagoras* , **< Unit is a Point without Position while \rightarrow a Point is a Unit having position >**

This is the **Vector relation of Monads** ,ds, [or as ,Complex Numbers (quaternion) in their general form of , $w = a + b. i$] , which is the **Dual Nature of lines , Discrete and Continuous** . It has been shown that Primary Neutral Space is not moving and **Time is not existing** , so Points in Primary-Space cannot move , *to where they are* , because thus are already there , and motion is impossible .

Since Points C , D , of Primary Neutral Space , PNS , **are motionless** ($v = 0$) at any Time (the composed instants are $dt = 0$) then motion is impossible , i.e. **Monads in PNS are motionless** because issues for the monads [$ds = a + b. i = v . dt$] and the changes of , a , b , are as follows , \rightarrow

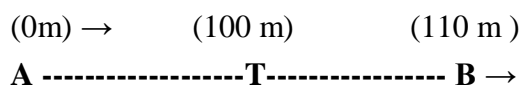
When $a = 0$ then $ds = b.i = v.dt$ and for $b \neq 0$, $dt = 0$ then $\rightarrow ds = \text{Constant} = v . 0$, and **for $b = 0$** then $ds = a = v.dt$, and for $dt = 0$ then $ds = a = \text{Constant} = v . 0 = \infty . 0$, therefore **in PNS** , $v = \infty$, **T = 0** , meaning **Infinite velocity , v , and Time not existing** , so since any Arrow (vector) moving from point **A** to point **B** , then exists a Numerical order $A \rightarrow B$ which is not valid for Temporal order (dt) . In case $dt = 0$ then motion from Point **A** to point **B**, has not any concept and distance **CD** , and anywhere exist **the Equal CD is unmovable** , i.e.

The **Motion of points , C, D , of PNS is not existing** because time ($dt = 0$) and also infinite velocity ($v = \infty$) while motion of the same points C , D exists in PNS out of a moving Sub-Space of AB [Any Arrow CD is one of the ∞ roots , the Sub-spaces of AB] . Monads $ds = 0 \rightarrow \infty$ are Simultaneously , Actual-Infinity (because for $n = \infty$ then $ds = [AB / (n = \infty)] = 0$, i.e. **a Point**) and , Potential-Infinity , { because for $n = 0$ then $ds = [AB / (n = 0)] = \infty$ } i.e. the **straight line through line AB** . Infinity exists between all points which are not coinciding , and because Monads ,ds, comprises any two edge points with Imaginary part , then this property differs between the , j , infinite points or it is Quaternion as , $d\bar{s} = \lambda j + \nabla I$, the Dual-nature of Spaces as the , **Real** $\equiv \lambda j \equiv \text{Units} \equiv ds$, and the , **Imaginary** $\equiv \nabla i \equiv \text{The motion}$, which are the two constituents of nature as the **Real-Space** $\rightarrow ds \leftarrow$ and **Imaginary** $\rightarrow \text{motion} \leftarrow$

Zenon Paradox and the nature of Points :

1.. Achilles and the Tortoise :

The Problem :



Word , quantization , has to do with the discrete-continuity, which describes the Physical-reality through the Euclidean conceptual , for Points Straight lines, Planes , the Monads in Universe and the Dual Nature of Spaces as Discrete and Continuous .

Euclidean Geometry is proved to be the **Model of Spaces** and **Material Geometry** the **Model of Physical-Reality** since it is Quantized as Complex numbers ,which are such.

The proposed Euclidean solution :

Straight line AB , is continuous in Points between A and B , [i.e. all points between line segment AB , are the Elements which fill AB , and which Points are also Nothing or Everything else and are Anywhere as in above and for Achilles in order to run the 100 m, has to pass the Infinite-points between point A and point B . A point ,T, is on line AB only when exists $TA + TB = AB$ (or the whole AB is equal to the two Parts TA , TB , as it is the logic of equality and the logic for equations) .

Since in nature exists the Principle of Equality and Un-equality consequently any Comparison is including the following three cases .

1.. In case $TA + TB > AB$, then point T , **Is Not On line AB** , it is OUT , and then issues the Property of An-equality and it is **an triangle** ABT ,lying in ABT Plane.

This is the main difference between the , **Euclidean and the Non-Euclidean Geometries** . On this is based the Philosophy of Parallel fifth-Postulate which was proofed to be a Theorem and also all the Ancient unsolved and now solved problems and which are the base of the **Material-Geometry** and **Quantum-Physics** . [44-47] In Euclidean Geometry points A , B , T consist the Plane , ABT , while for Others is a curve in Plane ABT . The Definition 2 (a line AB is breathless length) is altered as \rightarrow **For any point , T , on line AB exists $TA + TB = AB$** i.e. it is the equation which is also and equality . [9-10]

Since points have not any dimension and since only AB has dimension [the length AB and for any \overline{AT} the length AT] and since also on \overline{AB} exist infinite line segments $AT < \rightarrow AB$, which become the quantized-material-lengths and have infinite-Spaces, Anti-Spaces and Sub-Spaces , then is impossible in--bringing Achilles to the Tortoises starting point B , and also for Tortoises to 110 m , because as follows , Straight line AB , is not continuous unless a Common-Dimensional-Unit $AT > 0$, or $AT = ds \rightarrow AB$ is accepted and thus in this way exists ,

- a.. Straight-line AB is Continuous with points as filling (Infinitively divisible) ,
- b.. Straight-line AB is Discontinuous (discrete) with dimensional Units , ds, as filling (that is made up of finite indivisible parts the Monads , $ds \neq 0$, as in Material Geometry) defining the Space Anti-space at , A , B , points and Sub-space as issues [$ds \neq AB / n$, where $\rightarrow n = 1,2, \rightarrow \infty$) .
- c.. Straight line AB , is continuous in ,ds, with $ds = 0$ as points of filling , and also discontinuous (discrete) with the dimensional Units , $ds \neq 0$, defining the Space , Anti-space at , A , B points and Sub-space , where $ds = \text{quantum} = AB / n$, and { where $n = 1,2,3 \rightarrow \infty$, = [a + b i] / n = complex number and Infinitively divisible

which is keeping the conservation of Properties at the End-Points , A , B } as filling , and continuous with points as filling (for $n = \infty$ then $ds = 0$, i.e.

The , ∞ Positions of points in ds , where Units = Monads $ds = 0 \rightarrow \infty$ are simultaneously (actual infinity) and also (Potential infinity) in Complex number form , and this defines that , infinity exists between all points which are not coinciding , and because , ds , comprises any two edge points with Imaginary part , then this property differs between all the infinite points .

The Vector relation of Monads , ds , (or , as Complex Numbers in their general form $\bar{w} = a + b . i$) , which is the Dual - Nature of lines (Discrete as $\frac{\bar{w}}{|a^2+b^2|}$ and continuous as Points (.) and in recent Material-Geometry **The Work \equiv The Energy \equiv The Units \equiv The Monads \equiv The Imaginary-Part , i , \equiv The motion . [57-58] .**

2.. In case $TA + TB = AB$ then point , T , is **ON straight line AB** where then issues the Property of Equality.

On **Monad AB** which maybe equal to $\rightarrow 0 \leftrightarrow AB \leftrightarrow \pm \infty \leftarrow$ exists { a Bounded-Energy-State for each of the Infinite Spaces A and Anti-Spaces B called the Energy-monads in Space moulds } and this [Dipole $AB = \text{Matter} = \text{The meter of the reaction to Energy-change}$] is the communicator of Impulse [Force P] of the Primary Space .This Energy-monad is modified as the **Quanta of Energy** the monad , and is represented as above **The Dipole** i.e.

This motion is Continuous and occurs on Dimensional Units , ds , which is the Maxwell`s Monads-Displacement-Electromagnetic-current [$E + \bar{v} \times P$] , and not on Points which are dimensionless , upon these Bounded States of [PNS] , the Spaces and Anti-Spaces , and because of the different Impulses P_A , P_B , of edge points A , B , and that of Impulses , P_{iA} , P_{iB} of Sub-Spaces , they are either on straight lines AB , or on tracks of the Spaces , Anti-Spaces and that of all Sub-Spaces of , AB . The range of Relative velocities is bounded according to the single slices of spaces (ds) . [14 -15] , [39-40] .

3.. In case $TA + TB < AB$ then point ,T, is **IN straight line AB** , where then is NOT issuing the Property of Equality or Un-equality . Is issuing a ,

New Paradox in Geometry which is my recent **New-Material-Geometry** as in articles [55-56] and connects , **Geometry-Mechanics-Chemistry-Physics** .

From D. Hilbert`s \rightarrow 4. Problem of the Straight-line as the shortest distance between two points A and B become the following :

- a.. Lobachevsky : (Hyperbolic Geometry) is excluding the axiom of parallels or assume it as not satisfied .
- b.. Rieman`s : (Elliptic Geometry) is excluding the axiom of parallels ,

assuming that one and only one Point lies between the other two .

c.. Hilbert`s : (Non-Archimedean Geometry) is excluding the axiom of parallels , assuming that Infinitive Points on Parallels lie between the other two and straight line is the shortest distance between the two points .

d.. Euclid`s - Markos : (**Geometry - Material Geometry**) ,

The Definition 2 , (a line , AB , is breathless length) is altered as , for any point , T , on line AB where exists the Equality $\rightarrow TA + TB = AB$.

The critic of all above is in my articles , and because of the inattention in the establishment in these Definitions , allowed the creation of the **Non-Euclid Geometries** which **acted Negatively to the Right-Orientation of sciences** .

The deep-concept of Material-Geometry is this , *the Distance* . For Achilles , $<$ In a race , the Quickest runner , Achilles , can never overtake the Slowest , Tortoise , since the Pursuer must first reach the Point whence the Pursued started , so that the Slower must always hold a lead $>$

This problem was devised by Zeno of Elea to support Parmenides doctrine that $<$ All is one in Euclidean-Absolute-Space $>$, contrary to the evidence of our senses for plurality and change and to others arguing the opposite . Zeno arguments are as proof by contradiction or (reduction ad absurdum) , which is a philosophical dialectic method . Achilles at point , A , allows the Tortoise at point ,T, a head , start 100 m and each racer starts running at some constant speed , one very fast and one very slow , the Tortoise say has further 10 m at point B .

Since Straight line AB is **continuous with Points as filling** , The Quickest , has to pass Infinitive points to reach point T , so since the steps are the points ($\frac{AB}{\infty} = 0$) , The Quickest will **Never reach** point T . The same also happens for The Slower with step , ($\frac{TB}{\infty} = 0$) who will **Never reach** point B .

2.. The Arrow - Paradox (Arrow) :

The Problem :

$<$ If everything when it occupies an equal Space is at rest , [PNS] , and if that which is in locomotion is always occupying such a Space at any moment, then the Flying Arrow is Therefore motionless $>$

|..... (10 m)|

(10m) $ds = a + b.i = \bar{v} .dt$ (10 m)

A -----> B

A ----- C - D -----> B

The Arrow Paradox is not only a simple mathematical problem , because is referred also to motion in Absolute-Euclidean-Space PNS , i.e.

in a Space where issues Geometry , with all the unsolved till-recently problems as ,The Parallel Postulate the Squaring of circle etc., and also the Physical where Space [PNS] is not moving and because of its Duality (Discrete and Continuous as Complex numbers are) , shows that ,

Time is not existing as any essence but only it is a measure for measurements , a simple number .

This Paradox is not in metaphysical sphere of mind or somewhere else , since is was proved in [15] that , **Complex-numbers** and **Quantum-Mechanics** Spring out from the **Quantized- Euclidean-Geometry** .

As before Straight line AB is Discontinuous , (Discrete) with dimensional Units , $ds = CD$ as filling and Continuous with points as filling [The Complex Numbers in the general form as $w = a + b \cdot i$] , which is the Dual Nature of lines (line = Discrete with , Line-Segments \equiv **Units** , and Continuous with **Points**).

It has been shown that [PNS] , Primary-Neutral-Space is not moving and Time is not existing , so Points , **in Primary Space cannot move to where they are** because are already there and motion is impossible . Since any Points , C , D of the Primary-Neutral-Space , [PNS] , are motionless where ($v = 0$) this is at any Time (the composed instants are $dt = 0$) , and so then motion is impossible , i.e. issues [$ds = a + b \cdot i = \bar{v} \cdot dt$] where , **for $a = 0$** then $ds = b \cdot i = \bar{v} \cdot dt$ and for $b \neq 0$ and $dt = 0$ then $ds = \text{Constant} \equiv \bar{v} \cdot 0 \rightarrow$ i.e. $\bar{v} = \infty$, **For $b = 0$** then $ds = a = \bar{v} \cdot dt$ and for $dt = 0$ then $\rightarrow ds = a = \text{Constant} = v \cdot 0 \rightarrow$ i.e. again , $v = \infty$, **Therefore in PNS , $\bar{v} = \infty$, $T = 0$** , meaning infinite velocity and Time not existing , so Since Arrow is moving from point A to point B , then exists the Numerical order $A \rightarrow B$ which is not valid for Temporal order (dt) . In case that $dt = 0$ then motion from Point A , to point B , has not any concept , and the distance , CD , and anywhere exist the Equal , CD , is unmovable , i.e.

Motion of points C , D of [PNS] is not existing because time ($dt = 0$) and only **infinite velocity ($v = \infty$) exists** , while motion of the same points , C , D , exists in [PNS] out of a moving Sub-Space of , AB (arrow CD is one of the ∞ roots of AB) , where , ($ds = CD = \text{The Monad in PNS}$). [15] .

It has been shown that Primary Neutral Space [PNS] is not moving and **Time is not existing** , so Points , in Primary Space cannot move , to where they are , because are already there and motion is impossible . Since Points T , C ,, of Primary-Neutral-Space , [PNS] , are motionless ($v = 0$) at any Time (the composed instants are $dt = 0$) then motion ($s = \bar{v} \cdot dt$) is impossible . i.e. **In PNS $\bar{v} = \infty$ and Time = 0** , meaning infinite velocity ,v, and Time is not

existing , so since any Arrow (a vector) moving from point A to point B , then exists a Numerical order $A \rightarrow B$ which is not valid for Temporal order (dt) . In case $dt = 0$ then motion from Point A to point B has not any concept , and distance , CD magnitude , and anywhere exist the Equal CD it is unmovable ($s = v$) ,

i.e. The Motion of points C , D , T..... of PNS is not existing because time ($dt = 0$) and for , $ds = \text{Any-Constant}$ exists with infinite velocity ($v = \infty$) while motion of the same points C , D ,T exists in [PNS] out of a moving Sub-Space of AB (Included Arrow CD is one of the ∞ roots of line segment AB) . Monads $ds = CD = 0 \rightarrow \infty$ are Simultaneously , actual infinity (because for $n = \infty$ then $ds = [AB / (n = \infty)] = 0$ i.e. a point) and , Potential infinity , (because for $n = 0$ then $ds = [AB / (n = 0)] = \infty$, i.e. the Straight line through sector AB . Infinity exists between all points which are not coinciding , and because Monads ,ds, comprises any two Edge-Points with Imaginary part , then this property differs between the , i , infinite points or are as $\rightarrow d\bar{s} = \lambda i + \nabla i$, in which exists ($\lambda \equiv \text{Space}$, $i \equiv \text{Energy}$) , and it is the Quaternion .

Since Primary point , A , is the only Space then on this exists the Principle of Virtual

Displacements $W = \int_A^B P \cdot ds = 0$ or $[ds \cdot (P_A + P_B) = 0]$, i.e. for any monad $ds > 0$

Impulse $P = (P_A + P_B) = 0$ and $[ds \cdot (P_A + P_B) = 0]$, Therefore , for Each Unit $AB = ds > 0$, exists by this Inner Impulse (P) where $P_A + P_B = 0$, \rightarrow i.e. The Position and Dimension of all Points which are connected across the Universe and that of Spaces exists , because of this equilibrium Static Inner Impulse , on the contrary should be one Point only (**Primary Point A \equiv Black Hole $\rightarrow ds = 0$ and $P = \infty$**) . [17,22] . \Monad AB is dipole $[A(P_A) \leftarrow 0 \rightarrow (P_B)B]$ and it is the symbolism of the two opposite forces (P_A) , (P_B) which are created at points A , B . This Symbolism of primary point (zero 0 is nothing) shows the creation of Opposites , A and B , points from this zero point which is the Non-existence but are the Monads . [13] .

All points may exist with force $P = 0 \rightarrow \{ \text{PNS the Primary Neutral Space} \}$ and also with $P \neq 0$, ($P_A + P_B = 0$) , { PS is the Primary Space } for all points in Spaces and Anti – Spaces , therefore [PNS] is **self-created** , and because at each point may exist also with $P \neq 0$, then [PNS] is a (Perfectly Homogenous , Isotropic and Elastic Medium) Field with infinite Points (i) which have a \pm **Charge with a force** $P_i = 0 \rightarrow P = \Lambda \rightarrow \infty$ and containing everything .

Since points A ,B of [PNS] coincide with the infinite Points , of the infinite Spaces , Anti-Spaces and Sub-Spaces of [PNS] and exists there rotational energy $\pm \Lambda$ and since Motion may occur at all Bounded Sub–Spaces ($\pm \Lambda$, λ) , then this Relative

motion is happening between all points belonging to [PNS] and to those points belonging to the other Sub-Spaces ($A \equiv B$). The Infinite points in [PNS] form infinite Units (The Monads = Segments), $A_i B_i = ds$, which equilibrium by the Primary Anti-Space by an Inner Impulse (P) at edges A, B where $P_{iA} + P_{iB} \neq 0$, and $ds = 0 \rightarrow N \rightarrow \infty$. Monad, Discrete, (Unit $ds \equiv$ Quaternion) \overleftrightarrow{AB} is the ENTITY and $[AB - P_A, P_B]$ is the LAW, therefore Entities are embodied with the Laws. Entity is Quaternion \overleftrightarrow{AB} , and law $|AB| =$ Energy length (the Energy-Quanta) of points |A, B| or the wavelength where then $AB = 0$ and imaginary part are the equal **Forces P_A, P_B as their Fields**, the medium, in Monads, (This is distinctly seen for **Actions at a distance**, where there the continuity of all intermediate points being also nothing, is succeeded on a **Quantized-Tiny-Energy-Volume** or a Plane which consists the before referred Material-Point. i.e. **A Field is the medium, or by the Exchange of Energy in the Inner-monads field**. [39-40].

3.. The Dichotomy Paradox (Dichotomy) :

The Problem : < That which is in locomotion must arrive at the half-way Stage before it arrives at the goal >

(0m) \rightarrow \rightarrow (50 m) (100 m)
 A -----D----- C----- B

As before Straight line AB is not continuous unless a Common Dimensional Unit $AC > 0$ or $ds = 0 \rightarrow AB / 2 \rightarrow AB$ is accepted and this because point C is on line AB, where then issues $CA + CB = AB$ and since $CA = CB$ then $CD < CB$ therefore point D on (AD) will pass through C on (AC) before it arrives at the goal B on (AB).

4.. The Algebraic Numbers :

From priors Monad $\equiv AB \equiv$ Unit $AB = 0 \leftrightarrow AB \leftrightarrow \pm \infty$,

is and also represents **The Spaces A, the Anti-Spaces B, Sub-Spaces of AB**, which are the Infinite **Regular-Polygons**, on circle with AB as Side, and on circle with AB as diameter, and it is what is said, monad in monad. According to De Moivre's formula the n-th roots on the unit circle AB are represented by the vertices of these Regular-n-Sided-Polygon inscribed in the circle, and which are Complex-numbers in the general form as, $w = a + b i = r e (i\phi)$, and, a and b = Real Numbers, $r = \sqrt{a^2 + b^2}$, $(\pm) i \equiv$ Imaginary Unit.

We will show that since Complex-Numbers are on Monad - AB, (Any two Points non coinciding are Monads) and it is the only manifold, for the Physical reality, and so the Euclidean-Geometry is also Quantized.

The Periodic motion :

Harmonic Periodic motion, $x(t)$ is when motion is repeated itself regularly, in equal

intervals of time T (the period of oscillation) and is designated by the time function , $x(t) = x(t + T) = x = A \cdot \sin(2\pi \cdot t/T) = A \cdot \sin(\omega t) = A \cdot \cos(kq - \omega t)$, because issues sinusoidal , where A is the amplitude of oscillation measured from equilibrium position and for repeated motion $t = T$. Quantity $(2\pi/T) = \omega = 2\pi \cdot f$ is the circular frequency, or $f = 1/T = \omega/2\pi$, is the frequency and , k , is the wave number $k = 2\pi/\lambda$ and the speed of a wave is $\bar{v} = \lambda f$ or $\bar{w} = \bar{v} k$ and because of relation of angular velocity $\bar{v} = \omega \cdot r = \omega(1/k) \rightarrow \omega = v \cdot k$ then $r \cdot k = 1$.

Velocity $\bar{v} = \dot{x} = \omega A \cdot \cos(\omega t) = \omega A \cdot \sin(\omega t + \pi/2)$ and

Acceleration $\bar{a} = \ddot{x} = -\omega^2 A \cdot \sin(\omega t) = -\omega^2 A \cdot \sin(\omega t + \pi)$ i.e.

Velocity , \dot{x} , and Acceleration \ddot{x} are also harmonic with the same frequency of oscillation , and when evaluated lead to the displacement , x , by $\pi/2$ and π radians respectively and the whole system reveals at $\ddot{x} = -\omega^2 A$, so that *In harmonic motion acceleration* to be proportional to the Displacement and directed toward the origin , and because also Newton`s second law of motion states that the acceleration is proportional to the Force , then Harmonic-motion can be expected with force varying as kx . (which is Hook`s law $F = kx$ and k , **the Stiffness coefficient** $\equiv \frac{\text{Force}}{\text{Length}} \equiv \frac{\text{Energy}}{\text{Space}} \equiv \text{Quantum}$ directed in centrifugal velocity vector \bar{v}_r , on radius r) .

In Free-Vibration of Monads $AB = q = [s + \bar{v}\nabla i]$ and because velocity vector is composed of the Centrifugal-velocity \bar{v}_r , and the Rotational velocity \bar{v}_q , perpendicular to displacement , x , and because viscous damping represented by a dashpot , is described by a force proportional to the velocity as holds $F = c \dot{x}$ where , c , is the Damping coefficient , it is a constant of Transverse proportionality and this because $\dot{x} \perp dx$, then it is directional to transverse velocity , $\bar{v}_y \equiv \dot{x} / dt$, and is holding the homogenous differential equation , $m\ddot{x} + c\dot{x} + kx = 0$. Elements m, c, k the Quantum

For a flexible string of mass , ρ , per unit dx is stretched under Tension T and analyzing Newton Laws for tiny length , dx , then Net Force , $T \ddot{x} = \rho \bar{a}$ and

the equation of motion is $\ddot{x} = [\frac{1}{v^2}] \bar{a}$, or $\frac{\partial^2 y}{\partial x^2} = [\frac{1}{v^2}] \cdot \frac{\partial^2 y}{\partial t^2}$ (1) ,

where $v = \sqrt{\frac{T}{\rho}} = \sqrt{\frac{T}{m}}$ The general solution of (1) is

$y = F_1(ct-x) + F_2(ct+x)$ where F_1, F_2 are arbitrary functions , and regardless of the type of function F , the argument $[ct \pm x]$ upon differentiation leads to the equation ,

$\frac{\partial^2 F}{\partial x^2} = [\frac{1}{v^2}] \cdot \frac{\partial^2 F}{\partial t^2}$ (2) , where $F = \text{The tension} = \text{The Force}$, and

$v = \text{the velocity of wave propagation}$. Another general solution of (1) is that of the separation of variables as $y(x, t) = Y(x) \cdot G(t)$ (3)

where then (1) becomes $\rightarrow \frac{1}{Y} \frac{\partial^2 Y}{\partial x^2} = [\frac{1}{v^2}] \frac{1}{G} \cdot \frac{\partial^2 G}{\partial t^2}$ and because of the independent variables x, t , are both constant , the general solutions are ,

$Y = A \sin \frac{\omega}{v} x + B \cos \frac{\omega}{v} x$, $G = A \sin(\omega t) + D \cos(\omega t)$,

where the arbitrary constants A, B, C, D depend on the

boundary conditions where for $y(0,t) = 0$, will require $B = 0$ and for $y(l,t) = 0$

the solution lead to equations , $y = [C \sin (wt) + D \cos (wt)] \sin \frac{w}{v} x$, and

$$\sin \frac{wl}{v} = 0 \quad \text{or} \quad \frac{Wn.l}{v} = \frac{2\pi.l}{\lambda} = n.\pi \quad \text{where}$$

$$n = 1, 2, 3, \dots n \quad \lambda = \frac{v}{f} \quad \text{the wavelength} \quad , \quad \text{and}$$

$$f_n = \frac{n}{2l} v = \frac{n}{2l} \sqrt{\frac{T}{\rho}} \quad \text{is the frequency and motion} \quad Y = \sin n.\pi \frac{x}{l} .$$

In case of vibration initiated in any manner $y(x, t)$ then

$$y(x, t) = \sum_{n=1}^{\infty} [C_n \sin Wn.t + D_n \cos Wn.t] \sin(n\pi x / l)$$

Coefficients C_n and D_n , are the **Quantized** Quantities .

Example 1 :

To determine the C_n and D_n of above equation .

solution :

At $t = 0$ the displacement ,y, and velocity ,v, are ,
 $y(x,0) = \sum_{n=1}^{\infty} D_n \sin(n\pi x / l)$ and velocity
 $\dot{y}(x,0) = \sum_{n=1}^{\infty} Wn.C_n \sin(n\pi x / l) = 0$ and both multiplying by $\sin(k\pi x / l)$ and integrating from $x = 0$ to $x = l$, all terms become zero except $n = k$ where then ,
 $D_k = \frac{2}{l} \int_0^l y(x,0) \sin\left(\frac{k\pi x}{l}\right) dx$, and $C_k = 0$ $k = 1, 2, 3$.

For standing waves equation of motion is the Sum of a Right moving and a Left moving wave , or

$$Y_{sta} = A \cdot \sin(k n x + w n t) + A \cdot \sin(k n x - w n t) =$$

$$[2A \cdot \sin(k n x) \cdot \cos(w n t) \quad \text{where} \quad k n = 2\pi / \lambda_n \quad \text{and}$$

sin(kx) → is the Spatial - dependence at locations $x = 0, \lambda/2, \lambda, 3\lambda/2, n \frac{\lambda n}{2}$ called the nodes . At nodes amplitude A , is always zero and at locations $x = \lambda/4, 3\lambda/4, 5\lambda/4$ called the Anti-nodes where the amplitude becomes maximum .

cos(wt) → is the Time Oscillation dependence where the corresponding frequency $f_1 = v / 2x = v / n \cdot \lambda_n$ and $f_n = n \cdot f_1$,

i.e. n , more times Energy is stored in f_n frequency , showing the way of Energy Quantization in constant caves [49] .

Since energy $E = h \cdot f$ then frequency $f = E / h$. Angular velocity $w = 2\pi / T = 2\pi \cdot f = 2\pi \cdot (E / h) = E / [h/2\pi]$, or → $w = E / (h / 2\pi)$, $E = w \cdot [h/2\pi]$ **i.e** Angular-velocity w is Proportional to Energy E , since $h / 2\pi$ is constant.

Energy in a standing wave :

Kinetic energy is $E_K = \frac{dK}{dx} (x, t) = mv^2/2 = \frac{m}{2} \frac{\partial y^2}{\partial t^2} = \frac{m}{2} A^2 \cdot w^2 \dots(1)$

Potential energy is $E_U = \frac{dK}{dx} (x, t) = [F/2] \frac{\partial y^2}{\partial t^2}$

and Power transmitted as $P(x, t) = - F \frac{\partial y}{\partial x} \cdot \frac{\partial y}{\partial t}$

The Total Energy $E_T = E_K + E_U = [\frac{m}{2}] \frac{\partial y^2}{\partial t^2} + [\frac{F}{2}] \frac{\partial y^2}{\partial t^2} , T_{dx}$

In Sinusoidal waves as $\frac{dK}{dx} = \frac{dU}{dx} = [\frac{m}{4}] \frac{\partial y^2}{\partial t^2} = \frac{m}{4} A^2 w^2$

The same result is in Store , r , of Wavelength $\lambda_n = \frac{2r}{n}$, of Material-Point where

Fundamental-frequency $f_1 = [\frac{\sigma(1+\sqrt{5})}{4\pi r}]$, Work = h.f₁ , **i.e. Energy quantized in r** .

The Energy-Storage length E-P = $\lambda/2$, and is composed of **n = 3** Quantum-Lobes with wavelength $\lambda_3 = \frac{2r}{3}$, $f_3 = \frac{3v}{2r} = 3 f_0$, $W_3 = \frac{h}{2r} v_3$ and for \rightarrow Total-Work

$$W = [\frac{4\pi r^2 f_1}{3}] . n . (n+1) \quad \text{or} \quad W = \frac{48 . \pi r^2 f_1}{3} \quad , \quad v_3 = \lambda_3 . f_3 = 3 . \lambda_3 . f_0$$

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

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

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

Torsional Vibrations of Rods is similar to that of longitudinal vibration of rods and

for the angle of twist in any length , dx , due to Torque T is d θ and $d\theta = T_{dx} / I_p . G$ where , $I_p . G$ is the torsional stiffness as the product of the Polar-moment , I_p , of Inertia of the cross-section area , and the Shear modulus , G , of elasticity , and which net Torque is $\rightarrow \frac{\partial T}{\partial x} dx = I_p G \frac{\partial^2 \theta}{\partial x^2} dx$. and $dx =$ the Quantized length

The differential equation of motion becomes by equating Torque to the product of the mass moment of inertia $\rho I_p dx$ of the element and the angular acceleration $\frac{\partial^2 \theta}{\partial t^2}$ in it and is as ,

$$\rho I_p dx \frac{\partial^2 \theta}{\partial t^2} = I_p G \frac{\partial^2 \theta}{\partial x^2} dx \quad \text{and} \quad \frac{\partial^2 \theta}{\partial t^2} = \frac{G}{\rho} \cdot \frac{\partial^2 \theta}{\partial x^2} \quad \dots(2)$$

where $\theta \equiv$ the displacement u , $\frac{G}{\rho} \equiv \frac{E}{\rho}$ of the longitudinal vibration

with the general solution given for θ as $\dots(3)$

$$\theta = [A \sin w \sqrt{\frac{\rho}{G}} x + B \cos w \sqrt{\frac{\rho}{G}} x] . [C \sin wt + D \cos wt]$$

Example 2 :

To find the equation of the Natural frequencies of a uniform Rod in torsional oscillation with one end Fix and the other end Free . The solution :

The boundary conditions are ,

a.. when $x = 0$ then $\theta = 0$ resulting to $B = 0$

b.. when $x = l$ then Torque = 0 or $\partial\theta/\partial x = 0$ and

resulting to $\cos w \sqrt{\rho/G} l = 0$ and which is satisfied with the following angles,

$$w_n \sqrt{\frac{\rho}{G}} l = \pi/2 , 3\pi/2 , 5\pi/2 \dots (n + 1/2) . \pi \quad \text{and the Natural-frequency of the rod}$$

$$\text{of length } l , \text{ is } \rightarrow w_n = (n + 1/2) \frac{\pi}{l} \sqrt{\frac{G}{\rho}} \quad \text{where } n = 0 , 1 , 2 , 3 , \dots$$

$m = \rightarrow$ is the mass of the Rod , $\rho = \rightarrow$ is the density per unit length , dx ,

$G =$ The shear modulus of the Rod , and for Electromagnetism

$\epsilon =$ The Permittivity of the free Space , *Dielectric constant multiplier* .

μ = The Permeability of transverse Space , *Dielectric constant multiplier*.

Total E_T , Kinetic E_K and Potential E_U , Energy per length is their sum as follows ,

$$\text{The Total Energy } E_T = E_K + E_U = \left[\frac{m}{2} \right] \frac{\partial y^2}{\partial t^2} + \left[\frac{T}{2} \right] \frac{\partial y^2}{\partial x^2}$$

The Work done per cycle *{the Quantized energy}* is $W = \pi v \cdot A \sin \omega t \dots(\omega)$
 where A = Initial amplitude at $x = 0$.

5.. The Energy-Stores of Material-Point :

1.. General :

From the definition of Work , **Work = Force x Displacement = Energy** , results

the where this Energy as , *Momentum Vector* $\bar{B} \equiv Spin \equiv Energy$, is stored in

$$\mathbf{r} \equiv \sqrt{\mathbf{s}^2 + |\mathbf{v}|^2} , \text{cave of Quaternion } KK_1 = \bar{q} = [s + \bar{v}\nabla i] .$$

The , r , cave , **IS** , *Outward a Stationary Box* , *Inward a Stationary Wave* ,

with infinite frequencies $f_1 \dots f_n \rightarrow f_\infty$ and with Energy

$$E = h \cdot f_n = \frac{h(1 + \sqrt{5})}{4\pi} \cdot \left[\frac{\sigma}{r} \right] = \left(\frac{n\sigma}{8r^2} \right) \cdot \bar{B} = W_d = 8 \cdot k f_n A_r \dots\dots(e)$$

Material point may be considered as a flexible String of mass , ρ , per unit length , which is stretched under tension $T = \pm \sigma$, due to the principal stresses on KK_1 axis .

The lateral deflection , y , of the string KK_1 to be small , the change in tension with deflection , is negligible and is ignored . The equation of motion in the , y , direction according to Newton`s second law is ,

$$T \left[\theta + \frac{\partial \theta}{\partial x} dx \right] - T\theta = \rho \cdot dx \cdot \frac{d^2 y}{dt^2} \quad \text{or} \quad \frac{\partial \theta}{\partial x} = \frac{\rho}{T} \cdot \frac{d^2 y}{dt^2} \dots\dots(1)$$

and because the slope of the string KK_1 is $\theta = \frac{\partial y}{\partial x}$ equation (1) reduces to ,

$$\frac{\partial^2 y}{\partial x^2} = \frac{1}{c^2} \cdot \frac{\partial^2 y}{\partial t^2} \dots\dots(2) \quad \text{where } c = v = \sqrt{\frac{T}{\rho}} = \sqrt{\frac{\sigma}{\rho}} \text{ and can be shown to be the velocity}$$

of wave propagation along the string . The general solution of the equation (2) can be expressed in the form $y = F_1(ct - x) + F_2(ct + x)$ where , F_1 , F_2 , are arbitrary functions and regardless of the type of function , the argument $(c t \pm x)$ upon

differentiation leads to equation $\frac{\partial^2 F}{\partial x^2} = \frac{1}{c^2} \cdot \frac{\partial^2 F}{\partial t^2} \dots\dots(3)$ and hence the differential

equation is satisfied , the wave profile moves in the $\pm x$, direction with speed , c , therefore refer to , c , as the velocity of wave propagation .

The solution of (3) using the separation of variables is $y(x,t) = Y(x) \cdot G(t) \dots\dots(4)$ and

by substitution to (2) then $\rightarrow \frac{1}{Y} \cdot \frac{d^2 Y}{dx^2} = \frac{1}{c^2} \cdot \frac{1}{G} \cdot \frac{d^2 G}{dt^2} \dots\dots(5)$ where the left side is

independent of , t , and the right side independent of , x , so both sides must be constant . Letting this constant be $-\left[\frac{w}{c} \right]^2$, are obtained the two ordinary differential equations ,

$$\frac{d^2 Y}{dx^2} + \left(\frac{w}{c} \right)^2 Y = 0 \quad \text{and} \quad \frac{d^2 G}{dt^2} + w^2 G = 0 \quad \text{with the general solution ,}$$

$$Y = A \cdot \sin\left(\frac{w}{c} x\right) + B \cdot \cos\left(\frac{w}{c} x\right) , \quad G = C \cdot \sin wt + D \cdot \cos wt \dots\dots(6)$$

The arbitrary constants A , B , C , D , depend on the boundary conditions and the

initial conditions . When the string $KK_1 = ds$ is stretched between $ds = l$, the boundary conditions are $y(0,t) = y(l,t) = 0$. The condition that $y(0,t) = 0$, leads to the solution $y = [C \cdot \sin wt + D \cdot \cos wt] \cdot \sin(\frac{w}{c} \cdot x) \dots (7)$

The condition that $y(l, t) \equiv y(2r, t) = 0$, leads to the equation $y \equiv \sin(\frac{wr}{c}) = 0$ or, $\sin \frac{wr}{c} = 0$ and, $\frac{w \cdot r}{c} = \frac{w_n \cdot r}{c} = n \cdot \pi$, where $n = 1, 2, 3, 4, \dots n \dots \infty \dots (8)$ and $\lambda = \frac{c}{f}$ is the wavelength, $f =$ the frequency of oscillation

Each, n, represents a Normal - Mode - Vibration with natural frequency determined from equation, of Natural frequency as,

$$f_n = \frac{n}{2 \cdot r} c = \frac{n}{2 \cdot r} \cdot \sqrt{\frac{T}{\rho}} = \frac{n}{2 \cdot r} \sqrt{\frac{\sigma}{\rho}} = \frac{n}{4r} \sqrt{\frac{\sigma}{\rho}} = \frac{n}{4r^3} \cdot \sqrt{\frac{(1+\sqrt{5})^2 \sigma^2}{4\pi^2 \cdot r^4}} = [n \frac{\sigma(1+\sqrt{5})}{\pi (2r)^3}] \dots (9)$$

and the sinusoidal mode shape $\rightarrow Y = \sin(n\pi \frac{x}{l}) = \sin(n\pi \frac{x}{2r})$ for caves $l = 2r$ i.e.

The rotating axis KK_1 creates the, Linear vibration of string, and the Natural – frequency f_n , in Material – point $K \equiv [\oplus] \leftrightarrow K_1 \equiv [\ominus]$, as well the Rotational vibration of string $[\oplus s^2 \cup \ominus s^2]$. The more general case of free vibration of Material-point, **Linear $[\oplus s^2 \leftrightarrow \ominus s^2]$ or Rotational $[\oplus s^2 \cup \ominus s^2]$** in any manner, the solution will contain many of the normal modes and the equation for the displacement can be written as,

$$y(x,t) = \sum_{n=1}^{\infty} C_n \sin(w_n t) + D_n \cos(w_n t) \cdot \sin(n\pi \frac{x}{l}) \text{ and } w_n = \frac{n\pi c}{l} = \frac{n\pi c}{2r} \dots (10)$$

where, by fitting equation to the initial conditions of $y(x,0)$ and $\dot{y}(x,0)$, the C_n, D_n , can be evaluated. From Planck's Energy $E = h \cdot f = (h/\lambda) \cdot c$ is equal to the Isochromatic pattern fringe-order in Monad as $\sigma_1 - \sigma_2 = (a/d) \cdot N = (a/d) \cdot n \cdot f_1 = (8\pi r^2/3) \cdot n \cdot f_1$ where, $n =$ the order of isochromatic *a number*, and $f_1 =$ Frequency of Fundamental-Harmonic. This is the why colors exist in fringe-order and are of wave form. Since total Energy in cave $z^2 = (wr)^2$ is dependent on frequency only and stored in the Fundamental and the first Six Harmonics, so the summations bands of these Seven Isochromatic Quantized interference fringe order-patterns, is the Total Energy, E , in the same cave $(wr)^2$ as,

$$E = \text{Spin, Work} \rightarrow W = \bar{S} \cdot w = (h/2\pi) \cdot 2\pi f = [\frac{8\pi r^2 f_1}{3}] \cdot [\frac{n(n+1)}{2}] = [\frac{4\pi r^2 f_1}{3}] \cdot n \cdot (n+1) \dots (11)$$

Equation ... (11), **Represents The Total Energy Stored in cave** r , of, n , **fringes**

where, Fundamental frequency $f_1 = \frac{(1+\sqrt{5}) \cdot \sigma}{4\pi r} \equiv \frac{\Phi \cdot \sigma}{2\pi r} \rightarrow$ **the-Golden-ratio-Pattern**

When stress $(\sigma_1 - \sigma_2)$ go up then, $n =$ order fringe defining Energy goes up also, and the colors cycle through a more or less repeating pattern and the Intensity of the colors diminishes. Since phase $\phi = kx - wt =$ Spatial and Time Oscillation dependence, and

For $n = 1$, Energy in the First Harmonic is, $E = 2\pi r \cdot c = [\frac{2\pi r^2}{3}] \cdot f_1$, and for $n = 2$,

Energy in the First and Second Isochromatic Harmonic is, $E = [\frac{4\pi r^2}{3}] \cdot f_1$ in threes

and, ϕ , is trisected with Energy-Bunched variation f_2 , i.e.

*Energy stored in a Homogeneous Resonance, is spread in the First of Seven-Harmonics beginning from the (first) Fundamental and after the filling with frequency, f_1 , follows the Second - Harmonic with frequency, $2 \cdot f_1$, and so on. In this-way the **Energy Space monads** are generated from the frequency in caves, or from Slits.*

The How Spin is 1 or 1/2, or 1/N, ... The Why Spin is, 1/2, 1/3, 1/4, 1/5, ... 1/N, in monads It is the Quantization of Spin.

One, Half, Third ... 1/N - Lengths $\rightarrow [1/1], [1/2, 1/2], [1/3, 1/3, 1/3], \dots, [1/N, \dots, 1/N]$, with

One, Two, Three, ..., N Wave-nodes, where Spin $= \bar{B} = f_n \cdot (\frac{8r^2}{n\sigma}) =$ Energy in N wave-node-loops. In Second-Harmonic Energy as frequency is doubled and this because of sufficient keeping homogeneously in Spatial dependence, Quantity $kx = (2\pi/\lambda) \cdot x$, which is in threes, meaning that, \rightarrow **Dipole-energy is Spatially-trisected** in Space - Quantity Quanta the Spin $= h/2\pi$ as the angle ϕ , of phase $\phi = kx - \omega t = (2\pi/\lambda) \cdot x$, **and Bisected** by the Energy-Quantity Quanta as this happens in an RLC circuit. [49].

Since Momentum-Ellipsoid, \bar{B} , is perpendicular to, Angular-velocity-Ellipsoid, $\bar{\omega}$, no Work is produced and the Status is Neutral. This property issuing in Material - Point allows, Spin $\equiv \bar{B}$ Vector and, Velocity-Magnitude $\equiv \bar{\omega}$, be conserved as Total Energy $2L = \bar{B} \cdot \bar{\omega} = \mathbf{J} \cdot \mathbf{\omega}^2$, which is the **Quantization of Energy**.

In Material point, and because of Rotation, Stretched - String Energy \bar{B} is not transmitted, but trapped in the, N loops, where motion in loops are all in Phase with each other, and the Amplitude of oscillation varies from zero, at the N nodes, to maxima at the antinodes. By considering Rotation as a grating having N lines per r, then maximum values of n, is $n < \frac{1}{N\lambda}$, i.e. the biggest whole number less than $\frac{1}{N\lambda}$ which is always integer and \rightarrow the N loops are the N Energy-stores in M-P.

This is the Why Spin is, 1/2, 1/3, 1/4, 1/5, ... 1/N, i.e.

One, Half, Third ... 1/N - of Length as the loops $\rightarrow [1/2, 1/2], [1/3, 1/3, 1/3], \dots, [1/N, 1/N, 1/N, 1/N, \dots, N \dots \infty]$, with \rightarrow One, Two, Three, ..., N ... ∞ loops \rightarrow and Wave-nodes.

The Energy $\bar{B} = \frac{h}{2\pi} =$ Spin $= \frac{h \cdot f_1}{\bar{\omega}}$ as velocity, $v = (\omega r)$ in cave, l, is the Spin 1/2, while Doubled $\bar{B} = \frac{h}{2\pi} =$ Spin $= 2 = \frac{h \cdot f}{\bar{\omega}} = 2 \cdot \bar{B}$, in the same cave, l, then $\rightarrow f = 2 \cdot f_1 = f_2$ i.e. In the same cave, l, Energy is quantized as $\rightarrow \frac{1}{2} / 2 \cdot \frac{1}{2} = 1 / 3 \cdot \frac{1}{2} = 1,5 / 4 \cdot \frac{1}{2} = 2, \dots n \cdot \frac{1}{2} = n \cdot f_1$ and so on, depending on the number, n, of wave-nodes in cave, l, and Energy in, n, fringes consist \rightarrow **The, n, lobes Energy-Quanta of caves.**

Energy in n = 1 loop $\rightarrow W = [\frac{4\pi r^2}{3}] \cdot f_1$ and force $n^{\text{th}} \rightarrow W = [\frac{4\pi r^2}{3}] \cdot f_n = n \cdot \frac{(1+\sqrt{5}) \cdot \sigma r}{3}$

Energy in n = n loops $\rightarrow W = [\frac{4\pi r^2 f_1}{3}] \cdot n \cdot (n+1)$ where $n = 1, 2, 3, 4, \dots n \dots \infty$

It was proved that Energy of wave is, $\rightarrow E = m \cdot \dot{y}^2 / 2 = (m/2) \cdot (-\omega A_0)^2$, and

$$\text{Mass } \mathbf{m} = \frac{E}{2r \cdot \omega^2} \text{ i.e. Mass in cave } \mathbf{r}, \text{ is } \rightarrow \mathbf{m} = \frac{E}{2r \cdot \omega^2} = \frac{\bar{B}}{2r \cdot \omega^2} = \frac{(1+\sqrt{5}) \cdot \pi r^3 \cdot \sigma}{16r\omega^2} = \frac{(1+\sqrt{5}) \cdot r^3 \cdot \sigma}{16 \cdot 4\pi r \cdot f^2} = \frac{r^3}{16f^2} = \frac{(2\pi r)^2 \cdot r^3}{(6+2\sqrt{5}) \cdot \sigma^2} \equiv \text{The Inverse-Reaction to Energy } \dots (12)$$

i.e. mass is dependent on cave, r, and Inverse-First-Harmonic, and or is The Inverse-Principal Glue-Bond- Stress, σ , or the Quantized-cave.

Since also A-B Monad \equiv Dipole $AB = \bar{q} = [s + \bar{v}\nabla i]$, and cave $\mathbf{r} \equiv \sqrt{s^2 + |\mathbf{v}|^2}$ then \rightarrow **Energy of all Types is Quantized in this, r, cave of Quaternion.**

L.. DISCUSSION : The present article is the Supplementary of the priors [68-77] all being published .

Because Geometric-logic is for the *Space* , and Mechanic-logic is for *Energy* and are both above all other logics , are preferred in Article in order to give a clear impress of the objective-Reality .The fact that Electric-fields \mathbf{E} ,experience a Force to a Charge q from Material-point to all Universe shows the way of How Forces as motion exist, **i.e.**

The Types of motion \equiv Energy :

Linear-motion $\rightarrow f_n = \frac{1}{2\pi} \sqrt{\frac{k}{m}}$ $\rightarrow 4\pi^2 f^2 \cdot m = k \dots(1)$ and $f^2 = \frac{k}{4\pi^2 \cdot m}$

Orbital-motion $\rightarrow a = \sqrt[3]{\frac{1}{k \cdot f^2}}$ $\rightarrow \frac{1}{f^2 \cdot a^3} = k \dots(2)$ and $f^2 = \frac{1}{k \cdot a^3} = \frac{\Delta}{a^3 \cdot m \cdot g}$

Periodic-Orbital-motion $\rightarrow k = 4\pi^2 \cdot f^2 \cdot m = \frac{1}{f^2 \cdot a^3} \dots(3)$ and $f^2 = \frac{1}{k \cdot a^3} = \frac{k}{4\pi^2 \cdot m}$

From above Displacement , Δ , Stiffness \equiv Unit-Spring-Force-Stress , k , Frequency , f , is everything generated .

1.. The , G \equiv Force \equiv Energy \equiv Motion \rightarrow IS ACTING ON \rightarrow A Unit-force \equiv the Stress $|s^2| \equiv$ Charge per Unit-Surface {through mean \mathbf{f}_n or $\bar{\mathbf{B}}$ of the M- P-cave r , The Conductor} \rightarrow IS ACTING ON \rightarrow The-Spinning-Material-Points {Oriented and Re-oriented through above means \mathbf{f}_n or $\bar{\mathbf{B}}$ of the M-P-cave } \equiv The Gravity g is Acting On \rightarrow On all Masses \equiv The Reaction to the change of motion or \equiv The Inertia of Shape and ,Transports *motion to masses* , through the moving-Energy Storages the Photons .

i.e. The clues to the ubiquity of Electromagnetism in the Natural world .

2.. The Two -Types of Photons :

In prior was shown that all Particles are Quaternion \equiv Dipole \equiv Monads having , their mass as the Real Part and Energy as their Imaginary Part . Energy is the Work produced *i.e.* , a motion , a force acting on a Displacement in One-two and or Three directions , and which motion is thus conserved .

In order that this **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 and the **Revolving** motion . Oscillation or Displacement is the Removal of a point A , to another point B , not coinciding with point A . Vibration is the Periodic motion of a point A to another point B and vice versa . Line-segment AB is the Material – Point , *the Dipole* $[\oplus \leftrightarrow \ominus] = 2r$, *of the Material geometry* , in-where Point A , is the Positive \oplus and Point B , is the Negative \ominus .

a.. In Periodic-Orbital-motion issues the **Tack-Geometry** , *i.e.* the tracks of the Electric-lines-Pattern are , **Pairs of closed-loops starting , Clock-wise and Anti-clockwise from the \oplus Spring** , and not as straight-lines ,and because of the voltage between the ends of Spaces , is created the motion as an Eternal rotation of the $[\oplus]$ *constituent towards* $[\ominus]$ *constituent* . In both cases the Angular-momentum $\bar{\mathbf{B}}$, is equal to \pm Spin S . Material Points , Segments etc. consist the Physical-Structures . In the finite-Space ,*the cave r* of a Material-point , **is stored the Work or the motion** , produced by this eternal rotation of \oplus to $\leftrightarrow \ominus$. Because Stress $\sigma > 0$, Spin \equiv Angular momentum $\bar{\mathbf{B}}$, is equal to AM /Unit-Area = AM / π ,and frequency $f_n = (\frac{1\sigma}{8r^2}) \cdot \bar{\mathbf{B}}$, so **Spin is either Positive or Negative** , and \equiv Electric-Charge $\bar{\mathbf{E}} = \pm$ AM / π . The Spin becomes from the $\uparrow \leftrightarrow \downarrow$ Antiparallel Angular - Momentum-vectors $\bar{\mathbf{B}}$. which is equal

to the **Golden-ratio-Spin** ,of cave **r** , the **Spinning-Stationary-Material-point** with Fundamental frequency **f₁** as equation $W = \left[\frac{4\pi r^2}{3} \right] \cdot f_1 = \frac{(1+\sqrt{5}) \cdot \sigma r}{3} = 2L = \bar{B} \cdot \bar{w} = J \cdot w^2$

This Stationary–Energy-Storage is as **Coulomb Electrical-Force** where the Electrical Force , $F_{\text{elect}} = k_c \frac{Q_1 Q_2}{d^2} = \frac{[\oplus \leftrightarrow \ominus]}{d^2} = \frac{8}{\pi r(1+\sqrt{5})} \left[\frac{B}{r^2} \right] = \frac{64 f_1 \cdot}{\pi r \sigma (1+\sqrt{5})}$, in Box **B_p** .

From Electron-equation $4 \pi^2 f_e^2 \cdot m_e = k = \pi g$ then ,

The $k = \pi g$, denotes the \oplus **Space** \equiv Electric-field in-where exist the Electric-lines the tracks for the motion of electrons \ominus **Anti-space** . The Right angular momentum vector $AM \equiv \uparrow$ is the Produced Work and stored in Magnetic-field as motion while left-vector $AM \equiv \downarrow$ is the Produced Work and stored in the opposite Magnetic field as motion and both consist the Dipole $[\oplus \cup \otimes \cup \ominus]$ vector directed to $[\oplus \leftrightarrow \ominus]$, of **Tack-Geometry**. The chains of Spins due to Periodic excitation $[\leftrightarrow]$, is Material-Point , created in a Magnetic field due to LRC-Circuit and which is tuning to the critical-Quantum and critical-State **g_G** . The **Chains of Periodic-Spins** are Pointy-vibrating with their

characteristic frequencies $f_1 = \frac{(1+\sqrt{5}) \cdot \sigma}{4\pi r} \bar{B}$ and are filling up the entire universe .

b.. In Revolving or Rotational motion ,which is the opposite of prior, in the **Moving Photon-Tank** - **B_R** , and because of Stress **σ** , is created the Centrifugal-Force **F_f** .

Photon is a Material-point , a Box **B_p** , with fix-ends and an Inward-cave , **r** , which is the **Energy-Storage B_p** , and **Outward cave** , **r** , as an **Electromagnetic Radiation** of wavelength $\lambda = c T = c / f_p$ which carries the Storage **B_p** .

Electromagnetic Radiation which follows the **Golden-ratio-frequency** , **f_p** , of **Photon** , produced in Box from the **Centripetal-Centrifugal-forces** is equal to the main **Stresses ± σ** .This is the Why Golden-ratio-frequency **f_p** exists in nature from the micro to the macro scale and is a **Pressure everywhere** in all Energy structures .

Energy as motion defines **In-Box** the minimum **Resonance-Golden-ratio-frequency** $f_R = f_1$ which follows *Kepler constant for microcosm* and frequency **f_R** defines in **Outer-Box** the **Electromagnetic Radiation** which is the **Conveyer** , the carrier of the Energy-cave **r** ,The Reality is the **Energy-Space United-universe** of one Force which produces **Work** \equiv **Force x Space** , and which is conserved as motion in Space-Boxes. Potential-Energy \equiv **P_E** stored in Material-point is the Electric-Field **E = g π** in where $[\oplus \text{ moves to } \ominus]$ and thus from Geometry-Shape are created the two opposite Angular momentum vectors and from Dipole the Spin **S = 1/2** in **r** cave filling the whole universe

3.. Gravity g :

Gravity-cave , becomes from the **G** Pushing \rightarrow on **c** , from beyond Planck`s length and because **Gravity-Force** **F_G** becomes from the in-storages acceleration $a_c = v^2/r$ of the infinite-Material-Points in **MFMF field** , and force $[\nabla i]$ is stationary because from the Pointy-Rotation $[+s^2 \leftrightarrow \cup \cup - s^2]$ of the MP-Spin , then for **Planck length** , **r** , exists ,

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

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

$F_G \equiv \frac{n\pi\sqrt{3}}{16(1+\sqrt{5})} v^4 = \frac{n\sqrt{3}\pi}{(1+\sqrt{5})} \left(\frac{v}{2}\right)^4 = \frac{2n\sqrt{3}\pi}{\Phi} \left(\frac{v}{2}\right)^4 \dots(b)$ **and is the Black-Hole-Gravity**

equation which is related to the Inner velocity , v , and to its n lobes Φ ,Therefore

$$\text{Gravity-Acceleration is } \mathbf{g}_G = s \left[\frac{\pi r v^4}{2} \right] = \left[\frac{3,1415926([\sqrt{5}+1] \cdot \sqrt[4]{2} \cdot 10^{-35}) \cdot (299793458)^4}{2} \right] \cdot e^3 =$$

$$6,044981 \cdot 10^{-35} \cdot 80,776078 \cdot 10^{32} \cdot 20,085536 = g_G = \mathbf{9,8076925} \dots (c), \text{ where}$$

$1/m_G = s = \text{mass-coefficient } [\sqrt{5}+1] \cdot \sqrt[4]{2} \cdot e^3$, 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 $\rightarrow [\sqrt{5}+1] = 2 \cdot \Phi$ for any

Material cave , r , coefficient for the Unity-Plane-Quaternion is $\sqrt[2]{\sqrt{2}} = \sqrt[4]{2}$, or

The same , $\overleftarrow{1} \perp \overleftarrow{j} \equiv \sqrt{2} + \overleftarrow{k} \perp \sqrt{2} \equiv \sqrt[2]{\sqrt{2}} = \sqrt[4]{2}$ and for the Three dimensions Euler Rotation System number is $e \cdot e \cdot e = e^3$.

As in Binary-System $[1, 0]$, where one kilobyte = $2.8^3=1024$ bytes is eight times than a Kilobit = $2.4^3 = 128$ bytes [1byte = $2^3 = 8$ bits , **1bit** = a = **1 or 0**] , similarly are above dimensions as Units mass . In Anti-Space-caves one of which is the Planck`s-cave as

$$\mathbf{r} = \mathbf{L}_P \equiv e^{-i \cdot (\frac{\pi}{2} + 2k\pi) \cdot b} \equiv e^{i \cdot (-5\pi/2) \cdot 10} \equiv e^{i \cdot (-5\pi/2) \cdot 1} \equiv \{ \sqrt{3} \cdot \pi \cdot \mathbf{1,616199} \cdot 10^{-35} \text{ m} \} .$$

The Planck`s length ,is an **Energy-cave** ,and is the smallest **Energy-Unit of Space** and this because of Space , $\mathbf{s} = \mathbf{0}$ and $\mathbf{k} = \mathbf{1}$. It was proved that in these caves , motion happens as [(c) [\leftrightarrow] (L_P)] following the one degree of freedom equation $\ddot{x} + w^2 x = 0$

with solution the frequency, $\frac{w_n}{2\pi} = \mathbf{f}_e = \frac{1}{2\pi} \sqrt{\frac{k}{m}}$ and the Infinite motions in Sub-caves as ,

$$1 = g f_n^2 a^3 = \left[\frac{4\pi^2}{GM} \right] \cdot f_n^2 a^3 . \text{ From relation } \mathbf{G} = \mathbf{g} \mathbf{k}_E = 9,8076925 \cdot 6,8116 \cdot 10^{-12} =$$

$$\mathbf{6,680561} \cdot 10^{-11} \text{ m}^3 / \text{N} \cdot \text{s}^2 \text{ and Orbit-relation } \mathbf{1} = \mathbf{c} \cdot \mathbf{r}^3 \cdot \mathbf{f}_P^2 \rightarrow \mathbf{f}_P = \sqrt{1/cr^3} , \text{ and from}$$

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

$$\text{relation between } \mathbf{c} , \mathbf{r} , \text{ and Total-Energy } \mathbf{2L} = \mathbf{2n}(3 + \sqrt{5}) \cdot \left[\frac{\sigma^2}{\pi r^2} \right] = \mathbf{4n} \cdot \mathbf{\Phi}^2 \left[\frac{\sigma^2}{\pi r^2} \right]$$

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

$$\mathbf{a} = 2,1145016 \cdot 10^{-11} \text{ m} , \text{ and frequency } T^{-1} = \mathbf{f}_P = 3,28393 \cdot 10^{15} / \text{s} , \text{ Energy as}$$

frequency can **Enter , Format and cohesive , the first or any other Energy Rim in**

Planck`s length ,using relation $1 = g \cdot \mathbf{f}_n^2 \cdot \mathbf{a}^3 = \left[\frac{4\pi^2}{GM} \right] \cdot \mathbf{f}_n^2 \cdot \mathbf{a}^3$, and for $f = T^{-1}$

$$\text{Equation } \mathbf{a} = \sqrt[3]{\mathbf{T}^2 / \mathbf{g}} = \sqrt[3]{\frac{[3,04513 \cdot 10^{-16}]^2}{9,80769251}} = 2,1145016 \cdot 10^{-11} \text{ m} , \text{ and for unit energy}$$

$$\text{Newtonian Constant of Gravitation } \mathbf{G} = \mathbf{E} = \mathbf{h} \cdot \mathbf{f}_n = \left[\frac{c \cdot r^3}{a^3} \right] \cdot [\mathbf{g}_L \mathbf{k}_L] = \mathbf{g} \cdot \mathbf{k}_E = \mathbf{g} \cdot [\mathbf{g}_L \mathbf{k}_L]$$

4.. The Hydrogen-cave :

Hydrogen-cave , becomes from the **G** Pushing \rightarrow on \mathbf{g} , on the Earth-Unit-coefficient, \mathbf{k}_E , and because is the **Starting for first time begins** , of this **Mechanism** then from Relation $\mathbf{G} = \mathbf{g} \cdot [\mathbf{g}_L \mathbf{k}_L] \equiv \mathbf{g} \cdot [1 * 1] \equiv \rightarrow \mathbf{g}$, or $\mathbf{G} = \mathbf{g}$, meaning that in Earth-System of gravity , the Newton`s Gravitational constant \mathbf{G} , and Gravity \mathbf{g} are equal , while in all other relative Systems are equal to the proportionality of their Local-constant \mathbf{k}_L .

It was proved that ,**Constant G ,is the mechanism , mould** , for the **First-kick-Start** upon this Unit-Granular-Energy-Stress-Layer \mathbf{g} ,to formulate in that minimum energy

orbit \mathbf{a} as above $\rightarrow \mathbf{a} = \sqrt[3]{\mathbf{T}^2 / \mathbf{g}} = \sqrt[3]{1 / \mathbf{g} \mathbf{f}^2} = 2,1145016 \cdot 10^{-11} \text{ m}$ into Planck`s cave.

From Kepler third law Closed-Space-Energy equation of Newton's Laws of motion

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

Because (k) is constant, $r^3 \cdot f_p^2$, is also a Constant multiplication of cave, r , and the frequency f , and the, **Work \equiv motion** is conserved in cave, r , as the, n , frequencies $f_N = n \frac{(1+\sqrt{5})\sigma}{4\pi r} = \frac{n\sigma \cdot B}{8 r^2}$, and for a Damping-cave $\rightarrow r(t) = r(t+w) \leftarrow$ as Planck's scale is with **min-Damping = 1**, and **Unit-Energy-Quantity W_u** , (the critical-energy-unit in

the min, r) is this Unit-Stress-Gravity g , as $k = E = \frac{T^2}{a^3} = g = \frac{1}{f^2 \cdot a^3}$, i.e. \rightarrow

Stress g , when is entering into the minimum cave, a , of a minimum Surface, **then from the Period of Rotation T** , on the Perimeter, **is created in Surface the minimum Quantity of Energy-cave and is the Hydrogen-Atom**, where $g f^2 \equiv$ the **Energy-Part** embodied with stress, g , and cave, a^3 , is the **Space-Part**, in 3-DOF space as \rightarrow

$$T^2 = g a^3 = 9,808238 \cdot [2,1145016 \cdot 10^{-11}]^3 = 9,2728158 \cdot 10^{-32} \text{ s}, \text{ and Period } T,$$

$$T = 3,04513 \cdot 10^{-16} \text{ s}, \text{ or frequency } f = 3,2839982 \cdot 10^{15} / \text{s}. \text{ From equation } E = h f =$$

$$6.62607 \cdot 10^{-34} \cdot 3,2839982 \cdot 10^{15} = 2,175999 \cdot 10^{-18} \text{ J} / (1,6 \cdot 10^{-19}) = \mathbf{13,59999 \text{ eV}}$$

Above Quantized Energy of 13,59999 eV, correspond to Hydrogen-Atom-cave.

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

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

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

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

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

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

i.e. Equation $L^2 = -2a^2 \cdot E$, denotes that Angular -Momentum L ,

in Orbit-Rims is always Negative and equal to, $L = -a \sqrt{2E}$.

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

5.. Electron :

Electron is created through the vibration, f_n , in the **Energy-Space-meters**, g, π ,

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

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

mass is $F = -k r = -k r \cdot \bar{r}$ as equation (1a) $\ddot{x} + w^2 x = 0$ with a general solution

$x = A \sin w_n t + B \cos w_n t$, where A, B are constants and evaluated from the initial conditions and which become $x = [\dot{x}(0)/w_n] \cdot \sin w_n t + x(0) \cdot \cos w_n t \dots(1)$

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

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

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

From Planck's equation $f_e = E/h = [-13,6 \times 1,6 \cdot 10^{-19} = 2,176 \cdot 10^{-18} \text{ Joule}] / [6,626 \cdot 10^{-34} \text{ J.s}] = 3, 283998 \cdot 10^{15} / \text{s}$, where min-energy -13,6 eV is Hydrogen-atom

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

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

$$f_e = 3, 283998 \cdot 10^{15} / \text{s}, \text{ and } L_e = 2, 3762992 \cdot 10^{-16} \text{ m} \dots\dots\dots(2c)$$

Equation becomes from relation $\rightarrow 4\pi \cdot f_e^2 \cdot m_e = g \leftarrow$ In Planck's length .

Electron-Charge , becomes from the *Periodic excitation* of the motion of the \oplus , constituent to the \ominus constituent , **Tack-Geometry** , **Not** in loop ($\oplus \leftrightarrow \ominus$) , **But** through the **One way**- N -Electric-Paths [$\oplus \leftrightarrow \ominus$] , which formulate the **Electric Field-Pattern** , following charge-equation $\rightarrow \bar{q} \equiv \frac{m_e c^2}{2} = \frac{g c^2}{8\pi f_e^2}$. From Gravitation

$G = k_e \cdot g$, and Voltage $\bar{V} \equiv V_p \equiv \frac{c \cdot \bar{q}}{h}$ Spin = B / π , and the Electrons-equation of motion in $\oplus \leftrightarrow \ominus$ is $\ddot{r} + w^2 r = 0$ and Solution of equation $\rightarrow 4\pi \cdot f_e^2 \cdot m_e = g \leftarrow$ which is the **Electron** , and **Charges** , **q**

All above Physical Structures Vibrate , *In-Sectors* with minimum Energy , **and forming the** \rightarrow **Electron-charge** \leftarrow *In Surfaces* with minimum Energy **and thus forming The Orbitals** .

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

$f_N = n \frac{(1+\sqrt{5})\sigma}{4\pi r} = \frac{n\sigma \cdot B}{8 r^2}$ and for a damping-cave $\rightarrow r(t) = r(t+w)$ with min-Damping= 1 and Unit-Energy-Quantity W_u , (**critical-energy unit**) in-min , r , which is **Gravity g** .

From , **Orbital-Periodic-motion** is formatted the Energy-Space of the [$\oplus \leftrightarrow \ominus$] in **Tack-Geometry-Pattern** and formulation ,where for minimum Planck $L_p \equiv a$ cave

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

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

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

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

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

The $k = \pi g$, denotes the \oplus **Space** \equiv Electric-field in-where exist the Electric-lines the tracks for the motion of electrons \ominus **Anti-space**. The Right angular momentum vector $AM \equiv \uparrow$ is the Produced Work and stored in Magnetic-field as motion while left-vector $AM \equiv \downarrow$ is the Produced Work and stored in the opposite Magnetic field as motion and both consist the Dipole $[\oplus \cup \otimes \cup \ominus]$ vector directed to $[\oplus \leftrightarrow \ominus]$ as **Tack-Geometry**. For Material-Point, the chains of Spins due to Periodic excitation $[\leftrightarrow]$, is created in a Magnetic field due to LRC-circuit and which is tuning to the critical Quantum and critical-State g_G . The **chains of Spins** are Pointy vibrating with their characteristic frequencies $f = \frac{(1+\sqrt{5}) \cdot \sigma}{4\pi r} \bar{B}$ as in Stationary-Photon.

5a. The - New Dynamic-Hydrogen-cave .

The Shapes of the Orbits of Central-Forces, in the Conservative Systems, are the four Conic-sections. The Shape of Orbits for the **Two-body problem is the Circle**, when its eccentricity $e = 0$, while **the Ellipse** when $0 < e < 1$, and this because **Radius $r_p = L^2 / [(1 + e) \cdot GM m^2] \rightarrow 0$** , and issues $M = m_1 + m_2 + \dots m_n$

The Shapes of the Orbits for the **Three-Body Problem with the SLIT-Focus** is a Plane Harmonics of, **Eight-Shape**, as ∞ . The Singular points, $x = 0$, $y = 0$, become from equation corresponding to $f(x) = 0$, and $y = \dot{x} = 0$, and when Energy $P_E = U(x) = 0$ is that which are the stable-equilibrium minima-positions.

Orbitals are Plane-Rims which thickness is the Phase-Plane of a single DOF Oscillator.

Electrons-equation of motion is $\ddot{x} + w^2 x = 0$, with solution $4 \pi f^2_e \cdot m_e = g$,

where **the Reaction to the Change of motions**, electron-mass $m_e = \frac{g}{4 \pi f^2_e}$, and

the Primary equation of Electron is $\rightarrow w^2_e \cdot m_e = \pi g = \text{constant} \leftarrow \dots (m)$

In the constant, **Hydrogen Conservative-Cave-System**, which creates only closed Orbit-shapes as Circles, Ellipses and Eight-shape, ∞ , are placed the above elements,

i.e. $\pi g \equiv \text{Energy} \equiv [\text{meter of area} * \text{meter of force}] \equiv \text{Electrons on Orbits}$, on *Traces* and also the **Unit-Space \equiv Massive-United-Unit-Space $\equiv \rightarrow [+v \cdot s^2] \leftarrow$ The Nucleus** jointed through the Neutral Material-Points $[(+) [\leftrightarrow] (-)]$ with the **Strong-force \rightarrow**

$$S_F = h \cdot f_n \equiv h \cdot \{ [S \equiv B_P \equiv \mathbf{EM-R} \equiv f_{1=N}, f_2, f_3, f_D, f_n = w^2] \equiv h \cdot n \frac{(1+\sqrt{5})\sigma}{4\pi r} \equiv h \frac{n\sigma \cdot \bar{B}}{8 r^2} \dots (mg)$$

Equations (m), (mg) are the **Energy-Space-constituents** in the Hydrogen-System.

From relation $f_n = \frac{[(1+\sqrt{5})\sigma]}{4\pi r}$ and $\bar{B} = \frac{\pi r^3 \sigma}{8} [1+\sqrt{5}]$ then Force **f_n Orient Spin \bar{S} to \bar{B}** as

$$\bar{g} = f_n \times \bar{B} = |f_n| |\bar{B}| \cdot \sin \theta = \frac{[(1+\sqrt{5})\sigma]}{4\pi r} \frac{\pi r^3 \sigma}{8} [1+\sqrt{5}] \cdot 1 = \frac{[\sigma^2 r^2 (1+\sqrt{5})^2]}{32} \equiv \frac{\sigma^2 r^2 \cdot \Phi^2}{8} \dots (g)$$

Equation (g) which is Gravity constant g , is the permeable Path for inner stress σ , to **pass the Material's-point** surface $4\pi r^3/3$ and to **expenditure its energy**. The same exists also to the **Electromagnetic force** which is **associated with a fundamental property** of matter \equiv Storage, which is the **Electric-charge** in **Tack-Geometry**.

Because Golden-ratio Φ is squared Φ^2 , notifies the Energy-Growth of **Gravity g** .

Electric-charge $\bar{q} = \frac{G}{c \sqrt{2}}$, Photon-charge $\bar{q}_P = \frac{G}{\sqrt{2} \cdot f} = \frac{G \cdot h}{\sqrt{2} \cdot E}$, because $G = f_n \cdot \sqrt{2} \cdot \bar{q}$

From all above, is seen the Strong-clue to the ubiquity of Electromagnetism .

5b. Orbits :

Orbital Shapes and Physics is analogous to Energy-Space Material Geometry of the four Dimensions namely , Energy and the three coordinates of the Material-Point \equiv Quaternion in Space . Material Geometry issues in all levels of classical Mechanics , *D'Alembert , Euler , Lagrange* , either that of microcosm or of macrocosm .

It was shown before that *in Conservative Systems* of Central-Force , Total energy E is conserved and at periapsis energy $E = \frac{GMm}{2a}$ and $e = \sqrt{1 + 2EL^2/G^2M^2m^3}$ and for $e = 0$ $E = -\frac{G^2M^2m^3}{2L^2}$, i.e. energy is always Negative . The Total-energy for the Unit-mass is $E = K_E + P_E = (\frac{1}{2}) \cdot \dot{x}^2 + U(x) = \text{constant}$ and solving for $y = \dot{x}$ this Ordinate of the Phase-Plane is given by Planar equation ,

$$y = \dot{x} = \pm \sqrt{2[E - U(x)]}$$

By examining the value of energy , E , is determined by the initial-conditions of $x(0)$, and $\dot{x}(0)$ and if these are large , E will be also large and the Face-Plane plots are *open-loop* trajectories . If $x(0)$, and $\dot{x}(0)$ are very small then , as this happens at Slit , then E is also small and Face-Plane plots are *closed-loops single or jointed* trajectories

From equation on Orbit $E = -\frac{GMm}{2r_p}(e - 1)$ and $r_p = -a(e - 1)$, is seen that

Circle and Ellipse *occupy the same Total-Orbital-energy E* on diameter $2a$.
Because Hydrogen- atom , was proved to be *an Conservative System* of Central-Force therefore its Orbitals are *Circles* and *Ellipse also* .

The Shapes of the Orbits of Central-Forces , in the Conservative Systems , are the four Conic-sections . The Shape of the *Two-body problem is the Circle* ,when its eccentricity $e = 0$, while *the Ellipse* when $0 < e < 1$,, and this because

Radius $r_p = L^2 / [(1 + e) \cdot GM m^2] \rightarrow 0$, and when $M = m_1 + m_2 + \dots m_n$

The Shapes of the Orbits for the **Three-Body Problem with SLIT-Focus** is a Plane Harmonics of , *Eight-Shape* , as ∞ . In the Singular points , $x = 0$, $y = 0$, become from equation corresponding to $f(x) = 0$, and $y = \dot{x} = 0$, and this when Energy $P_E = U(x) = 0$, which are the stable-equilibrium minima - positions .

Orbitals are Plane-Rims which thickness is the Phase-Plane of a single DOF Oscillator.

The Total-kinetic-energy of Electrons in an , n , Orbit is $E = (m_e \cdot v^2/2) \cdot 2n^2 = m_e \cdot v^2 \cdot n^2$, and for the First-Energy-orbit $E_1 = m_e \cdot v^2 \cdot n^2 = [m_e \cdot v^2] \cdot 1 = -13,6 \text{ eV}$

The difference of Energy between any two orbits is , $E_n - E_{n-1}$, or

$$E_n - E_{n-1} = [m_e \cdot v^2 \cdot n^2] - [m_e \cdot v^2 \cdot (n-1)^2] = [m_e \cdot v^2] \cdot [n^2 - (n-1)^2] = [m_e \cdot v^2] \cdot [2n-1] \dots (d)$$

Equation (d) denotes the *Energy in Hydrogen-cave-Rims* for the permitted-positions of the Electrons in Rims . This frequency is the Kick-Start-Energy which is applied in the *Onion-Structure* also with the *Slit-Focus* of the two or four Protons .

5c. Focus :

3.. In the Undamped **Planck`s -Conservative -System** , the Total-Energy of , $-13,6 \text{ eV}$, of Hydrogen-cave , corresponds to the Natural-frequency of the *Primary-Particle* with the less *Negative-Charge-frequency* , which is **The electron** and which mass m_e and frequency f_e follow $\min g$.

Electrons-equation of motion is $\ddot{x} + \omega^2 x = 0$, with solution $4\pi f_e^2 \cdot m_e = g$, where **the Reaction to the Change of motion**, electron-mass $m_e = \frac{g}{4\pi f_e^2}$ and the Primary equation of Electron is $\rightarrow \mathbf{w}_e \cdot \mathbf{m}_e = \pi \mathbf{g} = \mathbf{constant} \leftarrow \dots$ (m)

In Energy-Level ,1,the Phase-Plane and the Plot appears as Circle with One-Nucleus and One-Planet and for Stability of Equilibrium Two-Planets symmetric to Focus .

In Energy-Level , 2 , the Phase-Planes and the Plot appears as Three-Ellipses which are perpendicular each other , and this for the Stability of Equilibrium of each orbit which has only Two-Planets symmetric to the common Focus.

In the three SLIT Orbits exist $3 \times 2 = 6$ positions .Since each orbit occupies only Two Planets for the equilibrium of the orbit therefore the Two-Residuary positions are occupied by the First energy level which is the Unite-Nucleus for the Two-Planets.

The Unit Work produced is considered from all other Unit monads.

The total Kinetic Energy is $\rightarrow E = \frac{1}{2} \cdot m_1 \cdot v_1^2 + \frac{1}{2} \cdot m_2 \cdot v_2^2$, and because $v_1 = v_2 = v$, then $E = \frac{v^2}{2} [m_1 + m_2]$, and since $m_1 = \frac{F}{g_1}$, $m_2 = \frac{F}{g_2}$, $\bar{v} = \bar{r}$, and Unit Work $E = 1$,

becomes ,

$$E = \frac{v^2}{2} [m_1 + m_2] = \frac{r^2}{2} \left[\frac{F}{g_1} + \frac{F}{g_2} \right] = \frac{F \cdot r^2}{2} \left[\frac{1}{g_1} + \frac{1}{g_2} \right] = \frac{F \cdot r^2}{2} \left[\frac{g_1 + g_2}{g_1 \cdot g_2} \right] = \frac{F \cdot r^2}{2} \left[\frac{2 \cdot g}{g^2} \right] = \frac{F \cdot r^2}{g} = 1$$

i.e. **The Unit force , F , between Two masses of constant Distance r , is Proportional to a Constant and Minimum Acceleration g**, the Layer , Stress $g \equiv 9, 808238$, and is inverse square to the distance as $F = \frac{g}{r^2} \dots$ (r) Newton`s and Coulomb Laws.

Gravitational-Constant Force $\equiv G$, is Spread over a minimum-Surface , the Layer or Conductor or , a-Surface , or a-Permissible path ,in-where exists this Reaction to the motion and which ,is called mass ,so \rightarrow the Surface-force , **g ,becoming from the inner acceleration f_n of Material-Points , is acting on Spins \bar{B} , of all masses and consequently to all masses of the universe , or , Action $G \rightarrow$ on $\bar{g} \rightarrow$ on $\bar{B} \rightarrow$ on g_G**

5d. Orientation :

The Extreme case , where surface is interchanged as line or line-segment , and is the same as the infinite small , ds ,in Calculus, where stresses $\sigma_2 = 0$ and τ_{12} are very small is **equation of stresses** $\sigma_{1,2} = \sigma_1 / 2 \pm (\frac{1}{2}) \cdot \sqrt{\sigma_1^2 + 4 \cdot \sigma_1^2} = \sigma_1 \cdot [1 \pm (\sqrt{5})] / 2$, which is the **Golden-ratio-Pattern** of Material-Point as type of a vanishing-shear due to layers laterally shifted . This minimum quantized energy σ , was proved that is going out the Material point as acceleration and creates gravity **g** as f_n acting on Spin S_{PA} .

From relation $f_n = \frac{[(1+\sqrt{5})\sigma]}{4\pi r}$ and $\bar{B} = \frac{\pi r^3 \sigma}{8} [1 + \sqrt{5}]$ then **force f_n orients Spin \bar{S} to \bar{B}**

$$\text{as } \rightarrow \bar{g} = f_n \times \bar{B} = |f_n| \times |\bar{B}| \cdot \sin \theta = \frac{[(1+\sqrt{5})\sigma]}{4\pi r} \cdot \frac{\pi r^3 \sigma}{8} [1 + \sqrt{5}] \cdot 1 = \frac{[\sigma^2 r^2 (1+\sqrt{5})^2]}{32} = \frac{\sigma^2 r^2 \cdot \Phi^2}{8} \dots (g)$$

Equation (g) which is Gravity constant **g**, is the permeable Path for inner stress σ , to **pass the Material`s-point** surface $4\pi r^3/3$ and to **expenditure its energy** .The same exists also to the **Electromagnetic force** which is **associated with a fundamental property** of matter which is the **Electric-charge . It is a clue to the ubiquity of Electromagnetism .**

From equation of Gravitation $G = k_E g = g \cdot [k_R g_R]$ seems that the two constants are related i.e. **act each other through Local-coefficients or through Field-lines**, called the Medium or the Permissible Path. It was shown that the first Path is Gravity g . Above defines that original Field-lines of Force, G , are distorted by these separate *Charges, Local-coefficients, the Layers*. The Original Field-lines terminate at the surface on one side of the Medium, and new field lines originate from the other side of it. It was shown that the Momentum vector, \bar{B} , and equal to spin S , because it is following the *Stationary - Wave - Nodes - Principle in Material-Point*, creates the minimum quantized Energy which is conserved in lobes. This Property is extended also to the Number of lobes as well as to, π , number as velocity $\{v = n \cdot \pi \cdot c\}$ which is the minimum Number relating Lines and Surfaces.

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

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

Equation (π) shows that velocities in lobes are, $n \cdot \pi$ times that of light, following, π , number in circle, i.e. **in Material-points exist velocities multi-times that of light** and the minimum *Surface-constant*, the **Unit π** , or the **Growth of the velocity-vectors** occurs in lobes by following the logarithm laws of Energy-constant c which is acting on Space constant π .

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

5e. The Tack-Geometry-Pattern :

Remarks :

1.. Electron Charge follows the **Tack-Geometry**, which denotes the **Periodic excitation** as the motion of, \oplus constituent to the \ominus constituent, **Not** in loop ($\oplus \rightarrow \ominus$) **But** through the **Oneway- N-Electric-Paths** [$\oplus \ll \rightarrow \ominus$], which formulate the **Electric Field-Pattern**, following the charge-equation $\rightarrow \bar{q} \equiv \frac{m_e c^2}{2} = \frac{g c^2}{8\pi f^2}$

2.. Material-Point-Charge follows the same **Tack-Geometry**, which denotes the before **Periodic excitation** as the motion of, \oplus constituent to the \ominus constituent, **Not** in loop ($\oplus \rightarrow \ominus$) **But** through the **Oneway- N-Electric-Paths** [$\oplus \ll \rightarrow \ominus$], which is formulating the **Material-Point-Pattern**, following the equation of charge as \rightarrow

$$E \equiv \frac{m_p c^2}{2} = \frac{m_p w^2 \cdot r^2}{2} = \frac{m_p r^2}{2} (2\pi f)^2 = 2\pi^2 r^2 \cdot m_p \cdot f^2 = 2\pi^2 r^2 \cdot m_p \cdot \left[\frac{\Phi \cdot \sigma}{[2\pi r]} \right]^2 = \frac{m_p \sigma^2 \cdot \Phi^2}{2} =$$

and since $\bar{B} = r \cdot \sigma \cdot [1 + \sqrt{5}] = 2r \cdot \sigma \cdot \Phi$, then **Charge $\bar{E} = \frac{m_p \sigma^2 \cdot \Phi^2}{2} = \frac{\pi \cdot m_p}{2} \bar{B}$.i.e.**

Charges in Stationary-Material-points are the same as those of **Rotational-motion** Equal to **The Self-Growing- Φ -Property of frequency f_n** in Photon-Material-Point.

3.. **The-Stationary-Photon-Charge**, is the case of Material point with **Periodic Orbital-motion** where issues the **Tack-Geometry** i.e. the tracks of the Electric lines Pattern are closed loops and not straight-lines, and also because of the Voltage between the Ends, on Dipole is created the motion as an **Eternal rotation** of the [\oplus] **constituent towards** [\ominus] **constituent**. The opposite issues for Rotational motion where in the **Moving-Photon-Tank** and because of Stress, σ , is created the

Centrifugal-Force F_f and frequency $f_n = \left(\frac{1\sigma}{8r^2}\right) \cdot \bar{B}$, so , Stress $\sigma = 0 \rightarrow \sigma$, and $\bar{B} = \text{Angular-Momentum} = AM = 0 \rightarrow AM$, and Spin is equal to $AM / \text{Unit-Area} = AM / \pi$, and because of the two Closed , Clockwise and Anti-Clockwise motions , *One-way-loops* , **Spin is either Positive or Negative** and then is \rightarrow Electric-Charge $\bar{E} = \pm AM/\pi = \text{Electron-Spin} = \text{The } \pm \text{ Electron}$ and because of the closed One-way-loop **Spin is either Positive or Negative** as this is $\rightarrow \text{Spin} = \pm AM / \pi \leftarrow$

Above Spin disappears the ERP Paradox because is extended and actually filling up the entire universe .These Stationary-particles are permanently entangled ,with Wave packets becoming from M-P-Photons , which Orientate and Re-orientate their Spins.

M.. CRITICISM , ON EPR , ARGUMENT :

A.. What is Quantization .

Quantization is the concept (*the Process*) that any , **Physical Quantity \rightarrow [PQ]** of the objective reality (**Space = Matter , Energy or Both**) is mapping the Continuous Analogous , *are the points* , to only certain Discrete values . Quantization of Energy is done in the Energy-Space-tanks , as Material-Points , in tiny volumes and on points consisting the Equilibrium , *all the Opposite Twin* , of Space - Anti space .

In Geometry [PQ] are the Points , *which is nothing* only , and transformed into the \rightarrow Segments , Lines , Surfaces , Volumes and to any other Coordinate System such as (x, y, z) , (i, j, k) and which are all quantized .

Quantization of E-geometry is the way of Points to become as \rightarrow (Segments , Anti-segments = Monads = Anti-monads) , (Segments , Parallel-segments = Equal monads) , (Equal Segments and Perpendicular-segments = Plane Vectors) , (Un-equal Segments twice - Perpendicular -segments = The Space Vectors = Quaternion) . [46]

In Philosophy [PQ] are the concepts of Matter and of Spirit , or of Materialism and or of the Idealism .

a).. Anaximander , claimed that Non of the elements could be, *Arche* and proposed , *apeiron* , an infinitive substance from which all things are born and to which all will return.

b).. Archimedes , is very clear regarding the definitions, that they say nothing as to whether the things defined exist or not , but they only require to be understood . Existence is only postulated in the case where [PQ] are the Points to Segments (magnitudes = quantization process) . In geometry we assume Point , Segment , Line , Surface and Volume , without proving their existence , and the existence of everything else has to be proved .

The Euclid`s similar figures correspond to Eudoxus` theory of proportion .

c).. Zenon, claimed that , Belief in the existence of many things rather than , *only one thing* , leads to absurd conclusions and for , *Point and all its constituents will be continuous without magnitude*. Considering Points in space are a distinct place even if there are an infinity of points , defines the Presented in [44] idea of , *Material Point* .

d).. Materialism or and Physicalism , is a form of philosophical monism and holds that matter (*without defining what this substance is*) is the fundamental substance in nature and that all phenomena , *including mental phenomes and consciousness* , are identical with material interactions by incorporating notions of Physics such as Space-time , physical energies and forces , dark matter and so on .

e).. **Idealism** , such as those of Hegel , *ipso facto* , is an argument against materialism (*the mind-independent properties can in turn be reduced to the subjective percepts*) as such the existence of matter can only be assumed from the apparent (*perceived*) stability of perceptions with no evidence in direct experience .

Matter and Energy are necessary to explain the physical world , *The Objective Reality* , but incapable of explaining mind and so results , *dualism* . The Reason determined in itself and its relation to the world creates the very old question as , *what is the ultimate purpose of the world* ?.

f).. **Hegel's** conceive for mind , *the Idea* , defines that , mind is *Arche* and it is returned to [PQ] the subjective percepts , while Materialism holds just the opposite .

IN PHYSICS [PQ] are The , Electrical charges , Energy , Light , Angular momentum , Matter which are all quantized on the microscopic level . They do not seem quantized in the macroscopic scale because the size of the steps between each possible value is so small and invisible .

a).. **De Broglie** found that , light and matter at subatomic level display characteristics of both waves and particles which move at specific speeds called Energy-levels .

b).. **Max Planck** found that , Energy and frequency of the Electromagnetic radiation is quantized as the relation $E = h \cdot f$ where h , is a constant and frequency only defines the Physical Quantity of microcosmic level .

In Mechanics , **Kinematics** describes the motion while , **Dynamics** , causes the motion.

c).. **Bohr model** for *Electrons in free-Atoms* is the Scaled Energy levels , for *Standing-Waves* is the constancy of Angular momentum , for *Centripetal-Force in electron orbit* , is the constancy of Electric Potential , for *the Electron orbit radii* , is the Energy level structure with the Associated electron wavelengths.

d).. **Hesiod Hypothesis** [PQ] is **Chaos** , i.e. *the Primary Point* from which is quantized to *Primary Anti-Point* . [From Chaos came forth **Erebus** , **the Space Anti-space** , and **Black Night** , **The [STPL] Mechanism** , but of Night were born **Aether** , **The Rest Gravity Dipole Field connected by the Gravity Force** , G , and **Day** , **Particles Anti-particles** , whom she conceived and **Bare** , **The Equilibrium between Particles Anti-particles** , in **Spaces Anti-spaces** , from union in love with Erebus] . [43-48]

e).. **Zeno's Paradox and The nature of Points** [PQ] . Zeno has set the Problem and Markos , gave the solution to <**Achilles and the Tortoise**> , <**The Arrow Paradox**> <**The dichotomy Paradox**> Solving thus the [PQ] of Euclidean-Geometry is that which is called as the **Material-Geometry** . [48]-[58]-[70] .

The word , **quantization** , has to do with the discrete continuity , which describes the Physical reality through the Euclidean conceptual , for Points Straight lines , Planes , the Monads in Universe and the Dual Nature of Spaces as Discrete and Continuous . Euclidean Geometry is proved to be **the Model of Spaces** and **Material-Geometry the Model of Physical Reality** since it is Quantized as **Complex numbers** , which are such.

f).. **The current method for Physical Quantity** [PQ] .

[PQ] is the Material Geometry where Points , are the non-collided elements in Caves and are the two Positive and Negative breakages $\pm s^2 = (wr)^2$ and the Vector breakage $[\nabla i] = 2s^2 = 2 \cdot (wr)^2$. becoming from a Stabilized-rotating-velocity-System [22]

With these three elements is possible by following the Geometrical Rules (and those of Algebra , as *Commutation* , *Distribution* , *Expansion* , *Association* , *Absorption* ,

Multiplication) and Permutation and Repetition to build all Physical World as shown Below . **Point in E-geometry is considered , nothing , without Position and direction while in Material Geometry** ,

- 1... **Point , is both massive discrete continuity Units** $+s^2$ and $-s^2$ and for
- 2... **Two Units , the Line-Sector , is the Dipole** $[s^2 \leftrightarrow -s^2]$, the Material-Point
The Infinite Series of $[s^2 s^2 . s^2 s^2 \dots]$, $[-s^2 -s^2 -s^2 -s^2 \dots]$, consist the **Material-points in Lines** . **Because of this Property in Dipole of Material-Points , Units are always at the Edges , A , B , and because also motion \equiv Energy , then \rightarrow MAGNETS , exist anywhere from , M-Points , Atoms , Molecules , Crystals \rightarrow everywhere , and are embodied with the \rightarrow GROWTH-GOLDEN-RATIO- PATTERN \leftarrow**
- 3... **Three Units** of $[s^2 s^2 s^2]$, $[-s^2 -s^2 -s^2]$ not coinciding consist the **Material Plane of the Infinite Lines** .
- 4... **Four Units** of $[s^2 s^2 s^2 s^2]$, $[-s^2 -s^2 -s^2 -s^2]$ not coinciding consist the **Material Volume of Infinite Planes** .
- 5... **Five Units** of $[s^2 s^2 s^2 s^2 s^2]$, $[-s^2 -s^2 -s^2 -s^2 -s^2]$ not coinciding consist the **Material Fifth - Space -Volume of Infinite Planes** .
- N... **Units** of $[s^2 s^2 s^2 \dots N]$, $[-s^2 -s^2 -s^2 \dots -N]$ not coinciding consist the **Material N-Space-Volume of Infinite Planes** . Since Material-geometry follows E-geometry so , all laws of nature are also those of Geometry . i.e.

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

- a.. **Moulds {caves}** \rightarrow The minimum Number of Points in each Level is
- | | | | | | | |
|----------|-------------------|---------------|---|--------------|----|---------|
| 1 | for Point , | \rightarrow | 1 | Points x 2 = | 2 | Units , |
| 2 | for Line-sector , | \rightarrow | 2 | Points x 2 = | 4 | |
| 3 | for Plane , | \rightarrow | 3 | Points x 2 = | 6 | |
| 4 | for Volume , | \rightarrow | 4 | Points x 2 = | 8 | |
| m | for m , Spaces | \rightarrow | m | Points x 2 = | 2m | |

- b.. **Units** \rightarrow The maximum number of Units in a Point is **2** ,
[1 Positive \oplus and 1 Negative \ominus].

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

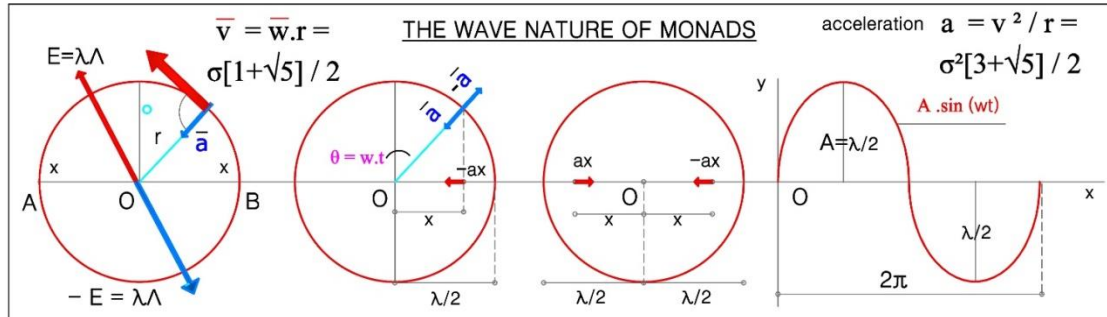
Point , Line -sector , Plane , Volume , m -Space , **are for** ,

- | | | | | | | | | | |
|--------------|---------------|-------|---------------|------------------|--------------------|---------|------------------|---------------|--------------------|
| Point | \rightarrow | m =1 | \rightarrow | 1 ² = | 1 x 2 | times = | 2 | \rightarrow | Material - Point |
| Line -sector | \rightarrow | m =2 | \rightarrow | 2 ² = | 4 x 2 | times = | 8 | \rightarrow | Line-vector |
| Plane | \rightarrow | m =3 | \rightarrow | 3 ² = | 9 x 2 | times = | 18 | \rightarrow | Plane |
| Volume | \rightarrow | m =4 | \rightarrow | 4 ² = | 16 x 2 | times = | 32 | \rightarrow | Volume |
| m -Space | \rightarrow | m = m | \rightarrow | m ² = | m ² x 2 | times = | 2.m ² | \rightarrow | Chemistry-m-Volume |

Photon was proved to be a Material-point in cave **r** , where its **Inner Storage** is **the Stationary-Standing-wave** the Electromagnetic-Wave $[E^2+H^2]=2(2r).c.\sin 2\phi$ with **n** Lobes representing the **Normal mode vibration** with frequencies $f_n = n.f_1 = \frac{E}{h} = \frac{n.v}{4r}$
 $= \frac{n\sigma}{8r} [1+\sqrt{5}]$, and **Outward the Storage is the Propagating Electromagnetic- Wave**
 $\rightarrow \{[\epsilon E^2 + \mu B^2] = 2.\lambda.c.\sin.2\phi\} \leftarrow$ where **Particle** $2r = n \lambda$, **Cave r** , **is the**

Electromagnetic-Energy-Storage , and Electromagnetic-Radiation E , B , is the **Wave Conveyor of Cave** , r , with frequency $f = \text{Energy } E / \text{Planck-constant } h$, or $f = E / h$. From a **Set of infinite rest Units** choosing two of them , is found the Mendelejev-system . **Physical Quantity [PQ]** . are the discrete caves in where motion exists .

c.. **Mould** \equiv [The B-Positive \oplus **Unit** - [$\oplus \cup \ominus$] - The O-Negative \ominus **Unit**] \equiv as below ,



(1)

(2)

(3)

(4)

Figure-22. The **Rotational Wave** nature of the **Material-Point-Monad AB** .

In (1) , are shown *Velocity* , $|\bar{v}| = w.2r = \frac{2\pi}{T}.r = 4\pi r.[f = [\frac{\sigma}{2}].(1+\sqrt{5})]$, *Angular velocity* $|\bar{w}| = \frac{\sigma}{2r} [1 + \sqrt{5}]$, and the **Golden-ratio-Frequency** $f = \frac{(1+\sqrt{5}).\sigma}{2.2\pi r} = \frac{\Phi.\sigma}{2\pi r}$ in cave AB.

In (2) , are shown Centripetal , $\bar{a} = v^2/r$, Centrifugal , $-\bar{a} = v^2/r$, acceleration in r ,cave.

In (3) , are shown the *Projections* on AB axis of Centripetal , \bar{a}_x , and Centrifugal $-\bar{a}_x$ acceleration in cave , $2r = \lambda$. Note that **Waves transfer Energy but Not mass** .

In (4) , is shown the *Sinusoidal - motion* of the Centripetal , \bar{a}_x , and Centrifugal $-\bar{a}_x$ acceleration in cave , $r = \lambda/2$.

Remark : From relations $E = h f$, frequency $f = \text{Energy } E / \text{Planck-constant } h$.

In order to exist Angular-velocity $w = 2\pi/T = 2\pi f$, are needed closed-loops \cup differently $w = 0$ annihilates ,and consequently $E = h f = h w/2\pi = 0$, therefore **BIG-BANG** may exist only in Closed-Systems which occupy energy i.e. ??

Orbital-Periodic-motion in Figure is the **Quantization of Stress** $\sigma \equiv -\bar{a} = v^2/r$, and

Newton`s velocity $|\bar{v}|$ is related to $\pm \bar{a}$ acceleration , which are **Markos** $\pm \sigma$ Stresses .

[PQ] is the Material-Point-cave where the \oplus **Unit** rotates around the \ominus **Unit** .

Velocity , $|\bar{v}| = w.2r = \frac{2\pi}{T}.r = 4\pi r.[f = [\frac{\sigma}{2}].(1+\sqrt{5})]$, *Angular velocity* $|\bar{w}| = \frac{\sigma}{2r} [1 + \sqrt{5}]$

frequency $f = \frac{1}{2\pi} \sqrt{\frac{k}{m}} = \frac{1}{2\pi} \sqrt{\frac{g}{\Delta}}$, and the **Golden-ratio-Frequency** $f = \frac{(1+\sqrt{5}).\sigma}{2.2\pi r} = \frac{\Phi.\sigma}{2\pi r}$

[PQ] is the Material Point where the , $+\sigma$, \oplus **Unit** equilibrium the , $-\sigma$, \ominus **Unit** .

d.. **Mould** \equiv [The B-Positive \oplus **Unit** - [$\oplus \leftrightarrow \ominus$] - The O-Negative \ominus **Unit**] \equiv as below

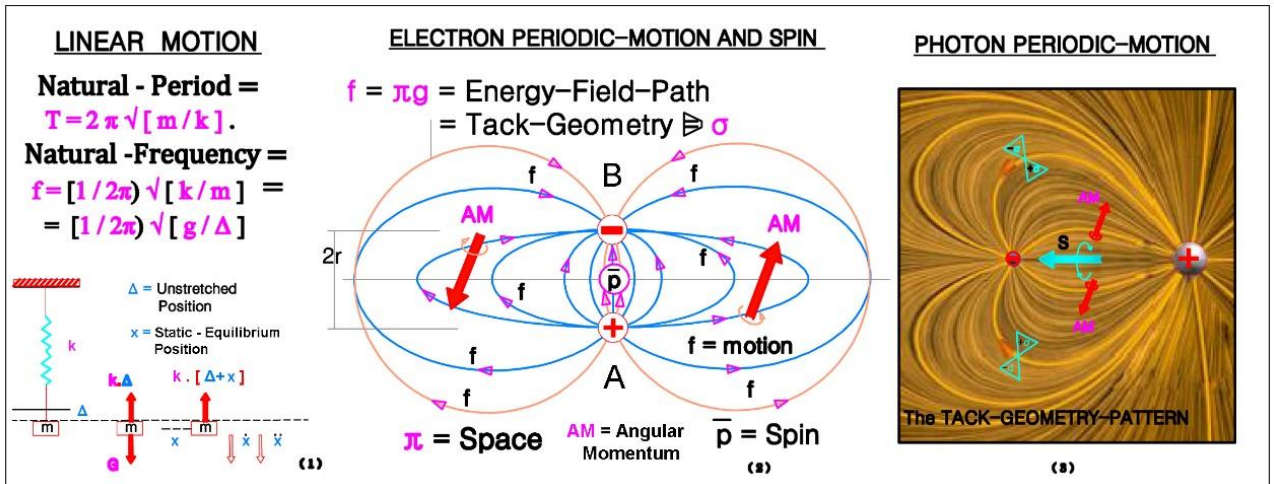


Figure-23 . The Three Possible motions in caves , Linear , Rotational , Periodic .

Forces $k\Delta = G = m g$, therefore $m \ddot{x} = - k x$ and $\ddot{x} - (k/m) x = 0 \dots(1)$

Defining the Centrifugal frequency $w_n^2 = k/m$ then $\ddot{x} + w_n^2 x = 0$ with general solution $x = A.\sin w_n t + B.\cos w_n t$, where A, B , are constants and for initial

Positions $x = \frac{\dot{x}(0)}{w_n} . \sin w_n t + x(0).\cos w_n t ..(2)$ with Natural Period and frequency

$$T = 2\pi \sqrt{\frac{m}{k}} \text{ and } f_n = T^{-1} = \frac{1}{2\pi} \sqrt{\frac{k}{m}} = \frac{1}{2\pi} \sqrt{\frac{g}{\Delta}} \text{ in cave } 2r = \Delta \dots(3)$$

[PQ] is the Material-Point E-field where the , \oplus **Electron-Charge** moves to **Oneway-Pairs Linearly and Rotating** , to the , \ominus **Electron-Charge** .

Remark : The three Types of motion is the **[PQ]** which results to energy-equations as

$$\text{Linear-motion} \rightarrow f_n = \frac{1}{2\pi} \sqrt{\frac{k}{m}} \rightarrow 4\pi^2 f^2 . m = k \dots(1) \text{ and } f^2 = \frac{k}{4.\pi^2.m}$$

$$\text{Orbital-motion} \rightarrow a = \sqrt[3]{\frac{1}{k.f^2}} \rightarrow \frac{1}{f^2 . a^3} = k \dots(2) \text{ and } f^2 = \frac{1}{k.a^3} = \frac{\Delta}{a^3.m.g}$$

$$\text{Periodic-Orbital-motion} \rightarrow k = 4\pi^2.f^2.m = \frac{1}{f^2 . a^3} \dots(3) \text{ and } f^2 = \frac{1}{k.a^3} = \frac{k}{4.\pi^2.m}$$

Because motions happen in the same circumstances then from (1) and (2) issues ,

$$\frac{g^2}{4.\pi^2.\Delta} = \frac{\Delta}{a^3.m.g} \text{ and } \Delta^2 = \frac{a^3.m.g^3}{4.\pi^2} \rightarrow \Delta = \frac{1}{2\pi} \sqrt{ma^3g^3} \dots(a)$$

$$f^2 = \frac{1}{4\pi^2} \left(\frac{k}{m}\right) = \frac{1}{k.a^3} \text{ and } k^2 = \frac{4\pi^2m}{a^3} \rightarrow k = 2\pi \sqrt{\frac{m}{a^3}} \dots(b)$$

$$k = \frac{f^2}{4.\pi^2.m} = \frac{1}{f^2.a^3} \text{ and } f^4 = \frac{4\pi^2m}{a^3} \rightarrow f^2 = 2\pi \sqrt{\frac{m}{a^3}} \rightarrow f = \sqrt[4]{\frac{4\pi^2m}{a^3}} \dots(c)$$

The motion in an Electric-field is from , Voltage $V \rightarrow \bar{q} \equiv \frac{K_E}{V_P} = \frac{m_e c^2}{2V_P} = \frac{g c^2}{8\pi f^2 V_P}$

and for Photon Gravitational force $G = f_n . \sqrt{2} . \bar{q}$, and for electron $G = c \sqrt{2} \bar{q}$.

With above Displacement Δ , Unit-Spring-Force-Stress k , Frequency f , light velocity c , and Charge \bar{q} , is everything generated.

The Physical Quantity [PQ] , is the Space , *the discrete-energy-caves or the Non-continuity of Points* , in where motion , **Energy exists** .

N.. CRITICISM :

The Fundamental Advances occur to the Part of science that Really needed or misleading . The same happens to ERP Argument which is →

a.. Can Quantum Mechanical description of Physical reality be considered Complete ?

EPR Argument is exactly the same as that of Idealist-Philosopher-Hegel`s , concerning *conceive for mind* , the Idea . For Hegel mind is Arche and it is returned to Physical Quantity , *the subjective percepts* , which is **the Objective reality** . For Materialism holds , Just the opposite which is the true , because all Ideas of the Objective reality Come from outside , Pass through our five Senses to our Brain . which is working as a Computer elaborating and creating minds , and which deposits them in caves .e.g. **The High-tree picture** passes through our Eyes which turn the picture to electricity and electricity through nervous-conductors to Brain and deposited to a microchip. High-tree-Idea in microchip exists only **If-had-come** from outside **and NOT** the opposite because Human race could do **Infinite-Objective-realities** which is false. Because mind occupies the process , of less elaboration and thinking may use , the **High-tree picture** , as the Row material for complicated figures based on the initial, On this , **Q.M is dialectically working on the Right-Direction for Completeness.**

**b.. How many Parallels pass through a point P to a line AB ?
For Euclidean-Geometry Only-one , while for all Non-Euclidean-Geometries , two and Infinite ones .**

Because the set question existed for many centuries , about two centuries ago Mathematicians gave a temporary solution to this problem through the NON Euclidean-Geometries . **Unfortunately** , General-Relativity followed the temporary solution resulting to the confinement of Physics in Planck`s length and Big-Bang . **The Solution of the Unsolved ancient-Greek-Problems** and that of Zenon Paradox gave the answer such for Physics and as Guidelines for **Future-Basic-Advances** .

Nature cannot be described through infinite concepts , as this can happen in Algebra and values ,because are devoid of any meaning in our Objective - Reality , or the Physical World , or the Nature ,or the Cosmos . Solutions of geometric classification problems with moduli Spaces , and Algebraic geometry by giving a universal space of parameters for the problems , must follow the classical and **Dialectic logic of Geometry which exists in Objective reality** and is reflected to the minds-recipient. The solution to this Problem and others is given in many articles [44-70] .

c.. Bohr Rejection to EPR , and Entanglement .

The Wave-Particle Duality of Photon , or The Principle of locality , comes out of Einstein work saying that *< The Energy of the Physical reality which are objectively possessed cannot be influenced instaneously at a distance >* . Entanglement , as a *< Physical phenomenon that occurs when pairs or groups of Particles are generated or interact in ways such that the Quanta-state of each Particle cannot be described independently – instead a Quantum-state may be given for the System as a whole >*

From above attempt is seen that both Parts were trying to create local- Quantization to interpret at Wave-Particle Duality of Photon . **The Non-Euclidean Geometries did not help in the Right-direction but offer a Trap in where General Relativity was first captured** , Ignoring that Nature cannot be described through infinite local

concepts , as this can happen in Algebra and values . The answer is that ,
 Photon **Particle** $\rightarrow 2r = n \lambda$, **Cave** , r , Is the **Electromagnetic-Energy-Storage** ,
 Photon **Wave** \rightarrow **E-B** Electromagnetic-Radiation, and Is the **Conveyer of Cave** , r .
i.e. Photon , Is of the two consistent-Pattern , Box and Wave .

d.. The Light velocity , c , and Planck`s length.

1.. In article was proved that, *in Material Point* , the Eternal-Rotation of (+) Opposite around (-) Opposite , due to Centifugal and Centrifugal Glue-Bond Principal stresses , $\pm \sigma$, **creates in Primary and in caves which are Standing waves as Resonance phenomenon** the Angular-momentum-Vector being Identical to the Spin of Particles , and which is trapped in caves`s loops always being in Phase with each other .

Their amplitude of Oscillation varies from Zero at Nodes to maxima at Antinodes . The **N loops are** , the **N** , **Sub - Stores** created in the **Main-Store** , r , and this because Energy Momentum vector , \vec{B} , follows the Stationary-Wave -Nodes Principle in Material – point only.

2.. **From Inner-cave-velocity** equation $v = wr = (2\pi/T).r = 2\pi.f_1.r$, and wavelength $\lambda = cT = c / f_1$, then cave $r = n.[\lambda/2]$, therefore $r = n.(c / 2f_1)$, and cave-velocity is $v = 2\pi.f_1.[n.c / 2f_1] = n.\pi.c$ or $v = n.\pi.c$ (c)

showing that velocities in lobes are , $n.\pi$, times that of light ,
 i.e. **in Material-points exist velocities multi-times that of light** .

Above equation (c) denotes that light velocity , c , is the **Quanta of velocities** in Planck`s length because differently **could-not-be measure** for Space and Energy .

3.. Energy produced by Reference System $\{D_A- P_A\} \equiv [R]$ (x', y', z', t') moves with an velocity \vec{v} , parallel , to $x-x'$, axis with respect to the fixed and Absolute System $\{D_A- O\} \equiv [S](x, y, z, t)$ and is conserved. [58]

In General-Relativity is referred that Space - time is giving energy to matter or absorbed it from matter , and thus the Total energy is not conserved . Here are Not clarified what are the three Basic Quantities , **Energy , Matter and Time** .

It was prior proved [70] that **the Basic Quantity is only the Energy** \rightarrow **motion** , while **Matter is the Space** , { the Reaction to the Change of Energy \vec{v} or $d\vec{v}$ } , **in-where Energy is stored** , and **Time is the meter of changes in Space and in Energy**.

The Argument < Energy is not conserved but it changes because Space-time-does> is the greatest – confusion for these magnitudes . In [31-36-39] was clarified that \rightarrow

a3) Because of Zero acceleration of rotational velocity $\vec{\omega}$ in a cave , velocity $\vec{v}=wr$ is also constant , so thus **GR failed to explain the WHY speed of light is constant** , considering constancy of light as an axiom from which derived the rest of its theory .

Relativity considers Electron-Spin as a property of Electromagnetic field interaction rather than a property of the free electron in the absence of than a property of the free electron in the absence of , than a property of the free electron in the absence of the electromagnetic field , **ignoring the today called Vacuum which is not** . Before , there was not neither any Geometrical-analysis of Spaces nor of Quantization .

b3) Because for the reality of discrete monads , GR failed **to explain the WHY** \rightarrow **Wave nature** , is the **Intrinsic Electromagnetic Wave of Particles** (Maxwell`s Displacement current) and speed of light is constant in a **Stress-Strain-System** with (where Red-shift happens as low f and-Blue-shift , as high f) Photon to be as Particle

and Wave also as above, but considering constancy of light as an axiom deriving theory . Here and now is referred that , Since the mass is equal to $\mathbf{m} = \frac{2}{c^2} (\mathbf{w}\mathbf{r})^3 = \frac{\mathbf{h}\cdot\mathbf{w}}{2\pi\cdot\mathbf{c}^2}$, analogous to Energy $\mathbf{w} \rightarrow$ then **mass is a factor measuring energy magnitude only** ,

c3) Because GR , by Appealing space-time a Priori is **accepting the two elements, Space and Time , as the fundamental elements of universe** without any proof for it and so anybody can say that this argument **Stay on air without any proof** .

It has been proofed [22-26] that any space AB is composed of points A , B which are nothing and equilibrium by the opposite forces , $P_{\bar{A}} = - P_{\bar{B}}$, following the *Principle of Virtual Displacement* .

d3) Because GR, by Presenting Time as element of universe **could not perceive that, Time (t) is the conversion factor between the conventional units (second) and length units (meter) and by considering the moving monads (particles etc. in space) at the speed of light pass also through Time , this is an widely-agreeable-illusion . It was proved that Time is a meter , A simple number , measuring the alterations of Space concerning velocity and direction and nothing else .**

e3) Because GR , by Presenting Space-Time universe **Becoming from Big Bang** is accepting Infinite priors . Euler-Savary equation of couple-curves is related to the Tangential and angular velocity from (Space , Path , Anti-space , Evolute) and it is , **The Rolling - Glue-Bond of Space , Anti-space** , which happens on the instantaneous center of curvature by STPL line . [58]

f3) Because GR Presents Space-Time as essence of universe while is Just the **opposite**

$$\text{Work} = \text{Total Energy} = \text{TE} = [\Lambda \nabla + \bar{\Lambda} \times \nabla] = \sqrt{[m \cdot v_E^2]^2 + [\Lambda \cdot v_B + \bar{\Lambda} \times v_E]^2} = \sqrt{[m \cdot v_E^2]^2 + T^2} = \sqrt{[m \cdot v_E^2]^2 + |\sqrt{p_1 v_{B1}}|^2 + |\sqrt{p_2 v_{B2}}|^2 + |\sqrt{p_3 v_{B3}}|^2} =$$

$$\mathbf{L}_{\mathbf{TW}} \equiv (\bar{z}_0)^{\mathbf{w}} = (\lambda, \Lambda \nabla i)^{\mathbf{w}} = (\bar{z}_0)^{\mathbf{w}} \cdot e^{[\bar{v} \cdot \mathbf{w} \theta]} = (\bar{z}_0)^{\mathbf{w}} \cdot e^{[\bar{\Lambda} \nabla i / \sqrt{\Lambda} \bar{\Lambda} [\text{Arc Cos}(\frac{\mathbf{w}|\lambda|}{2|\sqrt{z'} \cdot \mathbf{o} \cdot \mathbf{z}_0} |)]} \quad (\text{TW})$$

Nature has not any < meter > to measure quantized quantities (of Space and of Energy) except these of the Geometry constants, one of which is number , π , (Archimedes number π) so quantization of Points (λ) follows Geometry constant (π) and for Energy \mathbf{W}_d , which is the quantized Energy of the Quantity dissipated per cycle , [and this because monads follow sinusoidal oscillation on wavelength \equiv monads as the \mathbf{w} .th- power and the \mathbf{n} .th-root of this monad where $\mathbf{w} \cdot \mathbf{n} = 1$ as above on and in the same monad] and which energy is $\rightarrow \mathbf{W}_d = [\mathbf{m}\mathbf{w}]\cdot\lambda^2/4 = [2\mathbf{m}\pi\mathbf{f}]\cdot\lambda^2/4 = [\mathbf{m}\pi\cdot\lambda^2/2]\cdot\mathbf{f} = \mathbf{C}\cdot\mathbf{f}$, i.e.

From above monads $(s + \bar{v} \nabla i)^{1/\mathbf{w}} = |\mathbf{z}_0|^{-\mathbf{w}} \cdot \mathbf{e}^{-i \cdot (\varphi + 2\mathbf{k}\pi) \cdot \mathbf{w}}$, where $\cos \varphi = s / |\mathbf{z}_0|$ and for Rotated Energy case where $s = 0$, and also $\cos \varphi = 0$ exists for angle $\varphi = \pi/2$ the quaternion $(s + \bar{v} \nabla i)^{1/\mathbf{w}}$ as **dimension power** $\rightarrow \mathbf{w} = \mathbf{b} \leftarrow$ and for $\mathbf{k} = 1$ above becomes , $\mathbf{e}^{-i \cdot (\pi/2 + 2\mathbf{k}\pi) \cdot \mathbf{w}} = \mathbf{e}^{-i \cdot (\pi/2 + 2\mathbf{k}\pi) \cdot \mathbf{b}} = \mathbf{e}^{-i \cdot (5\pi/2) \cdot \mathbf{b}} = \mathbf{e}^{-i \cdot (5\pi/2) \cdot 10}$ and is for Planck length $\mathbf{L}_p = \mathbf{e}^{-i \cdot (5\pi/2) \cdot 10} \dots \dots (P_1)$

Equation (P_1) , is the basic Geometrical interpretation of the < **Planck scale meter** > based On the two **Geometry constants** \mathbf{e} , π where $\mathbf{k} = 1$, and **base** $\mathbf{b} = 10$, and this from logarithm properties with different bases on the same base \mathbf{e} as this is , $\mathbf{e}^{\mathbf{w}} = [\mathbf{b}^{\log_{\mathbf{b}}(\mathbf{e})}]^{\mathbf{w}} = \mathbf{b}^{\mathbf{w} \cdot \log_{\mathbf{b}}(\mathbf{e})}$ and because $\sqrt[\mathbf{w}]{\mathbf{e}} = \mathbf{e}^{1/\mathbf{w}} = \mathbf{e}^{-\mathbf{w}} = \mathbf{x}^{1/\mathbf{w} \cdot \log_{\mathbf{b}}(\mathbf{e})}$

which are monads in monads , and is therefore of Wave motion with angular velocity $w = 4 W_d / (\pi . C_o . \lambda^2)$, [5-4] i.e. Space and Energy is quantized and measured on the two Constant and Natural numbers e , π .where for base the natural logarithm e , and exponent the decimal base , $b = 10$, then is \rightarrow

For base $e = 2,71828$ and base $b = 10$ then $e^{-(78,2879)} = 1 . 10^{-34}$ m

For base $e = 2,71828$ and base $b = 10$ then $e^{-(78,5398)} = 8,906 . 10^{-35}$ m

For base $e = 2,71828$ and base $b = 10$ then $e^{-(80,5905)} = 1 . 10^{-35}$ m

$L_p = e^{i.(\frac{\pi}{2}+2k\pi).b} = e^{-i.(\frac{\pi}{2}).b} = e^{i.(-\frac{\pi}{2}).10} = e^{-(78,5398)} = 8,906.10^{-35}$ m

$L_p \equiv \{ \sqrt{3} . \pi . 1,616199 . 10^{-35} \text{ m} \} \rightarrow$ Planck`s length .

GR , is confined in L_p Chaos ,without any connection with L_{TW} Spaces which begin from Zero $\equiv 0 \equiv$ Nothing $\equiv -[\text{Nothing}] \equiv [+][-] \equiv [+]\leftrightarrow[-] \equiv [\oplus]\leftrightarrow[\ominus] \equiv$ Material-Point and this because followed the **False Directions given by NON Euclidean Geometries** Referring only π , have to say that its *Physical-Interpretation* [75] , is that which is the Euclidean-Geometry- Quantum and which **Regulates velocities in caves and turbines**

e.. The Stationary Photon-Charge S_p , and Light velocity c .

In **Material-point** executing **Periodic-Orbital-motion**, issues the **Tack Geometry** i.e. the tracks of the Electric-lines Pattern are **closed-loops** and not straight-lines , and becoming from the $[\oplus]$ constituent towards $[\ominus]$ constituent , **from the left and right directions** , and this because of the Voltage between the ends of the Spaces .

[Rotation is the opposite motion which happens in the Material-points but because of the same Stress σ ,is created the Centrifugal-Force F_f and frequency $f_n = \frac{1\sigma}{8r^2} . \bar{B}$]

Electrons can be spinning clockwise or anti-clockwise and Propagate on a Spiral trajectory, since Spin becomes from $\uparrow\leftrightarrow\downarrow$ Antiparallel-Angular-momentum vectors \bar{B} , and is created in M-Point a Dipole-Moment. Since Angular-Momentum $\bar{B} = AM$, Spin is equal to $AM / \text{Unit-Area} = AM / \pi$, and because of the **One-way-closed-loops** , AM stays in cave , r .

For Photon issues the same as above with Angular-Momentum the Moment $\bar{B} = (s^2) \times s$ **Electron Spin** and **Electric-Charge** is the same and the Cave-Spin equal to the Moment of couple becoming from the $\uparrow\leftrightarrow\downarrow$ Antiparallel-Angular-momentum vectors $\bar{B} = a m v = 2,1145016 . 10^{-11} m 7,237315 . 10^{-32} kg 2,99798 . 10^8 = 4,5879026 . 10^{-34} / \pi$, where issues $\rightarrow S/2 = 1,4603748 . 10^{-34}$ \rightarrow and it is **the Electron-Spin** .

In-Spinning-Material-Point , the Periodic-motion is equal to that of Electron and

Stationary-Photon-Spin $S = \bar{B} / \pi = \frac{\pi . m . p}{2} \bar{B} = [\frac{\pi . m . p . s^3}{2}] = 1,4603748 . 10^{-34}$ J

Above Spinning Material-Point disappears the **ERP Paradox** because is extended and actually is filling up the entire universe . These Stationary-Particles are permanently entangled with Wave packets becoming from **M-P-Photons** ,which Orientate and Re-orientate Spins from force $f_n = \frac{(1+\sqrt{5})\sigma}{4\pi r}$, $\bar{B} = \frac{\pi r^3 \sigma}{8} [1+\sqrt{5}]$ and Orients Spin \bar{S} to \bar{B} as

$\rightarrow \bar{g} = f_n \times \bar{B} = |f_n| \times |\bar{B}| . \sin \theta = \frac{[(1+\sqrt{5})\sigma]}{4\pi r} \frac{\pi r^3 \sigma}{8} [1+\sqrt{5}] . 1 = \frac{[\sigma^2 r^2 (1+\sqrt{5})^2]}{32} = \frac{\sigma^2 r^2 . \Phi^2}{8} ..(g)$ i.e. the force orienting the Stationary-Spin \bar{B} , is the **Growing-Golden-ratio** pattern Φ^2

When Photon hits an Obstacle , it reflects on it and comes to our eyes and then we can see the obstacle . Some will go to heating the Obstacle which radiates according to its temperature .The absorbed Photons are radiated at a longer wavelength such as the

AM and FM bands go right through . Photons are waves imparting energy , and when interact with electrons in outer shell of an Atom then the Energy is transferred to the electrons ,upping them to a higher energy level .The Storage-atom now can re-radiate another Photon or it can give up its energy in other ways including heat .

All above happen because of the same Spin and Electric-Charge . *Markos 15/3/ 19*

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