



The Origin of Energy Particles , from Material Geometry , and Relativity .

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Abstract :

In article is shown the How Positive (+) and Negative (-) are joint to create material point which is Zero and by adding it to monads , to create all Primary Particles , following Extrema Geometry-Spaces-Moulds , and which are the In-Periodic Table Elements in Planck's Space-Level . Also the How Rest- Gravity constituent MFMF field is joint and creates the Electromagnetic Waves E,P and Gravity-Spin , which External Spin , is continually converted into the Inner Electromagnetic Waves E,P and which continue this eternal cycle.

Euclidean-Geometry elucidated the definitions of geometry-content {Point, Segment, Straight Line, Plane, Volume Space [S] , Anti-space [AS] , Sub-space [SS] , Cave, Space-Anti-Space Mechanism of the Six-Triple- Points-Line , that produces and transfers Points of Spaces , Anti-Spaces and Sub-Spaces in a Common Inertial Sub-Space , the Field [MFMF] and Particles} and the same for **Material-Geometry** which describes the Space and Energy beyond

Plank's length-level [Gravity-Length $3,969.10^{-62}$] , reaching Quantized Point $L_v = e^{i(\frac{N\pi}{2})b=10^{-N} = -\infty} m \rightarrow 0$.

Energy monads presuppose Energy-Space Base which is the cause of Spaces existence and the motion of particles. This Energy-Space Base , MFMF = **Medium-Field of Material-Fragments** is the Material-Geometry in the way used in Mechanics and Physics .Property for Doubling Energy in the same Space is encountered in Stationary wave where energy is proportional to angular velocity ,w . Now is shown **the How** Material-Fragments are built-in E - Geometry and **the Why** follow its moulds . The Special Problems of E-geometry consist the , Mould Quantization of Euclidean Geometry in it to become \rightarrow Monad , through mould of Space -Anti-space in itself , *which is the material dipole in inner monad Structure as the Electromagnetic cycloidal field* \rightarrow Linearly , through mould of Parallel Theorem ,*which are the equal distances between points of parallel and line* \rightarrow In Plane , through mould of Squaring the circle , *where the two equal and perpendicular monads consist a Plane acquiring the common Plane-meter , π ,* \rightarrow and in Space (volume) ,through mould of the Duplication of the Cube ,*where any two Equal or Unequal perpendicular monads , producing zero Work , acquire a common Space-meter to be twice each other.*

The Unification of Space and Energy becomes through [STPL] Geometrical Mould Mechanism of Elements , the minimum Energy-Quanta to , **Monads** \rightarrow Particles , Anti-particles , Bosons , Gravity-Force , Gravity-Field , Photons , Dark Matter , and Dark-Energy , which consist the Material Dipoles in inner monad Structures , i.e. The parallel motion of DM and DE Heap Mixture , by rolling on Gravity-field MFMF ,and which travels with light velocity and continually formulating the , Zero \rightarrow Discrete \rightarrow Infinite Geometrical Universe .

Keywords : Material Geometry , Energy Particles , The Periodic Table .

1. General

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 ,

$$x(t) = x(t+T) = x = A.\sin(2\pi.t/T) = A.\sin.wt = \\ = A.\cos(kq-wt) \text{ because is sinusoidal , where}$$

A is the amplitude of oscillation measured from equilibrium position and for repeated motion $t=T$. Quantity $(2\pi/T) = w = 2.\pi.f$ is circular frequency, or $f = 1/T = w/2\pi$, is the frequency and k , is the wave number $k = 2\pi/\lambda$ and the speed of a wave is $v = \lambda.f$ or $w = v.k$ and because of relation of angular velocity $\bar{v} = w.r = w(1/k) \rightarrow w = v.k$ then $r . k = 1$.

$$\text{Velocity } \bar{v} = \dot{x} = wA. \cos wt = wA.\sin(wt+\pi/2)$$

$$\bar{a} = \ddot{x} = w^2A.(-\sin wt) = w^2A.\sin(wt+\pi)$$

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 $\ddot{x} = -w^2A$, 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 , 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 $\bar{v}y = \dot{x}/dt$ and is holding the

homogenous differential equation $m\ddot{x}+c\dot{x}+kx = 0$.

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

$$\frac{\partial^2 y}{\partial x^2} = [\frac{1}{v^2}] . \frac{\partial^2 y}{\partial t^2} \dots(1) , \text{ where } v = \sqrt{\frac{T}{\rho}} = \sqrt{\frac{T}{m}}$$

The general solution of (1) is $y = F1(ct-x)+F2(ct-x)$ where $F1, F2$ are arbitrary functions and regardless of the type of function F , the argument $(ct \pm x)$ upon differentiation leads to the equation ,

$$\frac{\partial^2 F}{\partial x^2} = [\frac{1}{v^2}] . \frac{\partial^2 F}{\partial t^2} \dots(2) , \text{ where } F = \text{The tension ,}$$

v = the velocity of wave propagation

Another general solution of (1) is that of separation of variables as $y(x,t) = Y(x).G(t) \dots(3)$

where then (1) becomes $\rightarrow \frac{1}{Y} \frac{\partial^2 Y}{\partial x^2} = [\frac{1}{v^2}] \frac{1}{G} . \frac{\partial^2 G}{\partial t^2}$ and because of independent variables x, t are both constant the general solutions are ,

$$Y = A \sin \frac{w}{v} x + B \cos \frac{w}{v} x$$

$$G = A \sin wt + D \cos wt , \text{ where arbitrary}$$

constants A, B, C, D depend on boundary conditions and for $y(0,t) = 0$ will require $B=0$ and for $y(l,t) = 0$ the solution lead to equations ,

$$y = [C \sin wt + D \cos wt] \sin \frac{w}{v} x \quad \text{and}$$

$$\sin \frac{wl}{v} = 0 \quad \text{or} \quad \frac{Wn.l}{v} = \frac{2\pi.l}{\lambda} = n.\pi \quad \text{where}$$

$$n = 1, 2, 3, \dots, n \quad \lambda = \frac{v}{f} \text{ the wavelength ,}$$

$$f_n = \frac{n}{2l} v = \frac{n}{2l} \sqrt{\frac{T}{\rho}} \text{ is frequency and } Y = \sin n\pi \frac{x}{l}$$

In case of vibration initiated in any manner $y(x,t) =$

$$\sum_{n=1}^{\infty} [C_n \sin Wn.t + D_n \cos Wn.t] . \sin(n\pi x / l)$$

Example 1 :

To determine the C_n and D_n of above equation .
solution :

At $t=0$ the displacement and velocity are ,
 $y(x,0) = \sum_{n=1}^{\infty} D_n . \sin(n\pi x / l)$ and velocity

$\dot{y}(x,0) = \sum_{n=1}^{\infty} W_n \cdot C_n \cdot \sin(n\pi x/l) = 0$ and both multiplying by $\sin(k\pi x/l)$ and integrating from $x=0$ to $x=l$, all terms become zero except $n=k$ and $D_k = \frac{2}{l} \int_0^l y(x,0) \cdot \sin\left(\frac{k\pi x}{l}\right) dx$ 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

$$Y_{sta} = A \cdot \sin(k_n x + w_n t) + A \cdot \sin(k_n x - w_n t) = [2A \cdot \sin(k_n x) \cdot \cos(w_n t)]$$

where $k_n = 2\pi/\lambda_n$ 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 corresponding frequency $f_l = v/2x = v/n \cdot \lambda_n$ and $f_n = n \cdot f_l$,

i.e. n , more times Energy is stored in fn 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** Proportional to energy E , since $h/2\pi$ is constant.

Energy in a standing wave :

$$\text{Kinetic energy is } E_K = \frac{dK}{dx}(x,t) = mv^2/2 = \frac{m}{2} \frac{\partial y^2}{\partial t^2} = \frac{m}{2} A^2 \cdot w^2 \dots\dots(1)$$

$$\text{Potential energy is } E_U = \frac{dK}{dx}(x,t) = [F/2] \frac{\partial y^2}{\partial x^2}$$

$$\text{and Power transmitted } P(x,t) = -F \frac{\partial y}{\partial x} \frac{\partial y}{\partial t}$$

$$\text{Total Energy } E_T = E_K + E_U = \left[\frac{m}{2} \right] \frac{\partial y^2}{\partial t^2} + \left[\frac{F}{2} \right] \frac{\partial y^2}{\partial x^2}$$

$$\text{In Sinusoidal waves } \frac{dK}{dx} = \frac{dU}{dx} = \left[\frac{m}{4} \right] \frac{\partial y^2}{\partial t^2} = \frac{m}{4} A^2 w^2$$

Torsional Vibrations of Rods is similar to that of of longitudinal vibration of rods and for the angle of twist in any length ,dx, due to Torque T is dθ then $d\theta = T dx / I_p \cdot G$ where ,

$I_p \cdot G$ 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 $\rightarrow \frac{\partial T}{\partial x} dx = I_p G \frac{\partial^2 \theta}{\partial x^2} dx$.

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 ,

$$\rho I_p dx \frac{\partial^2 \theta}{\partial t^2} = I_p G \frac{\partial^2 \theta}{\partial x^2} dx \quad \text{and} \quad \frac{\partial^2 \theta}{\partial t^2} = \frac{G}{\rho} \cdot \frac{\partial^2 \theta}{\partial x^2} \dots(2)$$

where $\theta \equiv$ replace u , $\frac{G}{\rho} \equiv \frac{E}{\rho}$ of longitudinal vibration with the general solution given for θ is $\dots(3)$

$$\theta = [A \sin w \sqrt{\frac{\rho}{G}} x + B \cos w \sqrt{\frac{\rho}{G}} x] \cdot [C \sin wt + D \cos wt]$$

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 ,

$$w_n \sqrt{\frac{\rho}{G}} l = \pi/2, 3\pi/2, 5\pi/2 \dots (n + 1/2) \cdot \pi$$

and the natural frequency of the rod of length l , is

$$w_n = (n + 1/2) \cdot \frac{\pi}{l} \cdot \sqrt{\frac{G}{\rho}} \quad \text{where } n = 0, 1, 2, 3, \dots$$

where $m = \rightarrow$ 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* .

$\mu =$ The Permeability of transverse space ,
Dielectric constant multiplier .

The Total E_T , Kinetic E_K , and Potential E_U , energy per length is their sum as follows ,

$$\text{Total Energy } E_T = E_K + E_U = \left[\frac{m}{2} \right] \frac{\partial y^2}{\partial t^2} + \left[\frac{T}{2} \right] \frac{\partial y^2}{\partial x^2}$$

The work done per cycle is $W = \pi \cdot v \cdot A \sin wt$ where $A =$ Initial amplitude at $x = 0$.

2. Introduction

Point, which is nothing and has not any Position may be anywhere in Space, therefore, the unique Primary point A, being nothing also in no Space, is the only Point and nowhere, i.e. Primary Point is the only Space and from this all the others which have Position, therefore it is the only Space and 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, It is $[PNS] = [A \equiv B]$. The position of points in $[PNS]$ creates the infinite dipole and all quantum quantities which acquire Potential difference and an Intrinsic moment $\pm \Lambda$ in the three Spatial dimensions (x, y, z) and on the infinite points of the (i) Layers at these points, which exist from the other Layers of Primary Space, Anti-Space and Sub-Space, and this is because Spaces = monads = quaternion [9]. Since Primary point A, is the only Space then on this point exists the Principle of Virtual Displacements as,

$W = \int_A^B P \cdot ds = 0$ or $[ds \cdot (P_A + P_B) = 0]$, i.e. for any $ds = \text{vector} > 0$, Impulse $P = (P_A + P_B) = 0$ and $[ds \cdot (P_A + P_B) = 0]$, Therefore, Each Unit $AB = ds > 0$, exists by this Inner Impulse (P) where $(P_A + P_B) = 0$ i.e.

The Position and Dimension of all Points which are connected across the Universe and that of Spaces exists because of this Static equilibrium and Inner Impulse, on the contrary should be one point only (Primary Point $A = \text{Black Hole} \rightarrow ds = 0$ and $P = \infty$), as the repellency of A, B points by (P_A) , (P_B) opposite forces as \leftrightarrow dipole $\rightarrow [\{A(P_A) \leftarrow 0 \rightarrow ((P_B)B) \}] \leftarrow [17, 23]$. All points may exist with $P = 0 \rightarrow (PNS)$ and also with $P \neq 0 \rightarrow (\text{Spaces})$, $(P_A + P_B = 0)$, 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 and Elastic Medium, in spatial and Temporal domain) Field with infinite points which have a \pm Charge with $P = 0 \rightarrow P = \Lambda \rightarrow \infty$ and work (W) is quantized on material points as EM wave and as spin $\pm(\bar{p})$ and from this equilibrium quantized angular momentum $\bar{\Lambda}$, independently of time, is capable of forming the

Wave nature of Spaces motion, following the Boolean logic and distorting momentum $\bar{p} = \bar{\Lambda}$, as energy, on the intrinsic orientation position of material points, on all points of the microscopic and macroscopic homogeneity, and since also in common circle both rotational velocity, \bar{w} , and momentum, $\bar{\Lambda}$, are constants, and thus consist a Pure quaternion, which is the cause of their Inner motion as *The Electromagnetic wave which also produces Spin*, and of their Outer Spin, *The screw helically Kinetic Energy*, causing the Outer wave Motion, so conjugation of the two is,

$$\begin{aligned} (\partial/\partial t, \bar{w}) \odot (0, \Lambda) &= (-\Lambda, w \times \Lambda) = \\ (-\bar{H} \times \bar{P}, \nabla \times \bar{\Lambda}) &= [\lambda, \nabla \times \bar{\Lambda}] \quad [13-15]. \end{aligned}$$

Since points A, B of $[PNS]$ coincide with the infinite Points, of the infinite Spaces, Anti-Spaces and Sub-Spaces of $[PNS]$ and exists rotational energy $\pm \Lambda$ and since Motion may occur at all Bounded Sub-Spaces ($\pm \Lambda, \lambda$), 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 (monads) $A_i B_i = d\bar{s}$, which equilibrium by the Primary Anti-Space by an Inner Impulse (P) at edges A, B where $P_i A + P_i B \neq 0$, and $ds = 0 \rightarrow N \rightarrow \infty$.

Monad, (Unit) $\bar{A}B$, is the ENTITY and $[A, B - \bar{P}A, \bar{P}B]$ is the LAW, so Entities are embodied with the Laws.

Entity is quaternion $\bar{A}B$, and law $|AB| = \text{length}$ = the Real part which is Space of points A, B and imaginary part forces, $\bar{P}A, \bar{P}B$ or fields of AB

The Inner impulse, inward Work W, of any two points A, B of distance $ds = AB$, is Electrically parallelized to Electric-Field E, inside a Sphere of radius r, and Charge Q, equal to work W, in distance ds.

From work $W = P \cdot ds = (\text{Work in cave } r) / (\text{Work in cave } ds) = W = W_r \frac{r^3}{ds^3} = Q_r \frac{r^3}{ds^3} \dots\dots(1)$

and force P is equal to the Electric field intensity,

$$E_r = \frac{Q \cdot r}{4\pi\epsilon \cdot ds^3} = P \dots\dots\dots(2)$$

Remarks :

Applying above equations for Initial Space-point A, to Anti-Space point B spherically, then work $W = P \cdot ds$ and for $ds = 0$ and $W = 0$ then force P is any constant or infinite, ∞ .

For $ds=0$ and $W=Q=0$ then $\frac{Q \cdot r}{4\pi\epsilon \cdot ds^3} = \frac{0 \cdot r}{4\pi\epsilon \cdot 0^3}$ is also any constant or infinite, ∞ as above .

Since Radial fields are drawn from a center point , Electric fields are drawn pointing from positive to negative like the flow of current and as like the magnetic and gravitational fields .

Since $W = \int_A^B P \cdot ds = \int_A^B E_r \cdot ds$, then work is equal to the Electric-Flux , and since Electric-Flux is the rate of flow of electric field through area of a sphere so thus , Electric-field of this unique and Initial dipole $A \leftrightarrow B$ is created. i.e.

All Space and Anti-Space which is universe , is a Giant and Uniform Electric field , with Lines directed from $A \equiv \oplus$ to $\ominus \equiv B$ meaning that Work as Energy (i.e. the spherical displacement ds) , is stored in this huge cave $AB \rightarrow \infty$.

It was shown [49] that ,The Infinite Electric dipole $NN \equiv [\oplus \leftrightarrow \ominus]$ in this Homogeneous and uniform Electric-field [$W = Q$] experience no net force but experience a net Torque . Furthermore Dipole NN possess intrinsic Maxwell`s Displacement current forming the outer Spin as Torque which moves it.

Generally Quantization of E-geometry happens in any Layer , *Level* , and between the Layers , in the same way as Electricity flows in the two ways , which is either in a Direct Current [DC] , or in an Alternating [AC] Current .

Quantization of E-geometry , is nothing but the Position of points at Extrema , *either* forming the multiplicity of a Layer of , (Points , lines , Planes , Volumes) , *or* Material Geometry forming the multiplicity of a material Layer of ,(Points , lines , Planes , Volumes) discrete elements .

A wide analysis for monads and EM-Waves in [49]

3. Definition of Quantization .

Quantization is the concept (*the Process*) that any , **Physical Quantity** \rightarrow [PQ] of the objective reality (*Matter , Energy or Both*) is mapping the Continuous Analogous , *the points* , to only certain Discrete values . Quantization of Energy is done in Space-tanks , on the material points , tiny volumes and on points consisting the Equilibrium , *all the Opposite Twin* , of Space Anti-space.

In Geometry [PQ] are the Points , *nothing* , only , transformed into 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) , (Unequal Segments twice – Perpendicular -segments = The Space Vectors = Quaternion) .[46]

In Philosophy [PQ] are the concepts of Matter and of Spirit or Materialism and 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 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 .

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 $E = h.f$ 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* , 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).. The current method for **Physical Quantity** [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 $[\nabla i] = 2s^2 = 2.(wr)^2$. [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

Point are both massive Units $+s^2$ and $-s^2$ and for **Two Units** , **Line-Sector is the Dipole** $[s^2 \leftrightarrow -s^2]$.

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** .

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** .

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** .

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 found 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 Gravity level in which Gravity-Field exists) and also all models of the atom as follows ,

1.. Moulds \rightarrow The minimum Number of Points in each Level is [**1** for Point , **2** for Line-sector , **3** for Plane , **4** for Volume , **5.. m** for m Spaces.

2.. 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} = m^2 , for every mould so the Available Extrema Positions for each Point, Line -sector ,Plane , Volume , **m** Space are as,

$m=1 \rightarrow 1^2 = 1 \times 2$ times = **2** \rightarrow for Point

$m=2 \rightarrow 2^2 = 4 \times 2$ times = **8** \rightarrow Line-vector

$m=3 \rightarrow 3^2 = 9 \times 2$ times = **18** \rightarrow Plane

$m=4 \rightarrow 4^2 = 16 \times 2$ times = **32** \rightarrow Volume

$m=5 \rightarrow 5^2 = 25 \times 2$ times = **50** \rightarrow Volume

$m = n \rightarrow m^2 = m.m \times 2$ times = $2.m^2 \rightarrow$ m Space

and which are all based on Geometric logic only, agreeing with objective reality .

A Comparison Chart between Euclidean Geometry and Material Geometry :

	<i>E-Geometry</i>	<i>Material Geometry</i>
A Point →	Is nothing	Are energy Breakages, cells $\oplus = +(wr)^2$, $\ominus = -(wr)^2$ $\emptyset = \oplus \ominus = 2(wr)^2 \neq \pm$ i.e. neutral to them , Zero i.e. Zero is the collision of the opposite breakages
Position of Point →	Every where	Within the objective reality is the quantized energy
A Line →	Is of Infinite ,∞,points	Is of Discrete points $\oplus\oplus\oplus$, $\ominus\ominus\ominus$, $\oplus\ominus\oplus\ominus$
Direction →	Are all directions x,y,z forward and backward .	Is in one direction in each axis as , $\oplus \rightarrow \leftarrow \ominus$.
A Plane →	Is of three non-coinciding Points	It is of three Points with the Zero fragments \oplus, \ominus
Steady →	Is the triangle becoming from the extrema points of line to equilateral triangles	Zero of opposite ,on the three vertices, i.e. hexagon
Frequency in change of direction →	Exist infinite	reversed directions in any plane . Exists the Zero direction in Hexagon steady - plan and a second flowing change that in material points
Obtained from →	Is of Point which is nothing and of Imaginary nature .	Material points of Quaternion nature as shells or <i>tiny caves</i> ,or Work included in them
Amount of Extension →	Is from zero to \pm Infinite	or symbolism $0 \rightarrow \pm \infty = - \infty \leftarrow 0 \rightarrow + \infty$ It depends on the Potential difference , <i>the Voltage</i> , contained in material cells or the number of Shells.
Case of Motion →	It is that Diversity or varying of Points position in all directions or forward creating Work on constant magnitude \oplus to \ominus , <i>the cells = breakages</i> , in one direction or and forward	It is the alternative uniqueness of mutual traction
The result is →	A sector ds can be repositioned Infinite times on a straight or a curved line.	The motion of monad , <i>the material sector</i> , through these discontinuously created from inner , $\oplus \leftrightarrow \ominus$, monad , and Externally acting on monad.
The Correlation between ,	Euclidean and Material-Geometry on	- Points , Lines , Planes , Volumes -

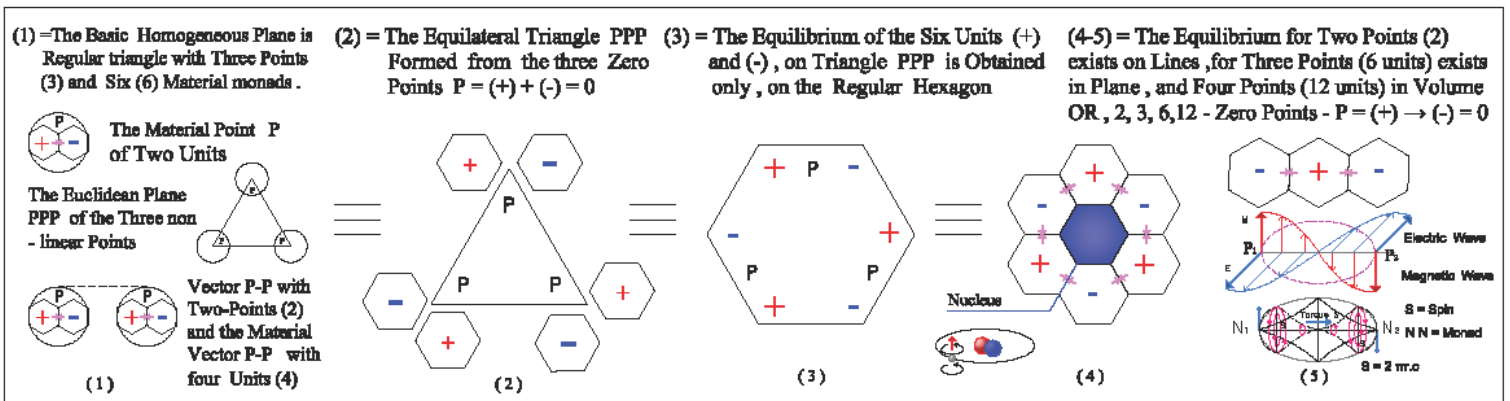


Figure.1 The Stationary Material Point $[\oplus\ominus] = 0$, The two Units on → Euclidean Points (2U) \equiv Zero Line – Sector (4U) , Plane (6U) , Volume (8U) , N Spaces (2N.U) .
The Permissive Sites within the premises are the Available Positions in each Level \equiv Mould .

- [1] The **One** Point is Zero=0, while Material-Point is the sequence of Breakage's length $\oplus\ominus$. The **Two** points, *Sector*, is the length $ds = PP$, while Vector $\overline{PP} = \text{Material length} = \text{Monad} = \text{Quaternion} = \text{The sequence Breakage's length } r = PP = \oplus\leftrightarrow\ominus \text{ --- } \oplus\leftrightarrow\ominus$ of 4 units. Three Units = One point and a unit, is the cause of inner motion and Spin of monads. The **Three** Points not coinciding, form the Plane of three sectors by two, equal 6 units. The **Four** Points in Plane, form a Shape of four sectors by two, equal to 8 units.
- [2] The Three points, sequence the stable shape of equilateral triangle with 6 units \oplus and \ominus .
- [3] The three points, sequence the stable shape of equilateral triangle with the Zero Breakage's length $\{\oplus\leftrightarrow\ominus = \text{Zero}\}$ on the three vertices of the triangle. For monads $ds = r = \leftrightarrow$
- [4] The three Points not coinciding, form the Plane of three sectors by two, equal to 6 units. The **Four** Points not coinciding, form Volume of six sectors by two, equal to 12 units.
- [5] Equilibrium exists by the three reciprocating Sources units \oplus to the three drain \ominus units. The three Units of One point and a unit, or a Positive Breakage between two Negative units $[\ominus\leftrightarrow\oplus\leftrightarrow\ominus]$ causes the Inner Electromagnetic Wave, which creates on axis Spin as a Torque causing motion of monads.

Remarks :

All material points are produced from \pm Breakages which consist the \oplus, \ominus, \odot , Units as follows ,

Breakage $s^2 = +(wr)^2 = \text{The Positive } \oplus \text{ Unit}$

Breakage $-s^2 = -(wr)^2 = \text{The Negative } \ominus \text{ Unit} \quad \oplus\leftrightarrow\ominus = \mathbb{R} = \text{The Rest Energy Quanta}$

Breakage $2s^2 = 2(wr)^2 = \text{The Energy } \odot \text{ Unit}$

Mutual traction of Breakages $[(+wr)^2] \leftrightarrow [-(wr)^2] = \oplus + \ominus = \oplus\ominus = \emptyset \rightarrow \text{The Neutral Unit}$

Unit $\rightarrow \oplus \equiv \emptyset - \ominus = [\oplus\ominus] + [-\ominus] \rightarrow \text{One Neutral Energy Quanta and one Anti-negative Unit}$

Unit $\rightarrow \ominus \equiv \emptyset - \oplus = [\oplus\ominus] + [-\oplus] \rightarrow \text{One Neutral Energy Quanta and one Anti-positive Unit}$

Collision of Breakages $[(+wr)^2] \rightarrow \leftarrow [-(wr)^2] = \oplus\odot\ominus = \oplus\ominus = \emptyset \text{ The Neutral Energy Quanta}$

Collision of Breakages $[-(wr)^2] \rightarrow \leftarrow [-(wr)^2] = \ominus\odot\ominus = \ominus+\ominus+\odot \rightarrow \text{Two } \ominus \text{ Units +Energy}$

Collision of Breakages $[(+wr)^2] \rightarrow \leftarrow [(+wr)^2] = \oplus\odot\oplus = \oplus+[\oplus\ominus] + [-\ominus] + \odot \text{ where } \rightarrow$

$\rightarrow \oplus + [\oplus\ominus] \rightarrow \oplus + \emptyset = \text{One Positive and One Neutral Unit,}$

$\rightarrow +[-\ominus] \rightarrow \text{One Positive Negative-Unit} = \text{The Positive Anti-negative Space Unit,}$

$\rightarrow \odot \rightarrow \text{The Energy Unit}$

Collision of Breakages $\oplus\odot[\oplus+\emptyset] = \oplus\odot[\oplus+\oplus+\ominus] = \oplus+\oplus+[\oplus-\ominus] + \odot \text{ where } \rightarrow$

$\rightarrow \oplus+\oplus = \text{Two Positive Units,}$

$\rightarrow [\oplus-\ominus] = \text{The one Neutral Unit,}$

$\rightarrow \odot = \text{The Energy Unit,}$

Collision of Breakages $[\oplus+\oplus+\emptyset] \odot [\oplus+\oplus+\emptyset] = [\oplus+\oplus+\emptyset+\emptyset] + [\oplus+\oplus+\odot] \text{ where } \rightarrow$

$\rightarrow \oplus+\oplus+\emptyset+\emptyset = \text{Two Positive Units and Two Neutral Units,}$

$\rightarrow [\oplus+\oplus] = \text{Two Positive Units,}$

Addition of two opposite numbers in Geometry $\equiv \text{Number } (+) + (-) = 0 \text{ causes Neutral Unit, i.e. Zero}$

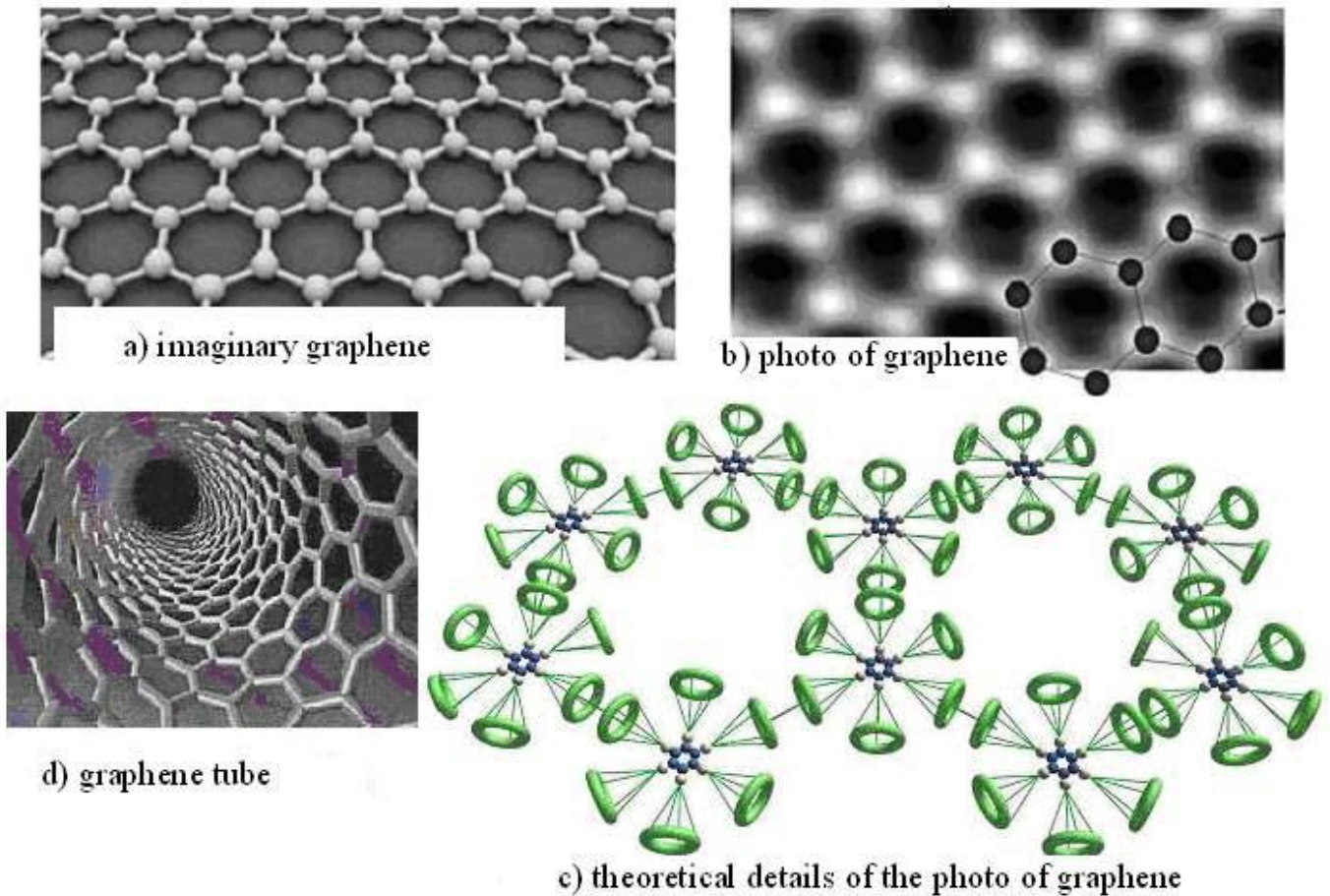
Addition of two Rest Breakages $\equiv \text{Units } \oplus+\ominus = 0 = \oplus\leftrightarrow\ominus = \emptyset$, and causes Neutral or Zero Unit.

Addition of three Rest Breakages in Geometry $\equiv \text{Number } (-) + (+) + (-)$ causes any Number of the Linear Coordinate System, Positive, Negative or Zero i.e. the Straight line.

Addition of three Rest Breakages $\equiv \text{Units } \ominus\leftrightarrow\oplus\leftrightarrow\ominus \equiv \ominus\leftrightarrow\emptyset=\emptyset\leftrightarrow\oplus=\vec{V}$, causes Vibration and Spin

In all above cases has been used the, E-Geometry Logic, for Summation and its properties. Using the logic of E-geometry Elements then is found \rightarrow what is Energy - Space, The How, When and Why Energy is Quantized in Space, The Origin of Material Geometry which is the objective reality of this Cosmos, and the why Geometry Mechanics and Physics faithfully follow.

Photo is from - RESOLUTION OF THE RUSSIAN THEORY OF MICROWORLD -
by Professor Ph. M. Kanarev [kanarevfm@mail.ru]



- Figure.2 .** a) Is shown the structure of graphene (the Regular Hexagon of E-geometry) in a higher Level.
 b-d) Is shown the Regular Hexagon structure with Nucleus ,Core, to be the Torsional missing link of Cluster.
 c) Is shown the Hexagon structure becoming from the triangle ,times, two Units each point and equal to Six units , or (3 vertex x 2 units = 6 Units) , for any compound Geometrical Cluster .
 e) The Hexagon shape is because in Photos is included the Projective Plane of graphene only.

Remarks :

- 1.. **The Linear Level , Shell , configuration** is of **8** available Units.
- 2.. **The Plane Level , Shell , configuration** is of **18** available Units.
- 3.. **The Volume Level , Shell , configuration** is of **32** available Units
- 4.. The Hexagon shape comes from the Projection of Units in the Available-Positions of the flattened , *Plane Level configuration* .
 Flat Plane corresponds to an Angular-Node that goes through the Orbital .
 [According to Bohr's model → Electrons orbit the nucleus in Shells]
- 5.. The elevated positions at nodes due to the ,*Volume-Level* , is generated by the two vertical Planes levels . The Volume Shell configuration is of 32 available Units .

THE POSITION OF SHELLS IN POINTS - LINE - SECTORS - PLANE - VOLUME						
Quaternion	Action $q \odot q = q^2 = +s^2, -s^2, 2s^2 \nabla$		Positive $+s^2 = \oplus$ Negative $-s^2 = \ominus$			
$q = s + \bar{v} \nabla$	Vector $2s^2 \nabla = 2(wr)^2 = \odot$		Neutral state $\oplus \ominus = 0 = \emptyset$			
	1	2	3	4	5	6
Moulds	Euclid Geometry	Material Geometry	Vertices Sub-levels Level	Units on Vertices	Shell Least Units	$\oplus = s^2 = (wr)^2$ $\ominus = s^2 = (wr)^2$ $\odot = 2s^2 = 2(wr)^2$
Point	.	$\oplus \ominus \equiv 0$	$\textcircled{1}$ ∞ ∞	2	$\textcircled{2}$	<p>The Chain of Actions</p>
Line Segment	A — B	$\oplus \ominus \dots \oplus \ominus$	$\textcircled{2}$ ∞ 1	4	$\textcircled{8}$	
Line	$\dots \oplus \ominus \oplus \ominus \dots$	$N = \infty$ ∞ 1	∞	∞	
Plane Triangle			$\textcircled{3}$ ∞ 2	6	$\textcircled{18}$	
Volume Tetrahedron			$\textcircled{4}$ ∞ 3	8	$\textcircled{32}$	
Cube Octahedron			$\textcircled{8}$ 6 7	16	$\textcircled{128}$	

Figure.3 The Euclidean Geometry ,EG, moulds and the corresponding to Material Geometry ,MG. Actions for Quaternion , Collision for Particles , happen between Units on and in , Line Segments , Planes , Volumes and Spaces by following Rules of E-geometry .

In [1] The Elements of E-Geometry → Point (.) ,Line Segment AB (—), Plane triangle ABC, Volume Tetrahedron ABCD and Spaces Cube ABCDEFGH are Extrema.

In [2] The maximum , **Extrema** , Elements in M-Geometry → Point 2 , Line Segment 4 , Plane 6 , Volume 8 , and N Spaces 2N , Cube 16 .

In [3] The minimum number for Vertices /Sub-levels /Level , needed in each Level ≡ Mould.

In [4] The maximum number, **Extrema**, of Units in Vertices of monads ,in Points ,of Moulds.

In [5] The SLU , Shell-Least Monad-Unit-Number ,or the Permissive Sites within Premises Levels and the maximum number of Sites for Sub-levels ,in each M-Geometry Element which is , Point→2 ,Line segment →8 ,Plane →18 ,Volume →32 ,m Space → 2m². SLU is → Full of Outer Permissive , Equilibrium Sites , and with Low Reactivity ,

In [6] The Main branch of one , of the Chain of Actions , in Planck`s Level .

4. Definition of the Material Geometry.

In [39-41] was shown the geometrical Mechanism [STPL] = [Six-Triple-Points-Line] where energy Massive and Vector Breakages , [$\pm s^2 = \pm (wr)^2$] and [$\nabla i = 2(wr)^2$] , become the Materials .

Action (©) of a quaternion $\bar{z} = s + \bar{v}i = s + \bar{v} \cdot \nabla i$ on itself is the Binomial type as ,

$$(s + \bar{v} \cdot \nabla i)(s + \bar{v} \cdot \nabla i) = [s + \bar{v} \cdot \nabla i]^2 = s^2 + |\bar{v}|^2 \cdot \nabla i^2 + 2|s| \cdot \bar{v} \cdot \nabla i = s^2 - |\bar{v}|^2 + 2|s| \cdot |\bar{w} \cdot r| \cdot \nabla i = s^2 - s^2 + 2[\bar{w} \cdot r] \cdot |s| \cdot \nabla i = s^2 - s^2 + 2.s^2 \quad \text{where ,}$$

$s^2 = (wr)^2 \rightarrow$ is the real part of the new quaternion and it is a Positive -Space and Scalar magnitude.

$-s^2 = -|\bar{w}r|^2 \rightarrow$ the always Negative-Anti-space which is always a Negative Scalar magnitude.

$2.s^2 = [2\bar{w} \cdot r] \cdot |s| \cdot |\bar{r}| \cdot \nabla i \rightarrow$ the double angular velocity term which is a Vector magnitude.

In the recovery equilibrium (a surface of a cylinder with $2r$ diameter) , *and because velocity vector is on the circumference while in the center axis is zero* , the infinite breakages Identify with points A,B,C (of the extreme triangles ABC of Space ABC) and with points A_E, B_E, C_E , of the extreme triangles of Anti-space $A_E B_E C_E$.

Points A_E, B_E, C_E of Anti-Space are all on the same circumference of the prior formulation and are rotated with the same angular velocity vector \bar{w} . The inversely directionally rotated Energy $\pm \bar{\Lambda}$ equilibrium into the common circle, so Spaces and Anti-Spaces meet in this circle which is the common Sub-space . Extreme Spaces (the Extreme triangles ABC) meet Anti-Spaces (the Extreme triangles of $A_E B_E C_E$) , through the only Gateway which is the Plane Geometrical Formulation Mechanism (mould) of the [STPL] line , or as a cylinder . [17]

The \rightarrow [Space, Anti- Space equilibrium , $\pm \bar{\Lambda}$, Absolute System [S] \leftarrow] , as Angular momentum $\bar{\Lambda} = \Omega = m.v.r$, is Crushed out into Fragments and , becoming the three Breakages [$s^2 = (wr)^2$] , [$-s^2 = -(wr)^2$] , [$\nabla i = 2(wr)^2$] , and after clashed with the velocity vector \bar{v} of [S] system , (unless succeed to escape un-clashed through center O in [STPL] line and this because $\bar{v} = 0$) , are Thrown OFF this System [S] , conveyed into the Linear momentum ,

the Inertial and Energy - Space , which is the Relative [STPL] System [R] and are the Particles Fermions $\rightarrow [\pm \bar{v} \cdot s]$ and Bosons $\rightarrow [\bar{v} \cdot \nabla i]$.

Un-clashed Fragments through center O , consist the { Medium-Field Material-Fragment } $\rightarrow [\pm s^2]$ = [MFMF] as base for all motions , and Gravity as force [∇i] , while the clashed with the constant velocity , \bar{c} , consist the Dark matter [$\pm \bar{c} \cdot s$] and the Dark energy [$\bar{c} \cdot \nabla i$] , or from

Breakages [$\pm s^2 = \pm (wr)^2$] , [$\nabla i = 2(wr)^2$] become

- A.. [$+\bar{v} \cdot s^2$] \rightarrow Fermions , through [STPL]
- B.. [$-\bar{v} \cdot s^2$] \rightarrow Anti-Fermions , through [STPL]
- C.. [$\uparrow \bar{v} \cdot \nabla i$] \rightarrow Bosons , through [STPL]
- D.. [$\downarrow \bar{v} \cdot \nabla i$] \rightarrow Anti-Bosons , through [STPL]
- E.. [$\pm s^2$] \rightarrow [MFMF] Field , through O
- F.. [∇i] \rightarrow Gravity Field , through O
- G.. [$\bar{v}(\pm) \nabla i$] \rightarrow Gravity Force , through O
- H.. [$\pm \bar{c} \cdot s^2$] \rightarrow Dark matter , through O
- I.. [$\bar{c}(\pm) \nabla i$] \rightarrow Dark energy , through O

Thrust ($\bar{v} = \bar{w} \cdot r$) of [STPL] Mechanism is continually acting on the Breakages [s^2 , $-\bar{v}|^2$, $[2\bar{w}] \cdot |s| \cdot |r| = 2(\bar{w} \cdot r)^2$] producing the [$1-1+2$] $\cdot \bar{w}^3 \cdot |\bar{r}|^3$ magnitudes $(w.r)^3$, which is a Positive Scalar magnitude, with Positive or zero electric charge and called Spin , $\frac{1}{2}$ or $1 = [2\bar{w}] \cdot |s| \cdot |\bar{r}| \cdot \nabla$. [43-49]

1.. Positive breakage Quantity $|\bar{v}|^2 = |\bar{w} \times \bar{r}|^2 = |\bar{w} \cdot r|^2 \rightarrow$ Being at Space points A,B,C of Common-Circle mechanism and the Action magnitudes Q at the coinciding points $D_A D_B D_C - P_A P_B P_C$ of it , Produces Leptons and Quarks , and carry them on [STPL] line. [30-36]

1.. Positive breakage Quantity $|\bar{v}|^2 = |\bar{w} \times \bar{r}|^2 = |\bar{w} \cdot r|^2 \rightarrow$ Being at Space points A,B,C then Action magnitudes Q at coinciding points $D_A D_B D_C - P_A P_B P_C$ Produces Leptons and Quarks , and carry them on [STPL] line.

2.. Negative breakage Quantity $-\bar{v}|^2 = -|\bar{w} \times \bar{r}|^2 = -|\bar{w} \cdot r|^2 \rightarrow$ Being at Space points A,B,C then Action magnitudes Q at coinciding points $D_A, D_B, D_C -$

P_A, P_B, P_C Produces Anti-Leptons and Anti-Quarks, and carry them on [STPL] line.

3.. Positive breakage Quantity $[2\bar{w}].|s|.|\bar{r}|\cdot\nabla i = 2w.(sr).\nabla i = 2w.(r^2.w).\nabla i = 2w.r^2w.\nabla i \rightarrow$ Bosons , being at Space points A,B,C of Common-Circle mechanism and then Action magnitudes Q at coinciding points $D_A, D_B, D_C - P_A, P_B, P_C$ Produces Bosons , and carry them on [STPL] line.

4.. Breakage Quantities $[\pm s^2 = \pm (wr)^2]$, being at ,O, commons' circle center and shacked OFF into [STPL] , and this because of $v = 0$, formulate the [MFMF] Field , which consist the base of all motions .

5.. Breakage Quantities $\nabla i = 2(wr)^2$ being at ,O, commons' circle center and shacked OFF into [STPL] , and this because of $v = 0$, formulate the Gravity Field and Force in [MFMF] Field .

6.. Breakage Quantities $[\pm \bar{c}.s^2]$ and $[\bar{c}.\nabla i]$, the clashed with the constant velocity , \bar{c} , formulate in [STPL] cylinder Dark matter and Dark Energy respectively in [MFMF] Field . i.e.

It was above referred that Thrust $[\bar{c}.\nabla i]$ moves with light velocity and is continually acting on the five Energy-Space Fragments as \rightarrow

$[\bar{c}.\nabla i] \odot \{ (\nabla i) , (+s^2) , (-s^2) , (+cs^2) , (-cs^2) \}$ and on the two Dipole-Couples , where for the **Rest - Couple** $[(\nabla i) \rightarrow (+s^2) \leftrightarrow (-s^2)] =$ It is the Gravity Thrust acting on the Stationary dipole creating the Rest Gravity-Field and Force] , and for **Moving - Couple** $[(\nabla i) \rightarrow (+cs^2) \leftrightarrow (-cs^2)] =$

It is the Gravity Thrust which is acting on the light velocity moving dipole and is creating in it the Rest Gravity - Field and Force dipole Dark - Matter Energy-Field] .

Figure. 4 . Thrust as the two Velocities $\bar{v} = \bar{c} = \bar{w}.r$ creates E-B Waves and Spin $S = S_x \perp S_y$ as Torque S in Velocity direction

i.e. The same force for the two Couples.

The two , opposite signed , Fragments $s^2 = \pm |(\bar{w}.r)^2|$ consist the under Gravity primary Dipole, $[|+s^2| \leftrightarrow |-s^2|] = |\lambda| \equiv [|(+\bar{w}.r)^2| \leftrightarrow |-(\bar{w}.r)^2|]$ where on this , Force $[\nabla i = 2.s^2 = 2(wr)^2]$ as velocity $\bar{v} = \bar{c}$, the Thrust , causes the Gravity's Electromagnetic Field $E \perp P \rightarrow [(\nabla i).(+s^2) , (\nabla i).(-s^2) , (\nabla i).(\pm s^2)] = [(\nabla i).[|+s^2| \leftrightarrow |-s^2|]]$, while Thrust (∇i) acting on $(\pm cs^2)$ dipole $[(\nabla i) \rightarrow (+cs^2) \leftrightarrow (-cs^2)]$ creates the Gravity \rightarrow Dark- matter Energy-field .[40-43]

The massive particles Fermions and Bosons : Velocity vector \bar{v} acting on breakages $\pm s^2 = (wr)^2$ is creating Fermions and Anti-fermions , while vector \bar{v} acting on vector $\nabla i = 2.(wr)^2$ creates Boson , Anti-bosons . In Figure.3 , Breakages $[\pm s^2 = \pm (wr)^2]$ occupying the minimum Space ,

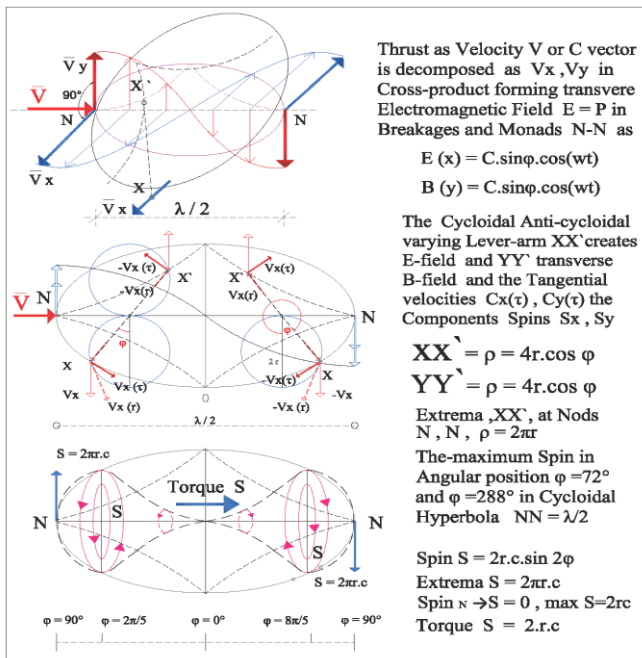
$\frac{\pi(wr)^6}{6} \rightarrow$ is Volume of the tiny cave of radius r , $[\epsilon E^2 + \mu H^2] \rightarrow$ is the Density of the tiny cave and mass $\rightarrow m_p = V.p = \frac{\pi(wr)^6}{6} [\epsilon E^2 + \mu B^2]$

In Common-circle Cylinder $NN = N_1 N_2 = [\pm s^2] = |\bar{w} \times \bar{r}|^2$ the tiny Energy-Space is following the trajectory , in=(N1) , or , out=(N2) , Cycloid=(c)= $|N1-N2| = \{[N(P_1) \leftarrow 0 \rightarrow (P_2)N]\}$ and needs more or less time $T(2) < T = 4\pi \sqrt{(r/g)} < T(1)$ to reach the other end point N2 . [33-36]

And since frequency $f = 1/T$ and energy $E = h.f$ then Cycloid motion Controls constancy of Energy , the inner stability of monad , by changing velocity, $\bar{v} = \bar{w}.r = 2\pi r / T = 2\pi r.f$, and period , T, of stationary monad as , $E = h.f = h.(\bar{v}/2\pi r)$.

Breakage quantity $2.(wr)^2$ under the tangential action $\bar{v} = wr$ becomes $2.(wr)^3$ acting on point A $\rightarrow 2wr.m$ of common circle . The same also for points A,B,C of Space and A_E, B_E, C_E of Anti-Space . Because all velocity vectors AA , BB , CC carry the material points A,B,C at points D_A, D_B, D_C in time ,t, isochrones , then material points follow a cycloid with period the norm of wavelength of velocities $|AA|, |BB|, |CC|$.

This Simultaneity is succeeded by Lorentz factor where transformations between Inertial frames that preserve the velocity of light will not preserve simultaneously . The Geometrical expression of this transformation (it is the base Mould STPL , of the natural Universe) follows i.e.



Through [STPL] line , the mould , which is the Primary Particle Mould, Energy as velocity vector is quantized to → Particles - Anti-particles , Gravity-Field and Gravity-Force , Dark matter and Dark energy , and all material world , following Cycloidal simultaneity . [17,31,35,41]

It was referred what is point , sector and line in Euclidean geometry. The Material point (1) at Euclidean point (1) , is now Breakage $\pm [(\bar{w}.r)^2]$ dipole volume which becomes from that cave where quantized Point length = $L_v = r = e^{i.(N.\frac{\pi}{2}).b} = 10^{-N}$, and for $N = \infty \rightarrow L_v = 0$.

It is one of the two equal and opposite equilibrium basic elements ($|+(\bar{w}.r)^2| \leftrightarrow |-(\bar{w}.r)^2|$) in this Rest Homogenously and Isotropically Quantized, mass-less Field [PNS] in the spherical volume $V = \frac{\pi}{6} . [| \pm (\bar{w}.r)^2 |]^3$, which consist in our Planck's confinement the required coordinate System and the base for all motions and forces in Gravity parallel Inertial systems . This rest element in Space system [PNS] (is the Base) into the Medium-Field Material Fragment → [MFMF] Field with the less space distance of diameter , $ds = |\bar{w}.r|^2$, which consists the Minimum Space material point and Energy Quanta.

It was referred that Fragments $s^2 = \pm |(\bar{w}.r)^2|$ occupying the minimum quantized space $|s^2|$ are deported and fill all [STPL] cylinder which is the Rest Quantized Field $\pm [(\bar{w}.r)^2]$ or it is , the material point in mechanics , and the base of all motions where Force $[(\bar{w}.r)^2 \nabla_i] = 2.[(\bar{w}.r)^2] = 2.s^2$ is vibrating on length $2.[(\bar{w}.r)^2] = \lambda$ as a Stationary Wave , and creates the curl Electromagnetic Field , $E \perp P$, on which is the **Universal Quantized force called Gravity** . The Gravity - Force is equal to $F_g = |\bar{q}|.[E + \bar{v} \times P]$ and is exerted on any movable particle with charge \bar{q} . **Gravity - Field** $G_f = [E + \bar{v} \times P]$, is the un-movable , forced welded spinning dipole ,

$\rightarrow [|+(\bar{w}.r)^2| \leftrightarrow |-(\bar{w}.r)^2| = |\lambda|] \equiv [\{ A(P_A) \leftarrow 0 \rightarrow (P_B) B \}] \leftarrow$
and because above is movable then with three Unis becomes the un-movable Torsion $\pm \Lambda$ as ,

$\rightarrow [|-(\bar{w}.r)^2| \leftrightarrow |+(\bar{w}.r)^2| \leftrightarrow |-(\bar{w}.r)^2|] = |\Lambda| \equiv \text{Spin} \leftarrow$
and also because jointed with forces , this means that Newton's laws issue in both , Absolute System [S] and to the Relative System [R].

The Material wavelength of two Units (1),(2), or the sector $\lambda = (1)-(2)$ or the minimum energy Space of the two material Units as above is as $\rightarrow \{ [\text{Medium-Field Material Fragment}] \rightarrow [\pm s^2] = \pm |\bar{w}.r|^2 = [\text{MFMF}] \text{Field} \leftarrow \}$ the Electromagnetic Field $[\bar{E} \times \bar{H}]$ or the field $\rightarrow [|+(\bar{w}.r)^2| \leftrightarrow |-(\bar{w}.r)^2| = |\lambda|] \equiv [\{ (1)(J=P1) \leftarrow 0 \rightarrow (J=P2)(2) \}] \leftarrow$ which is the Standing wave in cavity (1)-(2) , of the two scalar breakage $| \pm (\bar{w}.r)^2 |$ as medium (1)-(2) field , and $(J1) = 2|\bar{w}.r|^2$ as energy at point (1) and carried to point (2) by following the cycloid motion from (1) to (2) with an isochrones Velocity \bar{v} , and during shifting is analyzed into two velocity vectors \bar{v}_1 , \bar{v}_2 , and which undergo vibrations causing two waves that represent the two , Electric E and Magnetic H , perpendicular components following the trajectory, in=(c1), out=(c2) . On cycloid = (c) = |(1)-(2)| is needed the isochrones time $T = 2\pi.\sqrt{r/g}$ to reach end (2) < Fermat's Principle of Least time > and this because it is the Extreme < Isochrones Principle > which is embedded in all wavelength vector monads, and consists the Minimum Energy-dipole-Quanta i.e. the sector (1)-(2). [39-41]

The Material wavelength of three Units (2)(1)(2), or the sector $\lambda = (2)-(1)-(2)$ is the Electromagnetic Field $[\bar{E} \times \bar{H}]$ or the Rest field as ,

$\rightarrow [|-(\bar{w}.r)^2| \leftrightarrow |+(\bar{w}.r)^2| \leftrightarrow |-(\bar{w}.r)^2|] = |\Lambda| \equiv \text{Spin} \leftarrow$
 $[(1)(J=P1) \rightarrow (J=P2)(2)] \equiv [\emptyset \leftarrow (J=P2)(2)] \equiv [\emptyset \leftrightarrow \emptyset]$

which is the Reciprocating-motion , **Vibration** , of a Standing wave in cavity (2)-(1)-(2) $\equiv (2)-(2) \equiv \emptyset \leftrightarrow \emptyset$

For Dark-matter , the Material point (1) at Euclidean point (1) , is now the moving Breakage $[\pm \bar{c}.s^2]$ volume which becomes from that cave where quantized Point = $L_v = r = e^{i.(N.\frac{\pi}{2}).b} = 10^{-N} = \infty$, infinite , and it is the movable element in the Rest Homogenous and Isotropically Quantized, mass-less Field [PNS] in the same spherical volume $V = \frac{\pi}{6} [\pm \bar{c}.s^2]^3$.

For Dark-matter wavelength of two points (1),(2), or the sector $\lambda = (1)-(2)$ or the minimum energy Space of two Dark-matter material points is energy field $[\pm \bar{c}.s^2] = [c.|\bar{w}.r|^2] = [| + c.(\bar{w}.r)^2 | \leftrightarrow | - c.(\bar{w}.r)^2 |] = [c.|\lambda|] \leftarrow$ or the DM massive energy field . Force $[(\bar{w}.r)^2 \nabla_i] = 2.[(\bar{w}.r)^2]$ is also vibrating on same length $| \pm \bar{c}.s^2 | = 2[c.(\bar{w}.r)^2] = \lambda$

as the Stationary Wave of gravity , and creates the curl Dark-Matter Electromagnetic Field $[\bar{E} \times \bar{H}] \equiv E_D \perp P_D$ on which is exerted also the Universal Quantized force , Gravity . This heavier Gravity-Force in DM is equal to $F_D = |\bar{q}| \cdot [E_D + \bar{v} \cdot P_D]$ and is exerted on any movable particle with charge \bar{q} as in gravity field is .

Since for three Units is applicable the same and in Material Geometry then ,

$$\rightarrow [|c(-\bar{w}.r)^2| \leftrightarrow |c(\bar{w}.r)^2| \leftrightarrow -|c(\bar{w}.r)^2|] = c [|(-\bar{w}.r)^2| \leftrightarrow |(\bar{w}.r)^2| \leftrightarrow -|(\bar{w}.r)^2|] = c \cdot \{ \emptyset \leftrightarrow \emptyset \}$$

i.e. Gravity travelling at light speed = $c|\Lambda| \equiv c$ Spin

So, Gravity force is the minimum attractive and biding Force $\nabla i = 2(wr)^2$ on dispersion [MFMF] $\rightarrow [|(\bar{w}.r)^2| \leftrightarrow -|(\bar{w}.r)^2| = |\lambda|] \leftarrow$ and is the material energy length consisted of material points $|(\bar{w}.r)^2|$ which are the two $\pm |(\bar{w}.r)^2|$ dipole and restrained by the above Electromagnetic field E,P becoming from the binding force $|2(wr)^2|$ and having the equations ,

$$E = 2A \cdot \sin kx \cdot \cos wt = \sqrt{2} \cdot |(\bar{w}.r)^2| \cdot \sin kx \cdot \cos wt ,$$

$$P = 2A \cdot \sin kx \cdot \cos wt = \sqrt{2} \cdot |(\bar{w}.r)^2| \cdot \sin kx \cdot \cos wt ,$$

in our Planck's confinement cave , and which interact with all other particles . Since acceleration , $a = d\bar{v} / dt = (d\lambda / dt) \cdot f$, is analogues to wavelength , λ , and to frequency , f , then for , $\lambda =$ any constant (or zero), then $\bar{v} \rightarrow 0$ and $f \rightarrow \infty$.

This is the why the very strong gravitational fields are present and close to black holes where there $\bar{v} = \bar{c} = 0$ or any constant. [40-41] , For more in [51].

The motion of this DM,DE, mixture of the spherical opposite signed materials and dipole energy sector volumes , is not in contrary to gravity force , because both have already passed from the center of STPL contracted mechanism . Gravity field is the Rest base of all universe which doesn't exist apriori but continually created as above and is the Base , *the carpet* , on which the *Dark-energy Dark-matter heap mixture* , with light velocity , \bar{c} , is rolling , *expanding* , with the maximum constant , c , and continually formulating the ,

Zero \rightarrow Discrete \rightarrow Infinite Geometrical Universe.

In [22-23] \leftrightarrow Monad AB is the dipole , $(P_A \leftrightarrow P_B)$, or $[\{ A(P_A) \leftarrow 0 \rightarrow (P_B) B \}]$ and it is the symbolism of the two opposite forces (P_A) , (P_B) at points A,B which vibrate perpendicularly as E-M wave in energy-monad $|AB|$, and are created as force at the edge points A , B .

This Symbolism of primary point (i.e. the zero ,0, which is nothing) shows the how creation of Opposites , A and B , points becomes from this zero point A ,which is Non-existence to Existence B , in Space monad AB , i.e. the quantization of point A to point B as the dipole AB is as , the $[S] \leftrightarrow [AS] = [Space] \leftrightarrow [Anti-space]$ mechanism.[12] Above dipole Space-Anti-Space quantization of the Six-Triple-Points-Line Mechanism , produces and transfers Points of Spaces , Anti-Spaces and Sub-Spaces in a Common Inertial Sub-Space and a cylinder , in Gravity field [MFMF] and Particles , and describes the Space-Energy beyond Plank's length level [Gravity Length $3,969 \cdot 10^{-62}$ m] , reaching the Point = $L_v = e^{i \cdot (\frac{N\pi}{2})} b = 10^{-N} = -\infty$ m = 0 m , which is nothing and zero space .[43-46]. The very clear conclusion is that ,

Breakages located IN Cylinder \rightarrow Acquire Oscillation from their inherent Vibration derived from velocity vector $\bar{v} = > \bar{c}$, while

Breakages located OUT of Cylinder \rightarrow Acquire Oscillation from their interrelation , bonding .

5. The Spin and Torque .

In [49] was shown that equation of angular velocity $w = E / [h/2\pi]$ and defines the number of notes that will be present along the medium , *the cave* , and is depended upon the Incident Energy ,E , on cave so , $w = E / [h/2\pi] = E \cdot [2\pi/h] = E / SPIN$

When the applied force $E = hf = w \cdot (h/2\pi) = w \cdot Spin$ then **Spin** = $\frac{E}{w} = [\pm \bar{v} \cdot s^2] / w = (r \cdot s^2)$ on cave and are

created **Fermions** with **Spin** = $[\frac{E}{w}] = (r \cdot s^2) \rightarrow \frac{1}{2}$

When the applied force $E = h \cdot f = w \cdot (h/2\pi) = [\nabla i = 2(wr)^2 = 2 \cdot \bar{v} \cdot s^2]$ on cave then **Spin** = $\frac{E}{w} = [2 \cdot \bar{v} \cdot s^2] / w = 2 \cdot (r \cdot s^2)$ and are created **Bosons** with **Spin** =

$[\frac{E}{w}] = 2 \cdot (r \cdot s^2) \rightarrow 2 \cdot (\frac{1}{2}) = 1$ **which is double the before.** i.e. **Energy** as velocity vector \bar{v} or $E = [\pm \bar{v}]$, applied on the material energy dipole points $[\pm s^2]$ as the Dipole Quantity $|\bar{v}|^2 = |\bar{w} \times \bar{r}|^2 = |\bar{w} \cdot r|^2 = s^2$, separately creates the massive Particles , **Fermions** , while the velocity vector \bar{v} , applied on the **Double Quantity Energy** vector breakages $\nabla i = 2(wr)^2 = 2 \cdot s^2 = 2 [\pm \bar{v}]^2 = 2E$ and since $v = (w \cdot r)$, $2v \cdot s^2 = 2|\bar{v}|s^2 = 2 \cdot |\bar{w} \times \bar{r}|^3 = 2v \cdot |\bar{w} \cdot r|^2 = 2s^2$ creates the Energy Particles , **the Bosons** , by doubling its frequency $[f 2 = 2 \cdot f]$ in the same cave.

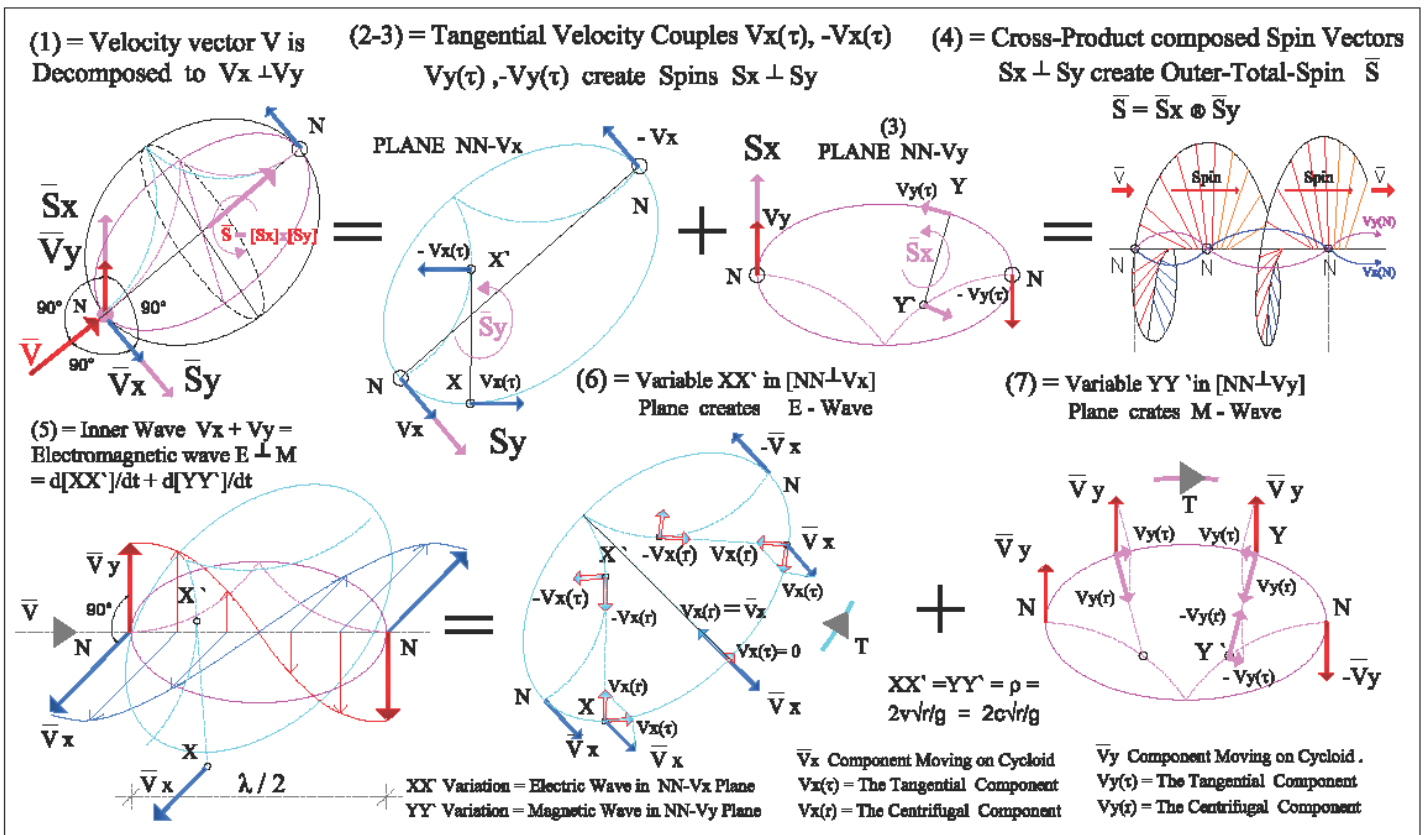


Figure. 5 The Mechanism of Angular Momentum – Spin – in Particles and their Curl-motion . The Collision between velocity vector \bar{v} and a Unit $\bar{N}\bar{N}$, produces the two transverse Electromagnetic-Waves and Spin as Torque , which creates the motion of Unit . Outer Spin of Particles creates E,P Inner Waves and in tern Inner Spin as Torque and recycled

Remarks :

Space is the Position of points , as in Introduction referred and explained , filled with energy Quanta as tiny Electromagnetic wave cycloidal caves.

Energy is the Cause of motion , the change of position of points , and it is motion itself .

Mass is the Reaction to the motion , it is an Index of the amount of motion , and a numeric magnitude which has nothing to do with Energy .

In mechanics – Physics , Change ,is that of Space , $d\bar{s}$, and it is the velocity vector \bar{v} , that of change of velocity vector and it is acceleration $d\bar{v}$, that of change of the Reaction to the Velocity and Direction of the motion and it is mass \bar{m} .

All Units = monads have their place in Spaces . The Second-order differential equation excited by a Harmonic external force $F_t \sin \omega t$ is as ,

$$m \frac{d^2x}{dt^2} + c \frac{dx}{dt} + k . x = F_t \sin \omega t$$

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

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

In Electromagnetism , Change , say a Space-monad is \rightarrow a Resonance which can occur in the RLC circuit , where **Resistance R** , is the change in current amount it is the converter of current , **Inductance L** , is like mass or Inertia in Mechanical systems which store the Magnetic-energy and , **Capacitance C** , concentrates (\pm) charge which store the Electric-energy in much the same way that springs store mechanical energy inverse spring constant , is the analogous .

The differential equation excited by a Harmonic Electromotive force $E_t \sin \omega t$, in an RLC circuit , oscillating at its natural frequency is as ,

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

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, Elastance constants, with general solution given by the equation

$$q = A.e^{s1.t} + B.e^{s2.t} + X \sin(wt-\phi) \dots\dots(2)$$

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.

In E-Geometry - Mechanics, *Change*, say monad NN is an cycloidal Resonance $NN = \lambda/2 = 2\pi r = s^2 = [2\pi/w]^2 = 4\pi^2/r/c$, clashed with velocity vector $\bar{v} = \bar{c}$, and causing velocity components $V(x), V(y)$ which move forth and back, up and down, and thus forced to Vibrate at a specific fundamental frequency. [49]

Motion is as the Charge in Physics, and occurs from the Cross-product velocity components $|\bar{v}_x|, |\bar{v}_y$ where $|\bar{v}|^2 = |\bar{v}_x|x|\bar{v}_y|y$ validating in clashed inherent vibration particles.

Potential Energy is as the Voltage and occurs from Cross-product velocity V_x, V_y couple-components $V_x(r), -V_x(r)$ on radius of curvature $\rho = 4rcos\phi$ and from the transverse centrifugal velocity couple $V_y(r), -V_y(r)$ the magnetic Voltage.

Since $\rho = XX' = 4r.cos\phi$ and is varying on Cycloid - Evolute, which is Space Anti-space equilibrium, this creates oscillation in $[V_x(r), XX']$ plane and thus producing Electric field. The same also for transverse varying YY' creating Magnetic field in $[V_y(r), YY']$ Plane. Oscillation is so produced from the varying Space Positions XX', YY' , forth and back - up and down, and this because of Geometry-Mechanics relation.

Spin is the Resultant of Plane system of \bar{S}_x, \bar{S}_y , vectors into V_y, V_x axis which follows the Cross-product, and is composed to vector \bar{S} acting on breakage NN axis as a Torque, and because lever arms XX', YY' are varying, Resultant Momentum

execute an Outer, Whirling motion producing the Outer Oscillating motion of breakage.

Following Newton's 1st and 3rd law for Spin at Nods N, N where Spin is swept, monad $= \lambda/2$ is Push forward as velocity vector following the same In-cycle by forming the Outward Electromagnetic field.

In Figure 4-5, Space $s^2 = |(wr)^2| = ds$ is the tiny Energy resonance between NN nodes so, any Changes to Motion Correspond to both, Classical mechanics and Electromagnetism equations.

In figure.5-1, the Changeable *Radius of Curvature*, formed between Cycloid and Anti-cycloid is $XX' = \rho = 4r.cos\phi$ which depends on angle ϕ , following a cosine's curve, and it is at N, N points, where for $\phi = 90^\circ$, then $\rightarrow \rho = 0$ and for the extrema case at $\phi = 270^\circ$, then $\rightarrow \rho = 2\pi.r$, and simultaneously $\rho = 0$. This changeable, *Radius of Curvature*, creates the varying cycloidal Electromagnetic wave of monads which is Regenerated between N, N nods, as a kind of geometrical variation position.

In figure.5-2, the Changeable *Tangential Velocity* $\bar{V}_x(\tau) = c.sin\phi$ depends on angle ϕ , following a sinus curve, it is at N, N points, where $\phi = 90^\circ$ and $\phi = 270^\circ$, $\rightarrow V_x(\tau) = c$ and at middle points O, O' , where $\phi = 0^\circ$, $\rightarrow V_x(\tau) = 0$. It is continually equilibrium with the opposite velocity $-\bar{V}_x(\tau)$.

In figure.5-3 the Changeable, *Tangential Velocity* $\bar{V}_x(r)$, creates *Spin vector* $\bar{S} = 2rc.sin2\phi = 4rc.sin\phi.cos\phi$, depending on angle ϕ , following the sinus curve 2ϕ , and instantly at N, N points, where $\phi = 90^\circ$ and $\phi = 270^\circ$, which is the extrema case $\rightarrow \bar{S} = 2\pi.r.c$, and after this immediately becomes zero until angle $\phi = 2\pi/5$ accepting the maximum value $\rightarrow \bar{S} = 2r.c$. At middle points O, O' , where $\phi = 0^\circ$, then spin $\bar{S} = 0$ even if $\rho = 4r$. Since **Spin = Torque** $= [\bar{S}_x]x[\bar{S}_y] = V_x(\tau).\rho.sin\phi =$ the Angular equivalence of Force=*Torque* in NN axis of monad { $NN = a$ moving or not frame with magnitude=*scalar*= $|S|$, and direction that of axis of vector \bar{S} }, and which force **never vanishes**, therefore is conserved.

By this vanishing velocity, Spin is swept away from monad as a kind of, *General Clearance*, for

the New regenerated Electromagnetic field $E_{\perp P}$ by the centrifugal velocity vectors $\bar{V}_x(r), \bar{V}_y(r)$.

Meanwhile Total Torque $|\bar{S}| = 2\pi r.c$, exists in NN axis, **so monad NN would still be moving**, this per Newton's first law of motion, and this is according to conservation of Total Impulse, and rotating due to conservation of Linear and angular momentum. The compound **Centrifugal Force** due to the two $V_x(\tau), -V_x(\tau), V_y(\tau), -V_y(\tau)$ is a centripetal force making monad to move in a circle or a helix as equation $C-F = mv_xw = -(wr)^2.v_xH = -(wr)^3.xH$.

According to math theory of Elasticity, the total work on free edges where there is no shear becomes from Principal stresses only and it is $W = \frac{\sigma^2}{2E} + \frac{\tau^2}{2G}$ and the analogous Energy in monads $W = \frac{1}{2}[\epsilon E^2 + \mu H^2]$ spread as the **First Harmonic** and equal to Spin $\bar{S} = 2\pi r.c$. Planck's Energy $E = h.f = (h/\lambda).c$ is equal to the Isochromatic pattern fringe-order in monad as

$\sigma_1 - \sigma_2 = (a/d).N = (a/d).n.f_1 = (8\pi r^2/3).n.f_1$, and the Summation of their Isochromatic

Quantized fringe-order is $E = \bar{S} = 2\pi r.c$

$$\left[\frac{8\pi r^2 f_1}{3} \right] \cdot \left[\frac{n(n+1)}{2} \right] = \left[\frac{4\pi r^2 f_1}{3} \right] n.(n+1)$$

of the same cave $(wr)^2$.

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. For $n = 1$, the First Harmonic, $E = 2\pi r.c = \left[\frac{4\pi r^2}{3} \right].f_1.[1]$, and for $n = 2$ the Second Isochromatic fringe Quantized order, **as threes** and, $E = \left[\frac{4\pi r^2}{3} \right].f_1 \rightarrow \phi$ trisection with Energy-Bunched variation $f_2 = 2f_1$. This is the way of Energy storing in caves $(wr)^2$.

Remarks : Figure.5

a.. From definitions, **Quantum-Spaces**, or, **Quantum-Monads** are the Scalars $[\pm s^2 = \pm (wr)^2]$ and Vector $[\nabla_i = 2.(wr)^2]$ breakages all quantized through [STPL] E-geometry [SS] Mould.

Thrust is, Energy applied on breakages as velocity vector \bar{v} .

Wave-Structures, are the clashed homogeneously breakages, with the velocity vector $\bar{v} = \bar{c}$.

Spin is fixed and independent of particle's mass because Spin $= (h/2\pi).w$, or its external angular velocity, **w**, is monad's quantum wave function.

The Inner Angular Momentum of Particles (L) as Spin (S) becomes of two Equal and perpendicular velocity Vectors \bar{v}_x, \bar{v}_y , which travel Isochronal between nodes in the tiny Quantum-volume $ds = \lambda/2 = (wr)^2$. The centrifugal velocity vectors $\bar{V}_x(r), \bar{V}_y(r)$ as forces and the equal opposite on Evolute - $\bar{V}_x(r), -\bar{V}_y(r)$ create **the Inner Electromagnetic wave E,P** in NN $= 2(wr)^2 = 2.s^2 =$ Vector breakage and as the single **Dynamic standing wave Vibrating structure E, P** in NN $= \pm (wr)^2 = \pm s^2 =$ Scalar breakage \rightarrow resonant. The wavelengths $\lambda = 2.NN$ of the two perpendicular Inward waves contain NN axis.

The tangential velocity vectors $\bar{V}_x(\tau), \bar{V}_y(\tau)$ as forces, equilibrium the opposite - $\bar{V}_x(\tau), -\bar{V}_y(\tau)$ on the centrifugal axis of Cycloid-Evolute for the Stability of the system, while both two angular momentum, \bar{S}_x, \bar{S}_y components, **the two Spins**, following the Cross-Product are then composed to vector $\bar{S} = \text{Spin} = \bar{V}_x(\tau) \times \bar{V}_y(\tau)$, in NN axis because Spin = Torque = The angular equivalence Force.

$$\bar{S} = [g.\sin\phi].\rho = [g.\sin\phi].[2c\sqrt{r/g} = 2c\sqrt{r}g.\sin\phi ..(s)]$$

i.e. Spin, as Energy \bar{c} , is dependent on velocity Position only, since $\bar{v} = \bar{c}$. Equation (s) Unify the Energy, Spin of, c, and Space Cave of, r. [51]

Inner Vibrating Wave and Outer Oscillating wave, as the Spin vector, are superimposed at breakage with opposite amplitudes.

Because at NN $= \lambda/2$, and at nodes evolute changes phase $\pi = 180^\circ$ rotation, and this because of the two neighboring lobes which are in anti-phase with each other, then exists phase shift at the center on which simultaneously Spin creates rotation. [49]

Wave amplitudes E,P are equal to $\sqrt{2} \cdot |(wr)^2|$ at nodes and $E = P = \sqrt{2} \cdot |(wr)^2| \cdot \sin(\pi/2 + \pi) \cdot \cos wt$ at middle Nodes.

Above Attributes of monad ,allows to transform the Inward wave to another Outward wave and obtain constructive interference with the proper phase relation and the whole space of breakage to become twisted up and stretched without limit .

Since spin $S = E/w = \pm \bar{v} \cdot (wr)^2/w = \bar{v} \cdot wr^2$, then has only One value for scalar breakages ($h = 1/2$) , and since also $S = E/w = \pm \bar{v} \cdot (2wr)^2/w = 2 \cdot \bar{v} \cdot wr^2$, then has only One Double-value for vector breakages ($h=1$).

Since Energy caves are versors then energy $E/(\pi\sqrt{3})$ and $E = \sqrt{3} \cdot \pi \cdot (h/2\pi) \cdot w = \sqrt{\frac{1}{2} [\frac{1}{2} + 1]} \cdot hw = \frac{\sqrt{3}}{2}$ Spin for spin value $s = 1/2$.

b.. From the principle of Linear superposition , if two waves of equal amplitude are in-phase then they meet crest-to-crest and trough-to-trough and their amplitudes add to each other (*the Constructive Interference*) and the difference in distance they travel is an integer , $n = \text{order}$, of wavelength $\lambda \rightarrow [DDT = n\lambda]$ and if the two waves are out-of-phase then they meet crest-to-trough and have zero amplitudes which cancel each other (*it is called the Destructive Interference*) and the difference in distance they travel must differ by an odd integer , n , of wavelength $\lambda/2 \rightarrow [DDT = (n+1/2) \cdot \lambda]$.

For all moving monads, Kinetic Energy T as Torque causes the Outer motion , and Dynamic energy V, causes the Inner Electromagnetic E,H field.

Electromagnetic waves are able to transmit Energy through a vacuum (empty space) by storing their energy in above Standing Transverse Electromagnetic dipole wave , and thus considered completely particle like , and in the transverse interference pattern to be considered as completely wave , so the same quantity of energy behaves as ,

Energy $I_d = \frac{\rho \pi^2 c^3}{2\lambda^2} [\epsilon E^2 + \mu H^2]$ **in volume** $V = [\frac{4(w^2 r^2)^3}{3\pi}]$
 having mass \rightarrow **Particle Energy**
 $I_d = (\frac{\rho \cdot c}{2}) \cdot (wA_0)^2$ **in Interference pattern as \rightarrow Wave**

This is the Wave-Particle duality unifying the classical Electromagnetic field and the quantum particle of light .

Spin $\frac{E}{w} = [\pm \bar{v} \cdot s^2]/w = (r \cdot s^2) = w^2 r^3 = [wr]^3$, or $\rightarrow \frac{h}{\pi} = 2 \cdot [wr]^3$, or **Energy Space quantity** wr , is **doubled and becomes the Space quantity** $\frac{h}{\pi}$

The above relation of Spin shows the deep relation between Mechanics and E-geometry ,where the tiny Gravity-cave in $r = 10^{-62}$ m , as the Energy-Volume - quantity $[wr]$, is **doubled and is Quantized in Planck`s-cave Space quantity as ,** $(h/\pi) = \text{Spin} = 2 \cdot [wr]^3$ in $r = 10^{-35}$ m **i.e.**

Energy Space quantity , wr , is Quantized , and becomes the New Space quantity , $h/\pi = 2 \cdot [wr]^3$, **doubled** , following the Euclidean Space-mould of Duplication of the cube , in tiny Sphere volume $V = (4\pi/3) \cdot [wr/2]^3$, as well as that of Squaring of circle , π , and or in Sub-Space-Sphere volume $\sqrt[3]{2}$ Since $w = E / [h/2\pi] = m \cdot c^2 / [h/2\pi] = 2\pi \cdot mc^2/h = 2r \cdot s^2 = 2 \cdot r^3 \cdot w^2$, then mass $m = \frac{(wr)^3}{c^2} = \frac{2}{c^2} (wr)^3$, and is what is called conversion factor mass , m , as an index of energy changes .

6. Particles and Momentum [41]

In general, momentum $p = m\bar{v}$, therefore the amount of momentum per unit volume , dV , is , $\rho\bar{v}$, (since $m = \text{volume} \cdot \rho$) and for surface , the normal stress $\sigma = F/dS = -F$ and then becomes $\rightarrow \partial\rho\bar{v} / \partial t + \nabla \cdot (\rho \cdot d\bar{v}) \cdot V = \nabla \cdot \sigma + \rho \cdot g$, i.e. **momentum is converted into a normal stress , σ , in tiny volume plus momentum of the whole volume as mass** , body force , where ∇ is nabla symbol for, divergence, , g , is gravity`s net acceleration, , ρ , the inner volume density. This interpretation applied to Young`s interference and Polarizer experiments for dark fringes then $\rho = [\epsilon E^2 + \mu H^2]$ and thus is shown the unified understanding between the classical Electromagnetic field theory and the quantum particle of light. In Figure - 8 , the maximum velocity occurs in Common circle , when the two velocities , \bar{c} , \bar{v} are perpendicular between them , from where then dispersion follows Pythagoras theorem and the resultant Quantized linear Space length , r , becomes ,

$$r = |(\bar{c} \cdot T)| = \sqrt{v^2 + c^2} .$$

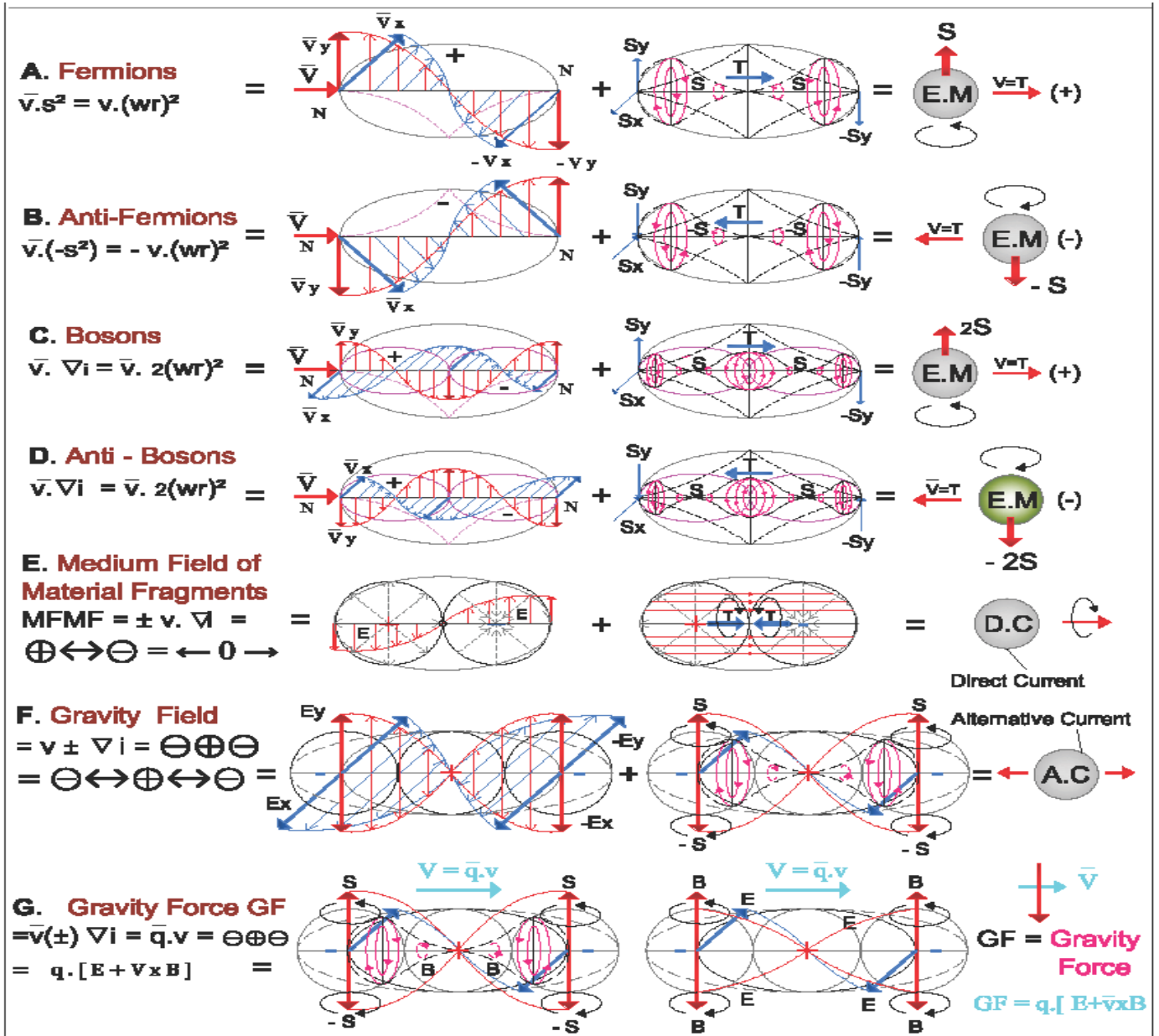


Figure. 6 → The Geometrical Construction of Particles.

A-B-C-D → The inner motion of Energy as Electromagnetic Wave in Breakages .

E – F → The Basic structure , *the Carpet* , of motion in Space Anti-space [PNS] , is MFMF field .

F - G → There are only Electric-charges \bar{v} , creating Magnetic fields B, exerting force on moving charges
And this because exist only thrust vectors $\nabla i \equiv \oplus$ creating the Electromagnetic Waves .

The Inverse Circle-Cycloidal , on the \oplus Relief , of \ominus Well Rotation :

Since Material Geometry follows Euclidean therefore series of Positive Numbers added to any Number consist the Sum of Positive Numbers , while series of Negative Numbers added to any Number consist the Sum of Negative Numbers and the whole consists the Infinite Number series. The two series are jointed to Zero where Zero is equal to the Sum of Positive and Negative series.

In Figure 7 , Interactions of opposite are the Centripetal Force ,CP, which is the Action to the equal and opposite reaction Centrifugal Force ,CF, according to Newton`s third law .

This Centripetal force \oplus is required so that the Negative breakage \ominus by Rolling on Positive breakage circumference , to experience Uniform Circular motion , towards their axis , and to maintain its circular path , i.e. Centrifugal and Centripetal Forces exist . . This Geometric logic is just the opposite to the circular motion becoming from the two above referred forces.

The Well is Zero and all the Negative series of Numbers ($-\infty \dots -N, 0$) are into Zero , i.e. The Space \oplus , the Anti-Space \ominus , are in Sub-space \emptyset , which is the Neutral space .

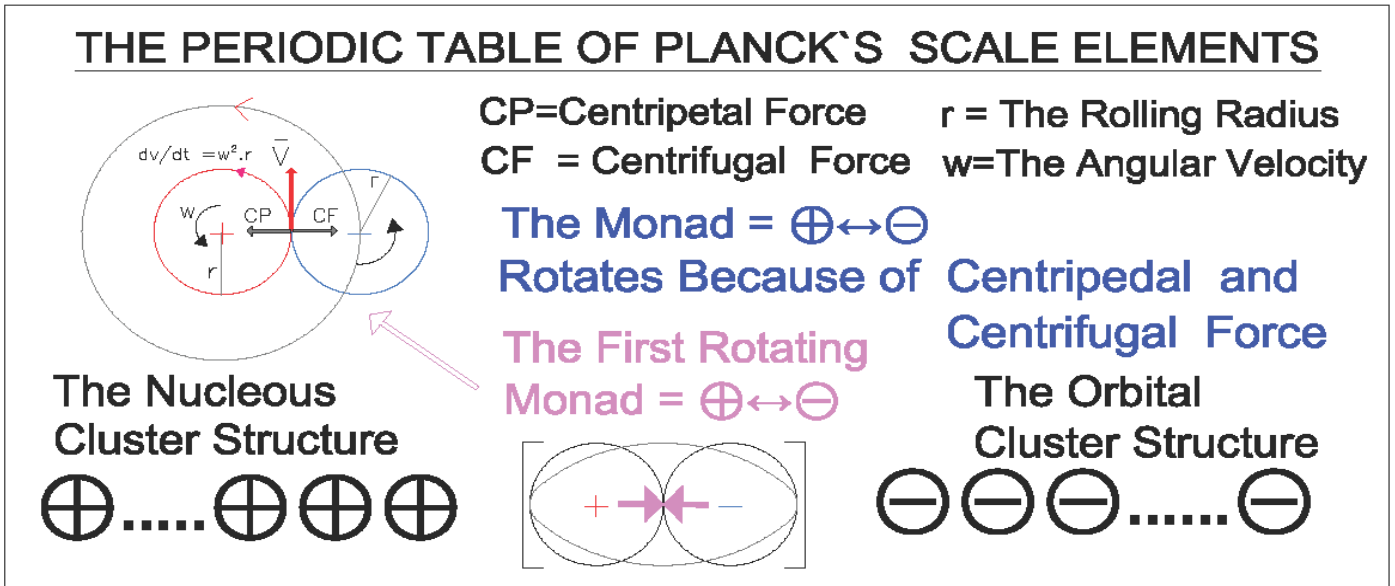


Figure 7. The Uniform Circular motion is the First Possible Position of Monads.

- 1.. $\frac{1}{1}P \dots \ominus | \oplus = \ominus 0 \oplus =$ The Set of Negative-Numbers , Point $\rightarrow O$, The Positive - Numbers , while $[\oplus \leftrightarrow \ominus] =$ Material Point of $ds = r =$ Monad = The two Inverse Perpendicular Units , creating Zero Work and this because , { of Interaction \leftrightarrow in Bonding , $\bar{v} \perp \bar{r}$, from the Centripetal Force } , and for Planck's Length scale 10^{-35} m , is **The Hydrogen Bohr's Model - Structure .**
- 2.. $\frac{P}{1}P \dots \oplus \dots \oplus \oplus \oplus [\oplus \leftrightarrow \ominus] =$ The Number of Positive Units , interacting on the Material Point , and for Planck's scale 10^{-35} m , is **The Nucleus Cluster - Structure of Positive Protons .**
- 3.. $\frac{1}{E}P \dots [\oplus \leftrightarrow \ominus] \ominus \ominus \ominus \dots \ominus =$ The Number of Negative Units , interacting on Material Point , and for Planck's scale 10^{-35} m , is **The Orbital Cluster - Structure of Negative Electrons .**
- 4.. $\frac{P}{E}P \dots \oplus \dots \oplus \oplus \oplus [\oplus \leftrightarrow \ominus] \ominus \ominus \ominus \dots \ominus =$ The Number of Positive and Negative Units interacting on The Zero Material point { $\bar{v} \perp \bar{r}$ } , is **The Proton and Electron on Material Point , and for Planck's scale 10^{-35} m , The Periodic -Table of Elements.**

The combination of \rightarrow **The Nucleus Cluster - Structure of Positive Protons , The Orbital Cluster - Structure of Negative Electrons , and The SLU = Shell Least Units** , creates the Periodic Table of Elements , and this because exist only the thrust vectors $\nabla i \equiv \oplus$ creating the Electromagnetic Waves . Following above logic , it is easy on 4.. to define particles beginning from Zero which is Point $\rightarrow O$ to $P=1$, $E=1$ which is Hydrogen , to $P=2$, $E=2$ which is Helium , to $P=3$, $E=3$ which is Lithium , to $P=4$, $E=4$ which is Beryllium , to $P=5$, $E=5$ which is Boron , and so on for all Particles of the Periodic Table as is shown in Fig.7-A .

For the Full Orbital Electrons are , $P=1$, $E=1$ for Hydrogen , $P=2$, $E=2$ for Helium , $P=10$, $E=10$ for Neon , $P=18$, $E=18$ for Argon , $P=30$, $E=30$ for Krypton , $P=54$, $E=54$ for Xenon , $P=86$, $E=86$ for Radon , $P=118$, $E=118$ for Onunoctium .

1		2		3	4	5	6
Euclidean's Geometry Quantized Spaces		E-Geometry Types of E - Spaces	The Types of Material Spaces	The Positive Number in Nucleus	Position's Number of Isotopes	Material's Geometry Space - Levels	7 = Wheel-Rim SLU = The Orbital Shell Least And
N=0	E - Point	According to Number of Points N = • •		Positive +	Isotopes =	Nucleus	Maximum Full Orbital Units
1	Material Point			0 +	2 = 2	CP ↔ CP Rotating Cave	S L U The Full Orbital Units
2	Line Segment	A B		0 +	4 = 4	HS = Hydrogen Shell	2
3	Plane Reg. 3gon	A B C N=3		1 +	6 = 7	H = Hydrogen	8
4	Volume Reg. 4gon	A B C D N=4		2 +	8 = 10	He = Helium	18
5	Space Reg. 5gon	N=5		3 +	10 = 13	Li = Lithium	32
6	Space Reg. 6gon	N=6		4 +	12 = 16	Be = Berillium	50
7	Space Reg. 7gon	N=7		5 +	14 = 19	B = Boron	72
8	Space Reg. 8gon	N=8		6 +	16 = 22	C = Carbon	98
9	Space Reg. 9gon	N=9		7 +	18 = 25	N = Nitrogen	128
10	Space Reg. 10gon	N=10		8 +	20 = 28	O = Oxygen	162
N	Space Reg. Ngon	N-N		N-2	+ 2N = 3N - 2	N _m = Element	200 P = Number of Positives = N-2 and N-Spaces = The Number of Points 2N ²

Figure. 8 . → *The Extrema Geometrical Construction of the Full - Units - Particles.*
 Each Element [E] Contains the Prior [E-1] Plus SLU = The Allowed by the Space Units .
 SLU = Shell-Least-Unit , is → *Full of Outer Permissive Sites and with Low Reactivity .*

7. The periodic Table of Elements .

Since Material geometry follows Euclidean so and those of Spaces , Anti-Spaces and Sub-spaces. In [9-11] was shown that all Spaces coexist in the same Space and Sub-space. Since also Monads are Quaternion then rules are strictly applied. By Applying this logic in Material Moulds then In-between infinite Spaces and points must be contained in the next as this happens in the series of integers i.e. The number of places of Electrons in-between 0_{N-1}^N -Orbitals must be $2.N^2-2(N-1)^2 = 2.(2N-1)$, and for N = 6 then then $N_6^6 = 22$ as in F-8

8. The Inertial Systems .

The Inertial Systems are all Parallels to [STPL] lines i.e the Cylinder of lines $D_A, D_B, D_C - P_A, P_B, P_C$

$$\Delta = OAD_A \gg OA = 1, AD_A = V, OD_A = C$$

$$\sec.\phi = 1 / \sqrt{[1 - \sin^2 \phi]} = 1 / \sqrt{[1 - (v/c)^2]}$$

$$\text{Lorentz factor } \gamma = \sec.\phi = 1 / \sqrt{[1 - \sin^2 \phi]} = 1 / \sqrt{[1 - (v/c)^2]}$$

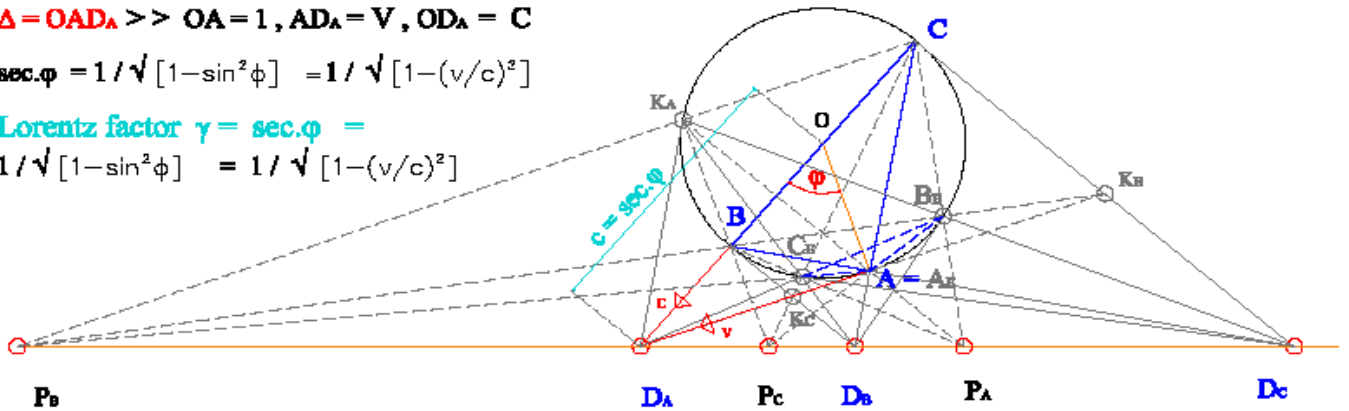


Figure.9 . The Geometrical expression of Lorentz factor γ , where $\sec.\phi = \gamma = ODA:ADA = \pm 1 / [\sqrt{1 - (v/c)^2}]$.

Kinetic Energy and mass in Inertial Systems :

It has been shown [16] that Projective and Perspective geometry are Extrema in Euclidean geometry into [STPL] line , their boundaries becoming from common Space and Anti-space . Energy, Motion , follows this Euclidean moulds , because this Proposition , Principle , belongs to geometry , and not to Energy which is only motion . In [33-36] Un-clashed Fragments through center O, consist the Medium-Field Material-Fragment $\rightarrow [\pm s^2] = [MFMF]$ 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 $[\bar{c}.\nabla_i]$, or from \rightarrow Breakages $[\pm s^2 = \pm (wr)^2]$ and $[\nabla_i = 2(wr)^2]$ where then become,

- A \rightarrow Particles , with Inherent Vibration ,
- B \rightarrow Gravity-field-energy , without Vibration and
- C \rightarrow Dark-matter-energy constituents as ,

- A $[\pm \bar{v}.s^2] \rightarrow$ Fermions and $[\bar{v}.\nabla_i] \rightarrow$ Bosons,
- B $[\pm s^2] \rightarrow [MFMF]$ Field , and the binder , Field $[\nabla_i] \rightarrow$ 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. [39,40,42].

Inner Thrust $(\bar{v} = \bar{w}.r)$ is continually acting on the Breakages $[s^2, -|\bar{v}|^2, [2\bar{w}].|s|.|r| = 2(\bar{w}.r)^2]$

producing the $[1-1 +2].\bar{w}^3.|\bar{r}|^3$ magnitudes $(w.r)^3$, which is a Positive Scalar magnitude , with Positive or zero electric charge and with , $1/2$ or 1, spin. [30] \rightarrow and the double angular velocity term which is a Vector magnitude $[2\bar{w}].|s|.|\bar{r}].\nabla$, and then when , Fig. 9,

- 1.. Positive breakage Quantity $|\bar{v}|^2 = |\bar{w}x\bar{r}|^2 = |\bar{w}.r|^2 \rightarrow$ Being at Space points A,B,C then Action magnitudes Q at coinciding points $D_A, D_B, D_C - P_A, P_B, P_C$ Produces *Leptons and Quarks*, and carry them on [STPL] line, cylinder .
- 2.. Negative breakage Quantity $-|\bar{v}|^2 = -|\bar{w}x\bar{r}|^2 = -|\bar{w}.r|^2 \rightarrow$ Being at Space points A,B,C then Action magnitudes Q at coinciding points $D_A, D_B, D_C - P_A, P_B, P_C$ Produces *Anti-Leptons and Anti-Quarks*, and carry them on [STPL] line.
- 3.. Positive breakage Quantity $[2\bar{w}].|s|.|\bar{r}].\nabla_i = 2w.(sr).\nabla_i = 2w.(r^2.w).\nabla_i = 2w.r^2w.\nabla_i \rightarrow$ Bosons, being at Space points A,B,C then Action magnitudes Q at coinciding points $D_A, D_B, D_C - P_A, P_B, P_C$ a Produces *Bosons* and carry them on [STPL] line .

1. Breakage Quantities $[\pm s^2 = \pm (wr)^2]$, being at ,O, commons` circle center and thrown OFF and into [STPL], and this because of $v = 0$, formulate the [MFMF] *homogeneous, rest Gravity Field* , which consist the base of all

motions.

2. Breakage Energy Quantities $\nabla i = 2(wr)^2$ being at ,O, commons` circle center and thrown OFF into [STPL] , and this because of $v = 0$, and acting on dipole breakages of [MFMF] Field $[\pm s^2 = \pm (wr)^2] \rightarrow [|(\bar{w}.r)^2| \leftrightarrow |-(\bar{w}.r)^2| = |\lambda|]$, {where ,when the like charges repel and the unlike charges attract } , experience a force as Lorentz force which is called *Gravity-Force* and thus formulated the Gravity force.

Breakage Quantities $[\pm \bar{c}.s^2]$ and $[\bar{c}.\nabla i]$,the clashed with the constant velocity, \bar{c} , formulate in [STPL] cylinder , *Dark matter* DM , and *Dark Energy* DE , respectively. Energy Quantities $\nabla i = 2(wr)^2$ acting , on dipole breakages $[\pm \bar{c}.s^2]$ or on DM field = $[E_m + \bar{c}.P_m] = [c.E_g + \bar{c}^2.P_g] \rightarrow [|c.(\bar{w}.r)^2| \leftrightarrow |c.(\bar{w}.r)^2| = |\lambda|] \leftarrow$, produces DM, while Dark-energy DE = $[\bar{c}.\nabla i]$ is acting on all Five Fragments with light velocity , \bar{c} , as, $[\bar{c}.\nabla i] \rightarrow \{ (\nabla i), (+s^2), (-s^2), (+cs^2), (-cs^2) \} \leftarrow$ which is the rolling Heap. [33-36]. All the Energy Quantities $\nabla i = 2(wr)^2$ in the rolling Heap, acting on dipole breakages $[\pm s^2]$ formulate Gravity-Field and Gravity-force while acting on dipole breakages $[\pm \bar{c}.s^2]$ formulate *Dark matter* and *Dark Energy* respectively, while acting on *Leptons and Quarks, Anti-Leptons and Anti-Quarks, Bosons* formulate Material worlds. i.e

Clashed Breakages located IN STPL Cylinder , Acquire Oscillation from their inherent Vibration and consist the Moving Particles while , Un-clashed Breakages located OUT the STPL Cylinder , Acquire Oscillation from their between bonding and consist the Rest Particles .

8.1 The Relative Motion

Because Properties In and On [STPL] line , are relative to the only one Equilibrium and Absolute system $\pm \Lambda = r.m\bar{v} = r.m.\bar{w}.r = mr^2.\bar{w}$, so exists that what is called Relativity. As Absolute System let it be $[S] \equiv \{D_A-O\}$ and as the Relative (Reference, Affine) System, $[R] \equiv \{D_A-P_A\}$. Fig- 8

The Relative motion $[S] \equiv \{D_A-O\}$, $[R] \equiv \{D_A-P_A\}$ of the two above Systems :

It was shown in (F-4) , that in $\{D_A-O\}, (x,y,z, t)$, System \bar{c}, \bar{v} , vectors are isochrones i.e. period $T =$

$L/V = 2\pi R/V = 2\pi/[c/r_c] = 2\pi/[v/r_v] \rightarrow c/r_c = v/r_v \rightarrow c.r_v = v.r_c$, where r_v, r_c are the radius of their intrinsic rolling circles . In F-8 , this relation is

Geometrically expressed as \rightarrow

$\sec.\phi = O. D_A : A. D_A = \gamma = \pm 1/ [\sqrt{1-(v/c)^2}] = c / [\sqrt{c^2 - v^2}]$, and it is a geometrical Cycloid property equal to Lorentz`s γ , factor .

Newton`s laws are true into Reference System

$[R] \equiv \{D_A-P_A\}$ by ,

Considering $\{D_A-O\}, (x,y,z, t)$, as the fixed frame $[S]$ of the coordinate system in the Gravity cave ($d=2r$) and point A(x,y,z) is fixed on circle (O,OA) and is rotating with a velocity $\bar{v} = \bar{w}r$ and of angular velocity $\bar{w} = 2\pi/T$ where period of rotation ,T, is constant also.

Since acceleration for a quaternion $z = (s + \bar{v}.\nabla i)$ is $a = [d^2z/dt^2] = (ds/dt.\bar{v}.\nabla i) + s.d(\bar{v}.\nabla i)/dt = 0 + s.d(wr)/dt = 0 + 0$, and this because $\bar{w} =$ constant for both , therefore , velocity $\bar{v} =$ constant , i.e. \rightarrow

Centrifugal velocity of Absolute system [S] is any constant , \bar{c} , and thus is not needed to accept apriori this constancy of velocity $\bar{c} = 0 \rightarrow \bar{v} \rightarrow \infty$ on circle (O,OA) to exist in frame ,

so , automatically is defined the conversion factor $t =$ time , between the conventional time units (second) and length units (meter = $A.D_A$) or as $\bar{c}.r_v = \bar{v}.r_c$, $\rightarrow \bar{c}(v)(T/2\pi) = \bar{v}(c)(T/2\pi) \rightarrow \bar{c}(v)/w = \bar{v}(c)/w$ which is happening with the same ,w, without any restrictions , in contradiction to General Relativity which is an axiom apriori.

This is the why conversion factor , $t =$ time, has not any essence in all universe , but it is a meter of changes only .

Because [STPL] line of the fixed frame is becoming from this system $[S]$, then this relative frame $[R]$ is common to the fixed one (common D_A) and let it be $[R](x',y',z', t')$.

From figure Fig-[8-9], $\sin\phi = (\bar{v}/\bar{c})$ meaning that the Relative system , $[R](x',y',z', t')$, (the Affine Frame) is the projection of Absolute Frame $[S] \equiv$

$\{D_A-O\}$ - (x,y,z, t) where exists as *Simultaneity for all motions* , i.e. $[R] \equiv \{D_A-A\} \equiv [(x',y',z', t')]$,

$$[S] \equiv \{D_A-O\} \equiv (x,y,z, t) = [R] \cdot \gamma \equiv (x',y',z', t')$$

Considering point D_A as the common center and [STPL] as the x-x axis of the two systems , then becomes $D_A(x, y=y', z=z', t)$ and for all linear systems $D_A(x', y=y, z=z, t')$ respectively .

This specific state of constancy , i.e., the Centrifugal velocity of Absolute system [S] to be a constant \bar{c} , and the rectilinear motion with respect to one another , defines the natural Inertial frames , and because of uniformity of Space and motion , therefore occupy the same meter of their changes , (i.e. the Time) .

Since points O,A remove to point D_A isochrones by their intrinsic property motion ,which is \rightarrow their wavelengths are a Stationary wave in cycloid \leftarrow following Lorentz's factor γ , then this following , happens also to all frames which make this motion , and so issues

$$\{D_A-O\} = \gamma \cdot \{D_A-A\} \dots\dots(2-0)$$

On this Relative system $D_A(x', y'=y, z'=z, t')$ are conveyed , the Breakages $[\pm (wr)^2, 2(wr)^2]$ of (O,OA) circle after the colliding with the rotating velocity $\bar{v} = \bar{w} \cdot r$ of the [S] system , and are the fundamental particles , Fermions and Bosons, or by escaping consisting the Rest Field and Gravity , or Dark matter and Dark Energy , as analytically is shown . [39]

Remarks :

a.. Material point $A \equiv \pm |(\bar{w} \cdot r)^2|$ of the Fixed System $\{D_A-O\}$ travels with velocity \bar{v} at point D_A , so geometrical distance $A \cdot D_A$ in the Relative System $[R] \equiv \{D_A - P_A\}$ is $A \cdot D_A = x' + \bar{v}t'$, and because of the isochrones motion in the Fixed System $[S] \equiv \{D_A-O\}$, it is holding ,

$$x = (x' + \bar{v} \cdot t') \cdot \gamma \text{ or } x = (x' + \bar{v} \cdot t') \gamma = [x' + \bar{v} \cdot t'] / [\sqrt{1-(v/c)^2}] \dots (2a)$$

Inversely, by using (2a) , where $[S] \equiv \{D_A - A\} \equiv \{D_A-O\} / \gamma$, then if Material point A of the Fixed System $\{D_A - O\}$ travels with velocity \bar{v} at point D_A , the geometrical distance $A \cdot D_A$ in the Fixed System $[S] \equiv \{D_A-O\}$ is $\rightarrow A \cdot D_A = x - \bar{v} \cdot t$ and in the Relative System $[R] \equiv \{D_A - P_A\}$ it is $\rightarrow x' = (x - vt) \cdot \gamma = [x - vt] : [\sqrt{1-(v/c)^2}] \dots(2b)$

b..The Conversion factor $t = \text{time}$, between the conventional time units (second) and length units (meter) and because of the isochrones motion of vectors $\bar{c} = O, D_A$ and $\bar{v} = A, D_A$, then vectors $O, \bar{D}^A = \bar{c} \cdot t$ and $A, \bar{D}^A = v \cdot t'$ reach point D_A simultaneously. This Geometrically means that convention factor t , on \bar{c} , is projected on \bar{v} , and so ,

$$t - t \cdot \sin\phi = t - t(v/c) = (1-v/c) \cdot t = (c - v) \cdot t / c .$$

From above Question , and because $\bar{w} = \text{constant}$ where then Centrifugal velocity $\bar{v} = \bar{c}$ is also constant and such that velocity \bar{c} , is kept the same in the two reference frames , valid \rightarrow

$$c = x/t = x' / t' , \text{ and time } t = x / c , t' = x' / c$$

$$\text{or } t = (x' + vt') / c \cdot (\sqrt{1-(v/c)^2}) = (x'/c) + (v/c) \cdot t' : N = [(t' + (v/c^2) \cdot x')] : N = [t' + (v/c^2)x'] :$$

$$[\sqrt{1-(v/c)^2}] \dots\dots(2c)$$

$$\text{From relation } t' = x' / c = (x-vt) \cdot \gamma / c = [t - (v/c^2)x] : N = [t - (v/c^2) \cdot x] : [\sqrt{1-(v/c)^2}] \dots\dots(2d)$$

i.e. equations ,

$$x = (x'+v \cdot t') \cdot \gamma = [x' + v \cdot t'] : [\sqrt{1-(v/c)^2}] \dots(2a)$$

$$t = (x' + vt') \cdot \gamma / c = [t' + (v/c^2) \cdot x'] : [\sqrt{1-(v/c)^2}] \dots(2c)$$

$$y = y' , z = z'$$

$$x' = (x - vt) \cdot \gamma = [x - vt] : [\sqrt{1-(v/c)^2}] \dots(2b)$$

$$t' = (x - vt) \cdot \gamma / c = [t - (v/c^2) \cdot x] : [\sqrt{1-(v/c)^2}] \dots(2d)$$

$$y' = y , z' = z$$

which are the known equations of Relativity .

c.. For constant velocity $c = \infty$ equations become

$$x = x' + v \cdot t' , y = y' , z = z' , t = t' ,$$

and inversely

$$x' = x - v \cdot t , y' = y , z' = z , t' = t .$$

issuing in [PNS] Spaces .

In this way velocity , \bar{v} , may have any constant value and also greater than ,c, which agree with Galilean mechanics .

Breakages $[(wr)^2, -|wr|^2, 2(\bar{w} \cdot r)^2]$, being masses off the system [S] , under the Action of the constant velocity \bar{c} , which is not changed , are multiplied by Lorentz factor γ , where then the new masses

$$\text{are } \rightarrow m' = m \cdot \gamma = 2(wr)^2 \gamma = 2(wr)^2 / [\sqrt{1-(v/c)^2}] = 2m / [\sqrt{1-(v/c)^2}]$$

The embedded energy to Breakages , masses , is

$$\text{as } \rightarrow E = mv^2/2 = \{2m / [\sqrt{1-(v/c)^2}]\} \cdot c^2/2 = mc^2 / [\sqrt{1-(v/c)^2}]$$

which is the known formula of Lorentz-Einstein in General Relativity .

c1... For $t = 0$ then $\sin\phi = vt/c = 0$ independently of velocities , v,c , where $\sec.\phi = \pm 1 / [\sqrt{1 - 0^2}] = \pm 1$ and since $\sin\phi = vt/c = 0$ and when $c = \infty$ also , then Absolute and Relative Systems are ,

$$\begin{aligned} [S] &\rightarrow x = x' + v.t', y = y', z = z', t = t', \\ [R] &\rightarrow x' = x - v.t, y' = y, z' = z, t' = t \\ m' &= m.\gamma = 2m / [\sqrt{1-(v/c)^2}] \text{ and} \\ E &= mc^2 / [\sqrt{1-(v/c)^2}] \end{aligned}$$

i.e. \rightarrow [PNS] Space is such that ,velocities $\rightarrow \bar{v}, \bar{c}$, exist independently of this Zero conversion factor ,time = t , and of the constant velocity , c , being $c = \infty$, and mass $M = 2m$, that of Space and the equilibrium Anti -Space , and Energy is infinite as it is $E = mc^2 = \infty$ which equilibrium from the opposite energy of Anti-Space.

c2... For $t = c/v$ or , $v = c$, then $\sin\phi = vc/vc = 1$ and $\sec.\phi = \pm 1 / [\sqrt{1 - 1^2}] = \pm \infty$, and the Systems

$$\begin{aligned} [S] &\rightarrow x = x' + v.t', y = y', z = z', t = t', \\ [R] &\rightarrow x' = x - v.t, y' = y, z' = z, t' = t \\ m' &= m\gamma = \infty \text{ and } E = \infty, \text{ independently} \end{aligned}$$

of velocities v,c but from their relation only , i.e. it is a NEW Space where velocities , v,c , dependent on their relation only and conversion factor , t , also . In all inertial Systems the conversion factors, mass m , time t , are altered by the , γ , factor.

c3... For $t = 1$ then $\sin\phi = vt/c = v/c$ and $\sec.\phi = \pm 1 / [\sqrt{1 - (v/c)^2}] = \pm 1$ and the Systems become \rightarrow

$$\begin{aligned} [S] &\rightarrow x = [x' + v.t'] / [\sqrt{1-(v/c)^2}], y = y', z = z', t = t', \\ [R] &\rightarrow x' = [x - vt] / [\sqrt{1-(v/c)^2}], y' = y, z' = z, t' = t \\ m' &= m.\gamma = 2m / [\sqrt{1-(v/c)^2}] \text{ and} \\ E &= mc^2 / [\sqrt{1-(v/c)^2}] \end{aligned}$$

i.e. it is a Space where velocities , \bar{v}, \bar{c} , exist and dependent on the conversion factor , t , and the constant velocity \bar{c} , mass $m' = 2m / [\sqrt{1-(v/c)^2}]$ and energy is , $E = mc^2 / [\sqrt{1-(v/c)^2}]$.

c4... For $t = \text{any } t$, then $\sin\phi = vt / c$ and $\sec.\phi = \pm 1 / [\sqrt{1 - (vt/c)^2}]$ and the Systems are \rightarrow

$$\begin{aligned} [S] &\rightarrow x = [x' + v.t'] / [\sqrt{1-(vt/c)^2}], y = y', z = z', \\ &\quad t = t', \\ [R] &\rightarrow x' = [x - vt] / [\sqrt{1-(vt/c)^2}], y' = y, z' = z, \\ &\quad t' = t \\ m' &= m.\gamma = 2m / [\sqrt{1-(vt/c)^2}] \text{ and} \\ E &= mc^2 / [\sqrt{1-(v/c)^2}] \end{aligned}$$

i.e. it is a Space where velocities \bar{v}, \bar{c} , exist and dependent on the conversion factor , t , and the constant velocity , \bar{c} , and mass $m' = 2m / [\sqrt{1-(v/c)^2}]$ and energy $E = mc^2 / [\sqrt{1-(v/c)^2}]$.

Momentum $\bar{p} = m\bar{v} = \bar{h}$ and Energy $E = mc^2 = h.f$ possess the double helix structures (the cycloidal screw motion of monads) .

General Relativity as referred , is dependent on one axiom , that of Galilean Relativity and also on dispute non-Euclidean geometries (*parallel to parallel is not parallel ??*) without any physical meaning and reality. Euclidean geometry moulds clearly show that Big-Bang does not exist and the new perception of quantization applied on points defines the whole Relativity Concept to be Part of the Energy-Euclidean-Geometry on where points equilibrium under Virtual-work Principle , and on the \rightarrow Primary Point \leftrightarrow Primary Anti-point \leftarrow as the first **Primary-Dipole is** . i.e.

From above outlook is concluded that Relativistic Time and Energy from Dark-matter - Force are completely refined , and thus Physics are completely supported (depended) by the purely E-geometry only .This because no restrictions and no commitments or other assumption for Relative velocities and on light velocity.

Both velocities v, c , become from geometry only , without any assumptions or any other bindings.

The meter of changes (*that what is called time*) valid in the reference System only because exists in-parallel to the Absolute torsional system [S]. Velocity magnitudes joint together with energy , *the motion and reaction to motion* , becoming more massive , and not any other substance .

8.2 The Absolute Motion

The **Fix Frame** $[S] \equiv \{D_A-O\}, (x,y,z, t)$ and **Relative Frame** $\rightarrow [R] \equiv \{D_A-P_A\}, (x',y',z', t')$, Reference System.

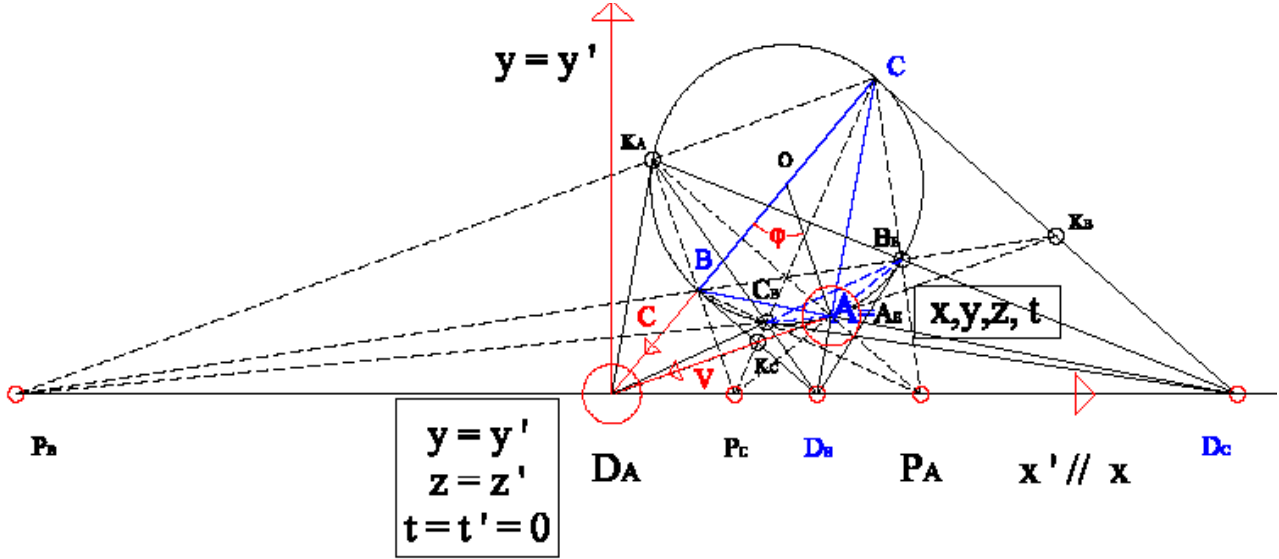


Figure.10. Reference System $\{D_A-P_A\} \equiv [R] (x',y',z', t')$ moves with velocity, \bar{v} , parallel to , $x-x'$, axis with respect to the fixed and Absolute System $\{D_A-O\} \equiv [S](x,y,z, t)$.

Gravity force is exerted on breakages $[\pm (\bar{w}.r)^2 = \text{Material points} = \text{Dipole of the two } \pm \text{ quantized energy-spaces } (\bar{w}.r)^2]$ as velocity vector, \bar{c} , which is then decomposed into two reverse velocities following the cycloidal motion, and consisting the intrinsic Stationary Electro-magnetic Wave of gravity, and which is binding points of this Homogenous- Isotropic, Rest and mass-less nature Field. The total dispersion Rotating energy of dipoles is $[\pm \bar{A}]^2 = [p.c]^2 + [m_o.c^2]^2$, which is the known relativistic energy- momentum equation of Lorentz transformation equations.

Conclusions .

Any moving monad $[z = s + i.\bar{v}] =$ as the Work, is transformed (*quantized*) into \rightarrow

1.. In Elastic material Configuration, as Strain Energy and is absorbed as Support Reactions and displacement field $[\nabla \varepsilon (\bar{u}, \bar{v}, \bar{w})]$ upon the deformed placement, (where these alterations of shape by pressure or stress is the equilibrium state of the Configuration [26], and then equations of Elasticity are, $G.\nabla^2.\varepsilon + [m.G/(m-2)].\nabla[\nabla.\varepsilon] = F$, or in isotropic material $\rightarrow [\mu \nabla^2 \varepsilon + (\lambda + \mu).\nabla(\nabla.\varepsilon)] + F = 0$)

The intrinsic Stationary Electro-magnetic Wave of gravity, is binding as an dipole the two edge

material points of this Homogenous- Isotropic, Rest and mass-less, and also of Elastic nature material Configuration Field. [22-23].

2.. In Solid material Configuration, is as Kinetic (Energy of motion \bar{v}) and Potential (Stored Energy) energy by displacement (the magnitude of a vector from initial to subsequent position) and rotation, on the principal axis (through center of mass of the Solid) as ellipsoid, which is mapped out, by the nib of vector $(\delta \bar{r}.c) = [\bar{v}.c + \bar{w}.\bar{r}n] \delta t$, as the Inertia ellipsoid [Poinot's ellipsoid construction] in [S] frame which instantaneously rotates around vector axis \bar{w}, ϕ with the constant polar distance $\bar{w}.Fe / |Fe|$ and the constant angles θ_s, θ_b , traced on, Reference [R] cone and on [S] cone, which are rolling around the common axis of \bar{w} vector without slipping, and if, Fe , is the Diagonal of the Energy Cuboids with dimensions a, b, c which follow Pythagoras conservation law, then the three magnitudes (J, E, B) of Energy-state follow Cuboids (Cycloid), Plane, or Linear Diagonal direction, and If Potential Energy is zero, then vector \bar{w} is on the surface of the Inertia Ellipsoid. [23-27-28].

3.. In Quaternion Extensive Configuration, as New Quaternion's (with Scalar and Vector magnitudes). Points in Primary Space [PNS] carry A -priori the work $W = [A-B [P.ds] = 0$, where magnitudes $P, d\bar{s}$ can be varied leaving work unaltered. The Diffusion (decomposition) of Energy is as the mechanism of Energy Transport as velocity (\bar{v}), through its quantized wave-length $|\lambda|$, which is a property of any standing wave , into the Medium $|\lambda| = (1) - (2)$, and involves the Absorption and Reemission of the wave quantized energy $J = (J1) = (J2)$ as Electric and Magnetic field of Electric Displacement of the two neighbor edges (1) and (2) of the medium , following the isochrones Cycloidal motion . [37-39]

4.. In the Space conserved Extensive property Continuum (the Spatial Configuration caves) , as Kinetic (the 3-current motion) and Potential (the perpendicular Stored curl fields) Energy by Cycloid motion (the magnitude of wavelength vector $|\lambda|$) , from the initial (1) to subsequent position (2) , as wavelength $|\lambda| = (1)-(2)$. During shifting Energy as velocity vector \bar{v} , (and this because extreme case happens for zero application area) is decomposed into two velocity vectors $\bar{v}1, \bar{v}2$, being vectors , undergo vibrations which causes two waves that represent the two Electric and Magnetic perpendicular , in Planes , components until reaching point (2) which is the Reemission of the wave and it is the new head of velocity , \bar{v} , where then mechanism is recycled .[39-40]

5.. The dynamics of any System = Work = Total Energy, is transferred as generalized force Q_n as, $Q_n = \partial W / \partial (\delta \bar{q}_n)$, $(\delta \bar{q}_n) = \bar{v}_n \cdot \delta t = [\bar{v}c + \bar{w} \cdot \bar{r}_n] \delta t =$ (Translational + Rotational velocity). δt as velocity and $Q_n = [\bar{v} c. (\partial T / \delta t) + \bar{w} \cdot \bar{r}_n]. (\partial T / \delta t) \rightarrow$ Translational kinetic energy + Rotational kinetic energy as the Total Energy of the system . [40]

6.. The ultimate Constituents of Monads (s, $\bar{v} \cdot \nabla i$) is the real part ,|s|, and the Magnitude of Imaginary part as Vector $\bar{v} = \nabla i$, decomposed into velocity vectors $\bar{v}1, \bar{v}2$. [STPL] cylinder is a Geometrical Mechanism (Mould) which transfers

the two Quantities of the breakable monads from one Level (Confinement) to another Level using Quantities or the Breakages of collision between monads .This Mechanism is not the Origin of monads , but a Mould (the Regulative Universe Energy Valve) .

It was shown that into Gravity cave , $L_g = 2.r = e^{-i.(-9.\pi/2)b} = 3,969.10^{-62} \text{ m}$, is inversely balancing the Common circle ,of Space , Anti-Space .

For the Rotational Spaces , with velocities $[\bar{v}g = \bar{w}r = \bar{c}]$ that of light , \bar{c} , tending to zero in cave $L_c > L_g$ then exist velocities $[\bar{v}c > \bar{c}]$ tending to infinity . The hidden pattern of universe is , the STPL line , which is off the Spaces and connect them (it maintains , conserve and support all universe) , so may say, it is *The Naval Cord (string) of Galaxies* .[33-34]. i.e.

In Common Circle (the Sub-Space) of the rotating Space Anti-Space $[\pm \Lambda]$, with maximum angular Velocity Vector , $\bar{v} = \bar{w} \cdot r$ on circumference , [in the absence of applied Torques and because of the Birefringence property of stress continuum with different indices ,n, of refraction , which this creates the Retardation , δ , and determining Color Bands or Fringes] is Produced a color Spectrum which is , the *< Color Forces >* \rightarrow Gluon Red ,Gluon Green , Gluon Blue.[36,41].

When tangential velocity $\bar{v} = \bar{w} \cdot r$ on the circumference of a cave , r, is in another of radius $R > r$, then the new tangential velocity $\bar{v} = \bar{w} \cdot R$ is greater than \bar{v} and when \bar{v} is the speed of light , then the new \bar{v} , are velocities greater than that of light , and this is a way of succeeding these velocities .

7.. In Black holes Energy scale $[|\lambda| \cdot \Lambda = k 1]$ there are infinite high frequency small amplitude vacuum fluctuations at Planck energy density of 10^{113} J/m^3 that exert action (pressure) on the moving Spaces dipole and their Stability is always achieved by Anti-space in their rotational equilibrium. [43]

8.. Dipole vectors are quaternion's (versors) of waving nature ,i.e., of one wavelength $|\lambda|$ in

circumference in energy levels , that conserve energy by transferring the Total kinetic energy T into angular momentum $L = \bar{r}m\bar{v} = \bar{r}.\bar{p} = \bar{r}\Lambda$, as the Stationary Electromagnetic wave [$\mathbf{E} \perp \mathbf{H}$] in constant mass $m = \pm [(\bar{w}.r)^2]$ = the reaction to this motion $v^2=(wr)^2$. Different versors with different Energy (scalar) possess the same angular momentum . A Composition of Scalar Fields (s) and Vector Fields (\bar{v}) of a frame to a new unit , maps the alterations of Unit by rotation only and transforms scalar magnitudes (particle properties) to vectors (wave properties) and vice-versa , and so , all particle-like properties are both of waves and particles. In Planck Scale, when the electron is being accelerated by gravity which exists in all energy levels as above , gravity is still exerting its force , so Electrodynamics can be derived from Newton's second law. [31-36] .

8.3. *The How Work is Quantized in Spaces and The How it is into Equilibrium* [40-41]

In Mechanics , a force , \mathbf{P} , is said to do work , \mathbf{W} , if when acting on a body (*something which has mass and has a resistance to any change of motion*) there is a displacement , \mathbf{ds} , of the point of application in the **Direction** of the force , i.e. $W = \mathbf{P} \cdot \mathbf{ds}$. For any direction with an angle , ϕ , between \mathbf{P} , \mathbf{ds} then $W = P.ds.\cos\phi$ and for $\phi = 0$, 90° then it is $W = P.ds$, $W = 0$.

In the three dimensional Euclidean Space \mathbf{P}, \mathbf{ds} are considered vectors , and their *Dot-product* $W = \mathbf{P} \cdot \mathbf{ds}$, define the geometric significance which is the *directed Area* , $\mathbf{P} \cdot \mathbf{ds}$, while *Cross-product* $W = \mathbf{P} \times \mathbf{ds}$ defines the geometric significance , which is the *directed perpendicular vector*, to both vectors . Above definition defines work as quaternion , i.e. *Dot-product* $W = \mathbf{P} \cdot \mathbf{ds}$ to be the real part and *Cross-product* $W = \mathbf{P} \times \mathbf{ds}$ to be the imaginary part as work , $W = [\mathbf{P} \cdot \mathbf{ds}] + i.[\mathbf{P} \times \mathbf{ds}]$.

Work is conserved as, as the Universal Principle of Virtual work on Geometry Primary dipole , \mathbf{ds} , law $W = \oint \mathbf{F} \cdot \mathbf{ds}$, and as Energy is then Quantized , *converted* , in Space monads , caves , cells, $\bar{x} = d\bar{s} = \lambda m$, as pressure σ, τ , the pressure is converted in caves as a Standing Electromagnetic Wave \mathbf{E}, \mathbf{P} which consists the Standing monad (Displacement current) and the moving Energy monad (by altering the inner wavelength or Period of monad)

in Gravity's field medium [MFMF] and is dissipated as Quaternion monads (Particles or Waves, matter or vectors) as Forces (displacements , masses, pressure etc.) using modulus , coefficients , reactions to the motion and all other geometrical indices . Part of W, is kept as Dark-matter-energy Heap which is Rolling with light-velocity on Gravity-field , thus causing the universe expansion.

Stability In-Out wavelength is obtained by the Isochronous Anti-Standing Electromagnetic Wave \mathbf{E}, \mathbf{P} which happens on Anti-cycloid , Evolute, and whirling , Curl , by the equality of the two transverse Complex Envelope displacements , Amplitudes , that consist the Standing monad (Coriolis force curl helix Displacement current in monads) . [39-40-41]

Remark :

Work as Energy is Quantized , converted ,in Space monads , caves , cells , $\bar{x} = d\bar{s} = \lambda m$, as pressure , σ, τ , the pressure is converted in caves as a Standing Electromagnetic Wave \mathbf{E}, \mathbf{P} which consists the Standing monad (Displacement current) and the moving Energy monad (by altering the inner wavelength or Period of monad) in Gravity's field medium [MFMF] and is dissipated as Quaternion monads (Particles or Waves , matter or vectors) as Forces (displacements , masses , pressure etc.) using modulus , coefficients , reactions to the motion and all other geometrical indices.

Stability In-Out wavelength is obtained by the Isochronous Anti-Standing Electromagnetic Wave \mathbf{E}, \mathbf{P} which happens on Anti-cycloid , Evolute , and whirling , Curl , by the equality of the two transverse Complex Envelope displacements, Amplitudes , that consist the Standing monad (Coriolis force curl helix Displacement current in monads) .

The Work Quantization process is as below ,

Energy and Space or both as follows , [F.2] ,

1.. Work $W = \mathbf{F} \cdot \mathbf{ds} - [ds=0, t=0, F \neq 0] \rightarrow$

Stationary Force on zero Displacement

\rightarrow and is transformed as,

2.. Work $W = (\sigma \cdot d\mathbf{F}) \cdot \mathbf{ds} - [ds=0, t=0, d\mathbf{F} \neq 0] \rightarrow$

Stresses on any Area , and if area is zero then is transformed as,

3.. Work $W = (c[\epsilon\mu]) \cdot \mathbf{ds} - [d\mathbf{F}=0, ds=0, t=0] \rightarrow$

Permittivity-Permeability of Electromagnetic field and is transformed as,

4.. Work $W = (E \perp H).ds - [dF=0, ds=0, t=0] \rightarrow$

Inner Electromagnetic Wave of monad and is transformed as,

5.. Work $W = (\lambda.m).ds - [dF=0, ds \neq 0, t=0] \rightarrow$

Moving Field Vector and for $dF=0, ds \neq 0$ is transformed as,

6.. Work $W = (p).ds - [dF=0, ds \neq 0, t=0] \rightarrow$

Angular Momentum of the moving field, and is transformed as, Space, and their combination as.

7.. Work $W = (h/v).ds - [dF=0, ds \neq 0, t=0] \rightarrow$

Cycloidal Spin, in wavelength, λ ,

Work as Energy = $h.f$ which is the known Plank's formula for frequency and energy.

$W = (\sigma.dF).ds = \sigma.(v.v) = \sigma.(v^2) = (\lambda m).(v^2)$

$[Mass \cdot v^2] = m \cdot c^2 - [dF=0, ds \neq 0, t=t] \rightarrow$

Work as Kinematic Vector which is the known

Einstein's formula for mass and energy and is transformed as,

8.. Work $W = (\lambda.m).(v.t) - [dF=0, ds \neq 0, t=t] \rightarrow$

Kinematic Vector with mass and velocity, and is transformed as,

9.. Work $W = (M).v.dt - [dF=0, ds \neq 0, t=t] \rightarrow$

General mass-Velocity moving vectors, and is transformed as,

10.. Work $W = (p).dt - [dF=0, ds \neq 0, t=t] \rightarrow$

Linear Momentum as Extrema for Angular. The Work Quantization process \rightarrow i.e. Work Energy and Space or both (Not Evolution) is as follows, [12, 40-41]. In Figure.11,

The three processes of quantization become from the two Substances of Energy-Space universe, Energy and Space, and their combination is as

- a.. The Work Quantization process as Energy is $W = P.ds = (\sigma.dF).ds = (\sigma.v.dF).dt = (p).dt$
- b.. The Work Quantization process as Space is $W = (c[\epsilon\mu]).ds = (E \perp H).ds = [dt.(E \perp H)].ds/dt = m.v$
- c.. The Work Quantization process as Energy and Space is $W = (\lambda.m).ds = (h/v).ds = (\lambda.m).(v.t) = (M).v.dt$

The Cycloid, Anti-cycloid Evolute :

Cycloidal motion equilibrium by the Anti-cycloidal (Evolute) as in F-11.

Equilibrium of the Resultant forces must exist also in our Solar system where, earth motion follows elliptic traces.

RESULTANCE'S EQUILIBRIUM IN EVOLUTE - TRAJECTORIES

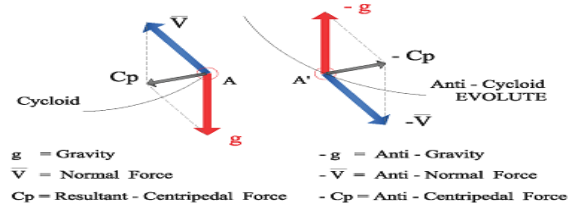
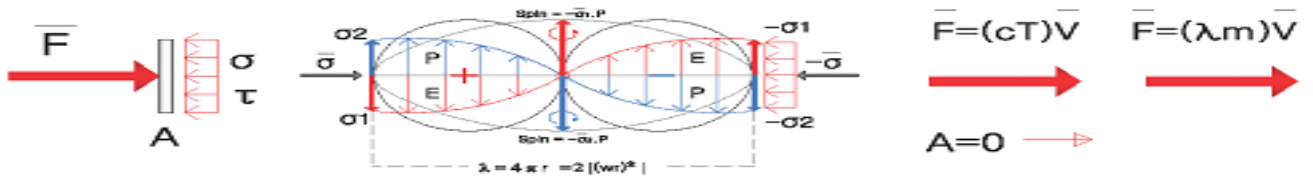


Figure. 11. Equilibrium of the Resultant Forces, in the Cycloid and as motion Wavelength, and of any Removal Monad. The Intrinsic Space (Wavelength) = $[\lambda]$ and it is the Energy quanta.

The Inner Monad's {Electromagnetic-Vortex Field} ENERGY-QUANTA



The motion of {Energy - Space} Monads

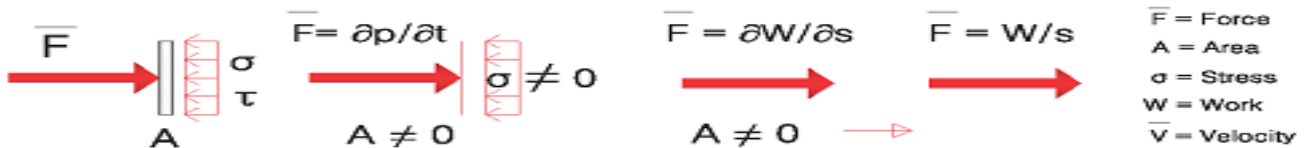


Figure. 12. The Quantization of Work as discrete Force (Energy) = Electromagnetic field [E,P]

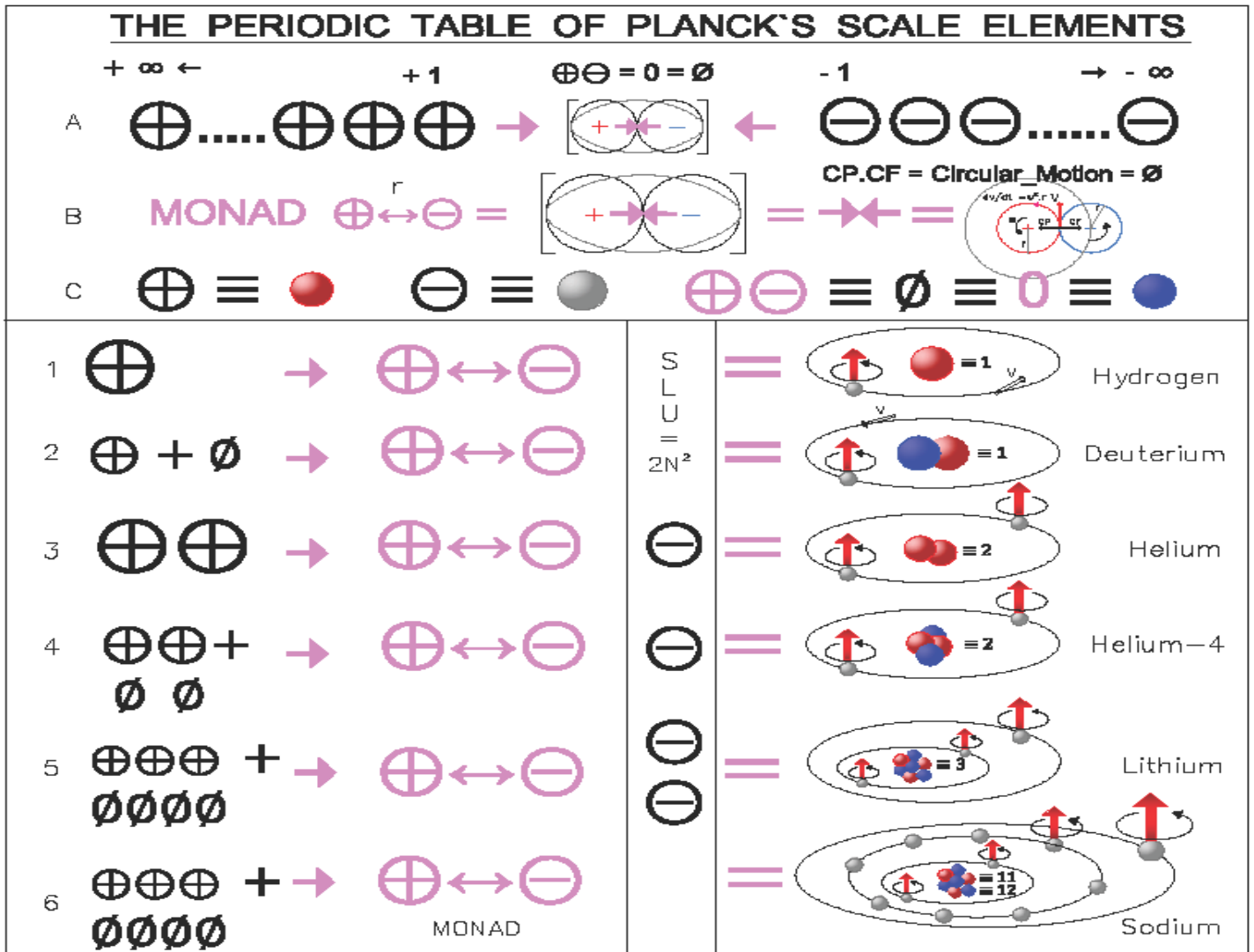


Figure 7-A . The Periodic Table of Particles Dependent on Material-Geometry Properties .

- A.. The Series of Positive Breakages \oplus is the Nucleus Cluster Structure , Zero = Neutral = $\ominus \oplus$ is the Rest -Monad Dipole , The series of Negative breakages \ominus is the Orbital Cluster Structure.
- B.. The Monad of Positive \oplus and Negative \ominus breakages with $r =$ Distance , which is thus resulting to the Circular - Motion , because of the CentriPedal .CP. and of CentriFugal .CF. equal Forces .
- C.. The Positive \oplus and Negative \ominus Breakages , and the Zero = Neutral = $\emptyset = \ominus \oplus$ with $r=0$.
- 1.. One Positive \oplus Breakages , Attached to Nucleus of Monad [$\oplus \leftrightarrow \ominus$] is Produced ${}^1_1\text{H} =$ Hydrogen.
 - 2.. One Positive \oplus Breakages and one Neutral , Attached to Nucleus of Monad [$\oplus \leftrightarrow \ominus$] is Produced ${}^2_1\text{H} =$ Deuterium which is Isotopes of Hydrogen .
 - 3.. Two Positive \oplus Breakages , Attached to Nucleus of Monad [$\oplus \leftrightarrow \ominus$] is Produced ${}^2_2\text{He} =$ Helium .
 - 4.. Two Positive \oplus Breakages and Two Neutral, Attached to Nucleus of Monad [$\oplus \leftrightarrow \ominus$] is Produced ${}^4_2\text{He} =$ Helium - 4 which is Isotopes of Helium .
 - 5.. Three Positive \oplus Breakages and Four Neutral, Attached to Nucleus of Monad [$\oplus \leftrightarrow \ominus$] and using SLU= Shell-Least-Units Principle to Orbital Cluster , is Produced ${}^7_3\text{Li} =$ Lithium .
 - 6.. Eleven Positive \oplus Breakages and Twelve Neutral , Attached to Nucleus of Monad [$\oplus \leftrightarrow \ominus$] and by using SLU= Shell-Least-Units Principle to Orbital Cluster , is Produced ${}^{23}_{11}\text{Na} =$ Sodium, and so on

Above equilibrium exists also in monads where Electromagnetic Vortex field is vertically opposed The Energy monads which are The Quanta . From work equation $W = [\lambda, \pm \Lambda \nabla i]$ where the wavelength $\lambda =$ The \rightarrow

Wavelength of quaternion = monad and $\pm \Lambda \nabla i = \Lambda = p = M.\bar{c} = [\lambda|\Lambda|]$. $\bar{c} = (\lambda m).\bar{c} = (\lambda m).\bar{\omega} .r = \bar{\omega} .[\lambda(m.r)] = \bar{\omega} .[\lambda(\bar{v})] = \bar{\omega} .[(cT).\bar{v}] =$ the **Energy** , and , $\bar{\omega}$, is the angular velocity or **the spin** , \bar{c} is the **constant** velocity equal to that of light , \bar{v} is the **velocity of monad** , T is the period in wavelength's monad.

Quantization of Energy confined in a monad say (\bar{v}), (it is the inner structure of monad) is the Stationary wave of the Real part $|\lambda|$ of \bar{v} , due to the Electric Displacement field ($|\bar{v}| = \epsilon . E + P$) , alternately in terms of The Electric field $E = (\partial P/\partial t)$ and The Magnetic field $P = (\partial E/\partial t)$, ϵ is the Permittivity as a measure of how much the wavelength opposes E-field .

Object in mechanics, is the **Quantized Material point** (1) at Euclidean point (1) , which is now Breakage $\pm [(\bar{\omega} . r)^2]$ magnitude , in the Rest , Homogenously ,Quantized mass-less Field $\{\pm [(\bar{\omega} .r)^2]\}$ and consists the required coordinate System and the base for all motions and forces. This rest Space system (the Base) is [MFMF] Field with the less space distance $ds = |\bar{\omega} . \bar{r}|^2$ extended beyond Planck's length , *the Space Quanta*.

Object in mechanics may be also the **Quantized Energy** as wavelength $\lambda=(1)-(2)$ in [Medium-Field Material Fragment $\rightarrow[\pm s^2] = |\bar{\omega} . \bar{r}|^2 =$ [MFMF] Field \leftarrow] which is a standing wave in cavity (1)-(2) with scalar breakage $\{+[(\bar{\omega} .r)^2] \leftrightarrow -[(\bar{\omega} .r)^2]\}$ as medium (1)-(2) field , and (J1= \bar{v}) the Energy as velocity at point (1) and carried to point (2) by following the isochrones cycloid motion from point (1) to (2) . Velocity , \bar{v} , during shifting , and because $A=0$, is analyzed into two transverse velocity vectors \bar{v}_1, \bar{v}_2 , which undergo vibrations and cause two waves which are the two **Quantized Electric and Magnetic** isochrones components because follow cycloid trajectories as *The Energy Quanta , in Space Quanta* .

Question ,, When maximum velocity occurs in Common circle ?? . From Fig-9 maximum velocity occurs when the two velocities \bar{c} , \bar{v} are perpendicular between them , where then dispersion follows Pythagoras theorem and the consultant Quantized Space ,r, becomes

$$r = |(\bar{c}.T)| = \sqrt{v^2 + c^2} .$$

$$\begin{aligned} \text{The total Rotating energy is } &\rightarrow \pm \bar{\Lambda} = \bar{p}.r = \\ (M.c).r &= (M.c). \sqrt{v^2 + c^2} \text{ and } [\pm \bar{\Lambda}]^2 = p^2.r^2 = \\ M^2.c^2.(v^2+c^2) &= (M^2.v^2).c^2 + M^2.c^4 = (p^2.c^2) + \\ M^2.c^4 &= [p.c]^2 + [m_0.c^2]^2 , \end{aligned}$$

Remark :

A Sound example , of Energy Quantization , is the fact of an progressive acoustic wave , **Energy as Signal in Air as series of vibrations in Air Pressure spreading out from whatever source made the sound** .When these pressure variations strike the Ear , then pass through the external auditory canal and strike the **Tympanic Membrane** setting it into vibration .The Signal is thus converted to vibrations in *Mechanical Solid matter* and transmitted to the **Ossicles** setting them into vibration . The Signal is thus converted into *Mechanical-liquid matter* , which in turn transmitted to the **Cochlea - Nervous** which is undergoing a second change of nature and converted into low pressure variations within liquid . The Signal is converted into *Mechanical - liquid matter* , which is transmitted to the **Hair-cells-liquids** undergoing Electrochemical liquid waves, and then transmitted to the **Nervous-Solids** signals to Electric-nervous signals. i.e.

The four states of **Energy Quantization is The , Energy Signal as air Pressure in the acoustic wave variations** ,

- 1..**Mechanical Vibration in solid matter** , by striking on the *Tympanic Membrane*,
- 2..**Mechanical Vibration in liquid matter** which converts vibrations of *Tympanic Membrane* into pressure variations by transmission , on the *Ossicles*
- 3..**Low Pressure variations within liquid** , *Vibration in liquid matter* , working as a

conventional lever because a low pressure across a wide area is converted into higher pressure on a small area, which transmits pressure variations of *Ossicles* on the *Cochlea Nervous*. **4.. Electro-Chemical** variations which are converted from *Cochlea Nervous* as low pressure variations and are transformed through *Hair cells* by converting Electrochemical liquid-waves to Nervous signals to Electric, meaning that Ear includes an → Built-in-analogue-to-digital conversion.

8.4. The Geometrical Caves and The Energy-magnitudes [29-41]

All particles are characterized by their quantized cave inner the Space [$V = 4\lambda^2/2\pi = 4(w^2.r^2)/2\pi$] composed of an inner Electromagnetic wave constituent [E⊥H], and $h = 2\pi/\lambda$, is the reaction to these velocity motions [it is the mass $m = (pr).w/c^2 = h.w/2\pi c^2$], the external energy momentum is $p = h/2\pi\lambda$ and Spin (the helically rotating electric field vector corresponding to a circularly polarized Electromagnetic wave and propagating with attenuation to the right). Conservation laws of energy linear and angular momentum are satisfied by the inner Anti-cycloidal motion, (lying on the evolute curve).

This interpretation of caves when applied to Young's interference and Polarizer experiments is shown the unified understanding between the classical Electromagnetic field and the quantum particle of light.

This tiny energy volume for wave's case, is the

Inner Cycloidal volume $V = 4/3.\pi.ab^2 = 4\lambda^3/3\pi$, [because $a = \lambda$, $b = \lambda/\pi$] of the Electromagnetic stationary field [$\vec{E} \times \vec{H}$] where Intensity $Sc = [\epsilon.E^2/2 + \mu.H^2/2]$ and ϵ, μ the Permittivity, (it is the Dielectric constant multiplier), Permeability (the Dielectric constant multiplier).

Electromagnetic waves are able to transmit energy through a vacuum (empty space) by storing their energy in a, *Dark*, Standing Transverse Electromagnetic dipole wave as above, and thus considered completely particle like, and in transverse interference pattern to be considered as completely wave, so when Energy Intensity is,

a.. Energy $I_d = \frac{\rho\pi^2c^3}{2\lambda^2} [\epsilon E^2 + \mu H^2]$ in volume $V = \left[\frac{4(w^2r^2)^3}{3\pi} \right] \rightarrow$ **Energy behaves as Particle like**,

b.. Energy $I_d = \left(\frac{\rho.c}{2}\right).(wA_0)^2$ in any Interference Pattern → **Energy behaves as Wave like, Discrete**

This is the Wave-Particle duality unifying the classical Electromagnetic field and the quantum particle of light.

The Geometrical caves : [29]

Nature has not any < meter > to measure quantized Quantities (that 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 Wd , which is the quantized Energy of the Quantity dissipated per cycle, [and this because monads follow sinusoidal oscillation on wavelength = monads as the *w.th* power and the *n.th* root of this monad where $w.n = 1$ as above on and in the same monad] and which energy is equal to,

$$Wd = \int \dot{x}.dx = \int C\dot{x}^2.dt = (\pi Cw).\lambda^2/4 = (2\pi^2C.\lambda^2/4).f = (m\pi.\lambda^2/2).f = C.f \text{ i.e. From above monads } (s + \bar{v} \nabla i)^{1/w} = |zo|^{-w}. e^{\wedge - i.(\varphi + 2k\pi).w}$$
, where $\cos\varphi = s/|zo|$, and for

Rotated Energy case where $s = 0$ and also $\cos.\varphi = 0$ exists for angle $\varphi = \pi/2$, the quaternion, z , is

$$z = (s + \bar{v} \nabla i)^{1/w}$$
 as dimension power $w=b$ and it is as $e^{-i.(\frac{\pi}{2} + 2k\pi).w} = e^{-i.(\frac{5\pi}{2}).b} = e^{-i.(\frac{5\pi}{2}).10}$ where,

$Lp = e^{i.(-\frac{5\pi}{2}).10}$ and it is the basic Geometrical interpretation of < Planck scale meter > based on the two Geometry constants e, π where $k = 1$, and base $b = 10$, and this from logarithm properties with different bases on the same base e [when $e^y = x$ then base e logarithm of x is $\ln(x) = \log_e(x) = y$] as it is $e^w = (b^{\log(b)e})^w = b^{w.\log(b)e}$ and $\sqrt[w]{e} = e^{1/w} = e^{-w} = \frac{1}{x^{w.\log(b)e}}$ which are monads in monads and is of Wave motion with angular velocity $w = 4.Wd/(\pi.C.\lambda^2)$, 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, $b = 10$, where then issues → During Diffraction, $d\bar{s}$, frequency, f , doesn't change and only the velocity, \bar{v} , and wavelength, λ , changes and the Total Energy is $[z^{-1/w} = |\bar{z}o|^{-w}.Lo]$.

Again because for quaternion, z , exists → $z^{1/w} = (s + \bar{v} \nabla i)^{1/w} = |zo|^{-w}. [\cos.(\varphi + k\pi)/w + i . \sin.(\varphi + k\pi)/w] = |zo|^{-w}. e^{\wedge i.(\varphi + k\pi) / w}$, and so then,

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

$/2$ and then $z^1/w = |z^0|^{-w} \cdot e^{i(\varphi + k\pi)} / w = \pm i \cdot (\pi/2 + k\pi) \cdot 10$ and it is the Diffraction *Energy mechanism* for all Space Levels of quantization which are the Energy Particles of monads only i.e.

Energy particles are then where issues \rightarrow

$z^1/w = |z^0|^{-w} \cdot Lv = \rightarrow$ Energy Monads.

For $\sin(\varphi+k\pi)/w = 0$ then exists only the Real part of monad $s, \neq 0$, where $\varphi = -\pi \pm k\pi$ and then spaces, Massive particles are then where issues \rightarrow

$z^1/w = |z^0|^{-w} \cdot e^{i(\varphi + k\pi)} / w = \pm i \cdot (-\pi \pm k\pi) \cdot 10$ and it is the Diffraction *Massive mechanism* for all Space Levels of quantization which are particles with mass, i.e. the reaction to this motion only.

Extending $Lv = e^{i(\frac{\pi}{2}+2k\pi)} \cdot b = e^{i(\frac{\pi}{2}+2k\pi)} \cdot 10$ then

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

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

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

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

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

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

For base $e = 2,71828$ and $k = 6 \rightarrow Lv = e^{i(-13\pi/2)} \cdot b$ then $e^{(-204,2040)} = 7,155 \cdot 10^{-89} \text{ m}$ 1st Layer length.

For base $e = 2,71828$ and base $b = 10$, then $e^{-78,5398} = 8,906 \cdot 10^{-35} \text{ m}$ and divided by $\sqrt{3} \pi = 1,616199 \cdot 10^{-35} \text{ m}$

Since cave is a versor then \rightarrow *Planck's Length*

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

i.e. Planck's length, which is a universal constant, and is not becoming from any measurements, but of the Geometric logic of Caves, cavity, for the minimum element of Energy, the Photon.

Conservative Planck's constant L-Planck = $1,616 \cdot 10^{-35} \text{ m} = \sqrt{h \cdot G^3}$ is consisted of the three compromising constants h, G, c , instead of geometry cave mould as above.

$Lp = e^{i(-5\pi/2)} \cdot 10$, which is based on the two natural constants e, π . [29-30].

8.5. The Quantization of E-Geometry and its moulds . [15]

Quantization of E-Geometry elements is for, Points, Line-Segments, Lines, Planes, Volumes Space, Anti-space-volumes. F-12.

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), (Non-equal Segments and twice-Perpendicular-segments = The Space Vectors = Quaternions)] , by defining the mould of quantization.

Between levels, moulds, is valid *Energy-Control* because Levels are Quaternions which are of dual nature (Equilibrium exists with their Conjugate and transverse Anti-Quaternion which keep Status) and because they continually, are in different Geometrical caves.

This is seen in Bohr's model where Electrons can be bumped up to a higher Shell, if hit by an electron or a photon of light. Energy as motion exists in Space-caves or transformed to other motion as referred in Work Quantization process.

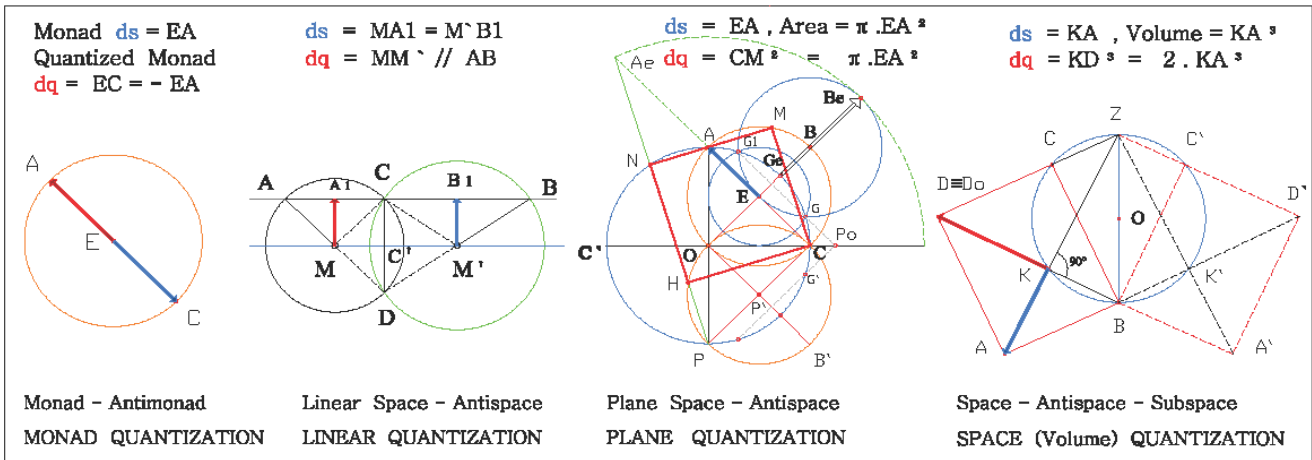


Figure .13. → *The Point , Linear , Plane , Space (volume) Mould for E-geometry Quantization , of monad EA to Anti-monad EC – of AB line to Parallel line MM' - of CE Radius to the CM Square Segment of KA Segment to KD Cube Segment - .*

The three Ways of quantization are → **for Monads** the mould is the *Cycloidal Curl* Electromagnetic field , **for Lines** the mould is that of *Parallel Theorem with the least constant distance* , **for Plane** the mould is the *Squaring of the circle* and , **for Space** is the mould of the *Duplication of cube* . All methods in, F-13.

The METERS of Quantization of monad ds = AB are as ,
In any point A , happens through Mould in itself (The material point as a → ± dipole) in [43]

In monad ds = AC , happens through Mould in itself for two points (The material dipole in inner monad Structure as the Electromagnetic Cycloidal field which equilibrium in dipole by the Anti-Cycloidal field as in [43]). **For monad ds = EA the quantized and Anti-monad is dq = EC = ± EA**

Remark : The two opposite signs of monads EA , EC represent the two Symmetrical equilibrium monads of Space-Antispace , the Geometrical dipole AC on points A,C which consist space AC as in F12 - (1)

Linearly , happens through Mould of Parallel Theorem , where for any point M not on ds = ± AB , the Segment MA1 = Segment M'B1 = Constant for all points on MM' . F13 - (1-2)

Remark : The two opposite signs of monads represent the two Symmetrical monads in the Geometrical machine of the equal and Parallel monads [MM' // AB where MA1 ⊥ AB , M'B1 ⊥ AB and MA1 = M'B1] which are → *The Monad MA1 – Antimonad M'B1 , or → The Inner monad MA1 Structure – The Inner Anti monad structure M'B1 = - MA1 = Idle , and { The Space = line AB , Anti-space = the Parallel line MM' = constant }* .

The Parallel Axiom is no-more Axiom because this has been proved as a Theorem [9-32-38-44]. **Plainly , happens through Mould of Squaring of the circle , where for any monad ds = CA = CP , the Area of square CMNH is equal to that of one of the five conjugate circles and π = constant , or as CM² = π . CE² .**

On monad ds = EA = EC , the Area = π . EC² and the quantized Anti-monad dq = CM² = ± π . EC² . F13-(3)

Remark : The two opposite signs represent the two Symmetrical squares in Geometrical machine of the equal and perpendicular monads [CA ⊥ CP , and CA = CP] , which are → *The Square CMNH – Antisquare CM'N'H' , or → The Space – Idle = Anti-space .*

In Mechanics this property of monads is very useful in Work area , where two perpendicular vectors produce Zero Work . {Space = square

CMNH ,Anti-space = Anti-square CM`N`H` }.

In three dimensional Space , happens through Mould Doubling of the Cube , where for any monad $ds = KA$, the Volume or , The cube of a segment KD is the double the volume of KA cube , or monad $KD^3 = 2.KA^3$. F12-(4)

On monad $ds = KA$ the Volume = KA^3 and the quantized Anti-monad , $dq = KD^3 = \pm 2. KA^3$.

Remark : The two opposite signs represent the two Symmetrical Volumes in Geometrical machine of triangles $[\Delta ADZ \perp \Delta ADB]$, which are \rightarrow The cube of a segment KD is the double the volume of KA cube – The Anti-cube of a segment $K`D`$ is the double the Anti-volume of $K`A`$ cube , Monad $ds = KA$, the Volume = KA^3 and the quantized Anti-monad $dq = KD^3 = \pm 2. KA^3$. {The Space = the cube KA^3 , The Anti-space = the Anti-cube KD^3 } .

In Mechanics this property of Material monads is very useful in the Interactions of the Electromagnetic Systems where Work of two perpendicular vectors is Zero .

{ Space = Volume of KA , Anti-space = Anti – Volume of KD , and this in applied to Dark-matter , Energy in Physics } . [43]

Radiation of Energy is enclosed in a cavity of the tiny energy volume λ , (which is the cycloidal wavelength) with perfect and absolute reflecting boundaries where this cavity may become infinite

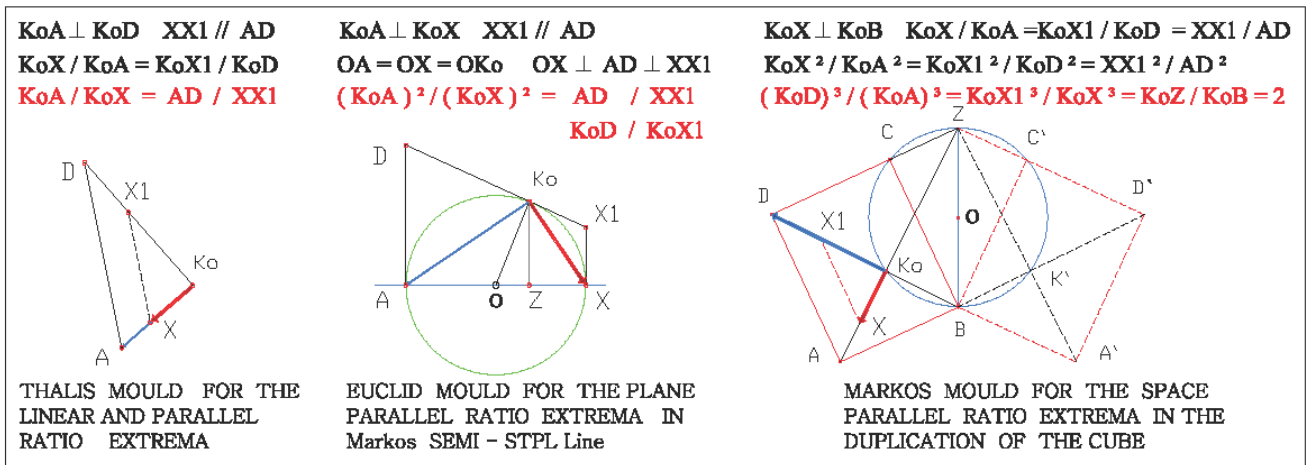
in every direction and thus getting maxima cases , limits, as properties of radiation in free space.

The electromagnetic vibrations in this volume is analogous to vibrations of an Elastic body (Photo-elastic stresses in an elastic material [18]) in this tiny volume , and thus Fringes are a superposition of these standing (stationary) vibrations .[41]

Above are analytically shown , the Moulds (The three basic Geometrical Machines) of Euclidean Geometry which create the METERS of monads Linearly is the Segment $MA1$, In Plane the square $CMNH$, and in Space is volume KD^3 in all Spaces , Anti-spaces and Sub-spaces .

This is the Euclidean Geometry Quantization in points to its constituents , i.e. the

- 1.. **METER of Point A is the Material Point A , the ,**
- 2.. **METER of line is the discrete Segment $ds = AB = monad = constant$, the**
- 3.. **METER of Plane is that of circle on Segment = monad , which is the Square equal to the area of the circle , and the**
- 4.. **METER of Volume is that of Cube on any Segment = monad , which is the Double Cube of Segment and Thus is the measuring of the Spaces , Anti-spaces and Sub-spaces in this cosmos . markos 11/9/2015 .**



(1)

(2)

(3)

Figure .14. \rightarrow The Thales , Euclid , Markos Mould , for the Linear – Plane - Space , Extrema Ratio Meters.

Saying **master-meters** , we mean That the Ratio of

**The Three Master – Meters in One ,
for E-geometry Quantization, F-14**

It is the linear relation of the Ratio (*continuous analogy*) of geometrical magnitudes , in all Spaces and Anti-spaces .

Saying **master-meters** , we mean That the Ratio of two or three geometrical magnitudes , is such that they have a linear relation (*continuous analogy*) in all Spaces , *in one in two in three dimensions*, as this happens to the Compatible Coordinate Systems as it is the Rectangular [x,y,z] , [i,j,k] , the Cylindrical and Spherical -Polar . The position and the distance of points can be then calculated between the points , and thus to **perform independent Operations** (Divergence , Gradient , Curl , Laplacian) on points only .

Remarks :

In F14-(1) , The Linear Ratio , *for Vectors* , begins from the same Common point Ko , of the two Non-equal , Concentrical and Co-parallel Direction monads .

In F14-(2) , The Linear Ratio , *for Plane* , begins from the same Common point Ko , of the two Non-equal , Concentrical and Co-perpendicular Direction monads.

In F14-(3) , The Linear Ratio , *for Volume* , begins from the same Common point Ko , of the two Non-equal , Concentrical and Co-perpendicular Direction monads.

In (1) → Segment KoA ⊥ KoD , Ratio KoX / KoA = KoX1 / KoD , and Linearly (*in one dimension*) the Ratio of KoA / KoX = AD / XX1

i.e. in Thales linear mould [XX1 // AD] , **Linear Ratio of Segments XX1 , AD is , constant and Linear , and it is the Master key Analogy of the two Segments , monads .**

In (2) → Segment KoA ⊥ KoX , OKo = OA = OX and since OX1 , OD are diameters of the two circles then KoD = AD , KoX1 = XX1 , and Linearly (*in one dimension*) the Ratio of KoA / KoX = AD / XX1 , in Plane (*in two dimensions*) the Ratio [KoA]² / [KoX]² = AD / XX1 ,

Proof :

Segment KoA ⊥ KoX because triangle AKoX is

rightangled triangle and KoZ ⊥ AX . Radius OKo = OA = OX . Since DA , X1X are also perpendicular to AX , therefore KoZ // X1X // DA. According to Thales theorem ratio (ZA/ZX) = (KoD/KoX1) and since tangent DA = DKo and X1Ko = X1X then AZ / ZX = DA / XX1 . From Pythagorean theorem (Lemma 6) → KoA² / KoX² = (AZ/ZX) = (DA/XX1) = (KoD/KoX1) i.e.

The ratio of the two squares KoA² , KoX² are proportional to line segments KoD, KoX1 (o.e.δ).

i.e. in Euclid's Plane mould [KoA ⊥ KoX] ,

The Plane Ratio square of Segments – KoA , KoX - is constant and Linear , and for any Segment KoX on circle (O,OKo) exists KoA such that ,

$$\rightarrow KoA^2 / KoX^2 = AD / XX1 = KoD / KoX1 \leftarrow$$

i.e. the Square Analogy of the sides in any rectangle triangle AKoX is linear to Extrema Semi-segments AD , XX1 or to KoD , KoX1 .

In (3) → Segment KoB ⊥ KoX , OKo = OB = OZ and since XX1 // AD , then KoA / KoD = KoX / KoX1 = AD / XX1 , and Linearly (*in one dimension*) the Ratio of KoA / KoX = AD / XX1 and in Space (*Volume*) (*in three dimensions*) the Ratio [KoA]³ / [KoD]³ = [KoX / KoX1]³ = 1/2 .

i.e. in Euclid's Plane mould [KoA // KoX , KoD // KoX1] , **Volume Ratio of volume Segments – KoA , KoD - , is constant and Linear , and for any Segment KoX exists KoX1 such that → KoX1³ / KoX³ = 2 ←**

i.e. the Duplication of the cube.

In F-14 , The **three** dimensional Space [KoA ⊥ KoD ⊥ Ko...] , where XX1 // AD , The **two** dimensional Space [KoA ⊥ KoX] , where XX1 // AD , The **one** dimensional Space [XX1 // AD] , where XX1 // AD , is constant and Linearly Quantized in each dimension.

i.e. All dimensions of Monads coexist linearly in Segments – monads separately (*they are the units of the three dimensional axis x,y,z - i , j , k -*) and consequently in Volumes , Planes , Lines , Segments , and Points of Euclidean geometry,

which are all the one point only and which is nothing. For more in [49-50] . 25/9/2015
 At the beginning of the article it was referred to Geometers scarcity from which instigated to republish this article and to locate the weakness of proving these Axioms which created the Non-Euclid geometries and which deviated GR in Space-time confinement .

Clashed Breakages which are located out of the STPL Cylinder are classified to the continually Moving Breakages because these acquire motion *Oscillation* , from their inherent Internal Vibration while ,

Un-clashed Breakages which are located out of the STPL Cylinder are classified to the continually Rest Breakages because these acquire motion *Oscillation* , from their interrelation , *bonding* , unless other acting forces move them.

The diffused energy between any two particles is stored alternatively in Internal Vibration by changing frequency , or stored in outer Oscillation by changing either wavelength or frequency .

In case of Rest particles Work as Energy is stored as change of velocity vector , *while mass is the reaction to the change of velocity* . [49-51]

Now is more referred ,

a). There is not any Paradoxes of the infinite because is clearly defined what is a Point and what is a Segment .

b). **The Algebra of constructible numbers and number Fiels is an Absurd theory** based on groundless Axioms as the fields are , and with directed non-Euclid orientations which must be properly revised .

c). **The Algebra of Transcental numbers has been devised to postpone the Pure geometrical thought** , which is the base of all sciences , by changing the base-field of solutions to Algebra as base . Pythagorians discovered the existence of the incommensurable of the diagonal of a

square in relation to its side without giving up the base , which is geometrical logic.

d). All theories concerning ***the Unsolvability of the Special Greek problems are based on Cantor`s shady proof*** , < *that the totality of All algebraic numbers is denumerable* > and not edified on the geometrical basic logic which is the foundations of all Algebra .

The problem of Doubling the cube as that of , Trisection of any angle , is a Mechanical problem and could not be seen differently and the proposed Geometrical solutions is clearly exposed at end and to the critic of all readers .

All trials for Squaring the circle are shown in [46] and the set questions will be answered on the Changeable System of the two Expanding squares , *Translation [T] and Rotation [R]* .

The solution of Squaring the circle using the Plane Procedure method is now presented and consists an , *Overthrow* , to all existing theories in Geometry , Physics and Philosophy .

e). Geometry is the base of all sciences and it is the reflective logic from the objective reality and which is nature .

9. The Hesiod`s Creation Hypothesis .

Towards A Creation Hypothesis → (A critique to quantization of the Non-existence which is point in geometry , to Existence which is the Material point) , [42-43]

From Chaos came forth Erebus and Black Night ;but of Night were born Aether and Day , whom she conceived and bare from union in love with Erebus.. Hesiod, Theogony, (c.700-B.C)

The above Ancient and standing hypothesis which was analytically answered in two prior articles , is now criticized from quantization view .

The Diagram of Hesiod Hypothesis is agreeing with the E-geometry elements as this is now presented in Figure .15.

The Hesiod Creation Hypothesis without Big-Bang

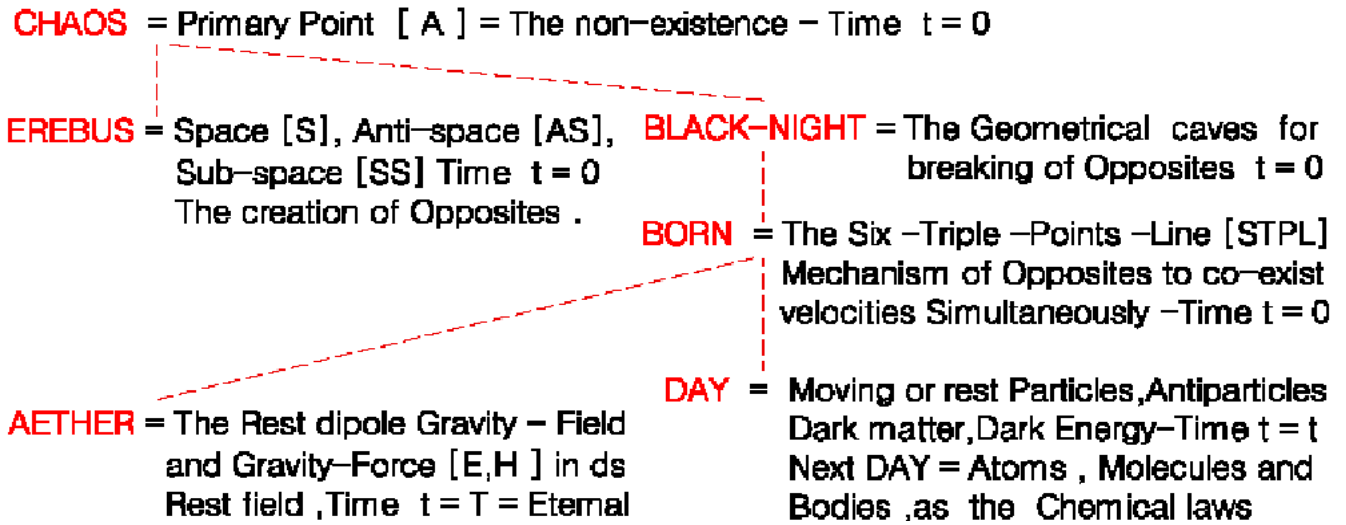


Figure .15. Diagram of the Hesiod Quantization (creation) Hypothesis.

Critique to Ancient and Recent Admissions :

- 1.. Aethergy \rightarrow Is a motionless substance, a, mixture of Aether (a kind of unknown matter) and kinetic Energy, ik, (a kind of unknown type of Energy).

Comment on 1 : Considering Aethergy substance having also kinetic energy, Aethergy is accepted to be as a Quaternion $q = a + (i)k$ of Real part, a, and Imaginary part, ik, . The uniformly distribution in gravity happens because breakages $[\pm s^2]$ being dipoles are restrained by the inner Electromagnetic field $[E \perp H]$ of gravity force . Real and Imaginary part a-k is Gravity's field Quaternion, q, as the definitions above and is not happening separation of, a, from, k, because, k, is the Inner Electromagnetic field joining the opposite dipole breakages $\pm s^2$ and consisted of dipole breakages $[\pm s^2]$ side by side and are the minimum Quantized Energy, the Quanta magnitude, $2s^2$, of our Planck's confinement and so **gap in gravity field** is not existing because this **becomes the Rest wavelength**

of Gravity field, and as prior referred for, material point, it is spatially diffused in all quantized spaces. Mass, m, is not a physical body but that consistence factor measuring the reaction of the body to its motion and is a scalar magnitude due to the internal motion of velocity vector components.

The external Energy **Orbital** angular momentum $p = h/2\pi\lambda$ and **Spin** is the helically rotating electric field vector corresponding to a circularly polarized Electromagnetic wave propagating with attenuation to the motion. The non-k energy belongs to the \langle stability reaction \rangle of the outer Electromagnetic field of the body with the inner Electromagnetic field of gravity. The Stability reaction of the inner Electromagnetic field of the wavelength is obtained by the inverse Anti - Electromagnetic field in monad, following the Conservation laws of energy, linear and angular momentum satisfied by the inner Anti-cycloidal motion, (the non-k energy is the Anti-Electromagnetic field on the equilibrium evolutive curve, the Anti-space, on the balancing cycloidal field wavelength). [49]

2.. Particle $m-e$, is another one particle with charge $,q$, contacting with the rest gravity field $a-k$.
Comment on 2 : Here is referred that all constituents of, the after Born mechanism , contain all prior constituents which are the two only components and all of Erebus Equilibrium and all physical Laws of opposites , (the smaller caves and constant velocity $,c$, greater than that of light) , etc. Black-Night properties are because of the opposite Rotating Energy becoming , the Quantity and Quality of particles dependent on Thrust – the Motion of particles due to Centre or Circumference of Common circle – etc., it is the Point which is nothing and , the Work which is the Energy as above , in all its transformations , i.e. The Energy-Space Universe in all Transformations qualities and not the Space-time universe . [39]

The two particles $a-k$ and $m-e$ consist two different quaternion , the first belonging to the Rest Gravity field and the second to any rest or moving particle or body , therefore the two quaternion interact with each other , either directly or indirectly , so no other third kind of substance is required between them for this . Figure 6.

Mass m is not a kind , of self-existent , but the reaction to the motion either is the **intrinsic** motion of monads (the cycloidal and anti-cycloidal motion of v_1, v_2 for stability in monad) or the **outer** , since it is a convention factor (as this happens also for time) . The Energy $,k$, which is the Gravity's Inner Electromagnetic field is balanced by the opposite anti - Electromagnetic field which is created on the cycloidal evolute without any loss of energy . Only Energy is added to energy so $E = k+e$ and since the reaction to the motion is both , energy and mass together , the generalized mass M , then Lagrange's equation of energy $E = Mc^2/2$ becomes for oscillating energy $2E$, $k^* = 1/2Mc^2$. The storage of energy takes place in $[E \perp H]$ waves .

Gravity field [MFMF] is an ocean composed of Infinite oscillating energy dipole on tiny breakages $[|\pm s^2| \equiv [+(\bar{w}.r)^2 \leftrightarrow -(\bar{w}.r)^2 = |\lambda|]$ in the least cycloidal quantized cave which is the Space $[V = \frac{4\lambda^3}{3\pi} = \frac{4(w^2 r^2)^3}{3\pi}]$ composed of an inner Electromagnetic wave constituent $[E \perp H]$, with $h = 2\pi/\lambda$, and the

reaction to these velocity motions [i.e. the mass $m = (pr).w/c^2 = \frac{h.w}{2\pi.c^2}$] , with the external energy momentum $p = \frac{h}{2\pi \lambda}$. **Simultaneity , Homogeneity , Continuity** is succeeded not because of the constancy of light $,c$, but of the Dipole-rest-continuity-cycloidal-inner motion of the Gravity [MFMF] field . Aether $,a$, doesn't transforms into $,k$, exactly the amount of k , $1/2Mc^2$, of the Aethery lost to the swift particle , because the outer equilibrium Electromagnetic field of the particle is on its Energy Wavelength and balancing happens , on outer cycloidal evolute curve , the anti-field as analytically in [41] .

Aether $,a$, is **not released** because is the motionless tiny breakages $[|\pm s^2|] \equiv \{A(P_A) \leftarrow 0 \rightarrow ((P_B)B)\}$, and tied together by the Gravity's Electromagnetic field $[E,H]$, but because of Work conservation , which work never gets less or more . [49]

The Aether density is constant as above and gravity's system is not the outcome of any Big-Bang which has never been existed . The Energy radiation system of particles issues after STPL mechanism and maybe represented in Space by the three states of interaction or , and Geometry-positions and are ,

- The position of the particle by means of any system to general coordinates or in Cartesian coordinates ,
- The state of radiation field is determined by the values of the components of the Electric and Magnetic vectors at points of the space, or the field by means of a scalar and a vector potential (the values of scalar potential as above) and ,
- The action of the Particle as a whole on this inside Field (the coupling energy of the inner constraints with , evolute) and the action to its outer environment . Maximum Entropy principle is respondent with respect to any other type of masses and energy and is not disturbing the density of gravity field .

Big-bang never incited in this cosmos because of all above referred reasons . Sequence that in this cosmos Space was created before matter \rightarrow the answer is that Human mind , in front of this dilemma created the outlet in Religious and the Myth of Big-Bang .

The accumulation of disarrangement may lead by itself to a powerful vortex is right, because Space Anti-Space being the first disarrangement lead to infinite small vortices which by entering in tiny geometry caves existed as happens to Sub-space in Common Circle [13,28].

The stationary Gravity field $[\pm s^2]$ and because of opposite \pm dipole, is wave nature with inner Electromagnetic fields E,P as other particle. The Dark matter $[\pm \bar{c}.s^2]$ breakages where also exist opposite \pm dipole, is wave with inner massive Electromagnetic fields E,P as other particle and moving Dark energy $[\bar{c}.\nabla i] = c^2$ is composed of light velocity $c = v$ or $c > v$ and is acting on all Five Fragments with light velocity \bar{c} , therefore their particles are made of heavier than those of other particles. Clusters of galaxies by merging become increasingly larger and because of wave nature, any energy released by their systems is much bigger than all others. [43]. Systems or monads follow Rectilinear or Curl motions.

Causality, running from motion to vortex, is the phenomenon of Young's double slit Dark fringes where moving energy is then concentrated in the Energy Wavelength as property of particles, and as waves, and it is the same which happens to the hedgehog, when feels danger in its cave. [41]

This because, Space is quaternion composed of Stationary quantities, the position $\bar{r}(t)$ and the kinematic quantities velocity $\bar{v} = dr/dt$ and acceleration $\bar{a} = d\bar{v}/dt = d^2r/dt^2$. The Kinematic quantities are also, tiny energy volume caves,

(cycloid in λ of \bar{v} and \bar{a} consist in gravity's field the infinite tanks in where energy is conserved).

Etherovortices m-e doesn't revive masses because with a-k consist two different quaternion and so Aether density a-k is constant and being also a separate gravity's system is not changed to m-e-k or ,k, or be absorbed. The m-e is a separate particle with constant work which reacts only with the others and absorbs or gives energy while with a-k is only reacting. Generalized mass M of m-e is not changed to m-e-k but to M.e.

Following the above definitions, m-e is not needed to maintain a-k because the independent particles (m-e) have velocity, while gravity base a-k is a Rest material and only the inner velocity of the confined Electromagnetic field [E,H] exists in the tiny dipole breakages of their Energy -Space.

Entropy is the intrinsic energy of [E,H] Electromagnetic field of gravity base and the velocity vector for particles.

A greater speed than that of light is obtained in caves smaller than that of Planck's where then exists only the rotational energy, Torsional Momentum greater than that of Planck's, The [STPL] line-cylinder as the passage of particles from Absolute [S] Frames (the cave) to all Relative [R] Frames, and which is the Navel cord, the string of galaxies either for Spaces, Anti-spaces or for Subspaces, the monad in monad.

Here we have to clarify that the **Substance of all universe is the Work**, which is traveling as, **Work Quantization process**, velocity speed and kinetic energy in all types. This substance is not distributed uniformly everywhere in the universe, neither is waiting to unleash the tremendous kinetic energy, but is **confined in its wavelength** or in a smaller tiny volume as above. Here exists a confusion to basic definitions to what is mass (it is a consistence factor) and what is energy or work (it is the ability to do some work as motion). Infinite velocity exists only in PNS, as this was prior referred.

Maxwell is correct in his conclusions and is the first who saw the Electromagnetic Displacement current in monads in magnitude below the length $L_v = e^{i(\frac{N\pi}{2})b=10^{-N}} = -35 \text{ m}$. Euclid and Zenon [15] was the first who saw magnitude of Point discrete as, $L_v = e^{i(\frac{N\pi}{2})b=10^{-N}} = -\infty \rightarrow 0 \text{ m}$.

The undulatory theory, with half of this energy due to distortion of elementary portions of the medium in the form of potential energy and the other half in the form of kinetic energy is Right only when happening in the same Medium. Maxwell, by conceiving Displacement current into Empty-space, was aware of the Work Quantization process to Energy and Space or both, to Gauss' and Ampere's law for continuity in a tiny volume, but was simultaneously confined in Planck's length.

The Hesiod Theogony, \rightarrow it is a Quantization Hypothesis.

{ From **Chaos** came forth **Erebus** and **Black Night**; but of Night were born **Aether** and **Day**, whom she conceived and bare from union in love with Erebus... Hesiod, Theogony, (c.c.700 B.C.). Hesiod's Theogony does connote to our physics. In the beginning, there was Chaos, a world in which

events were inconsequential and nothing sensible could be made out of it . For example, static electricity would appear temporally before rubbing amber with fur , or spatially somewhere else; and in the place of static electricity nothing or a nuclear blast from some other faraway interaction might be experienced . It was a chaotic world , because there was no time to preserve the sequencing of events , thus depriving the nexus cause-effect of its spatiotemporal dimension . All was random , all was incidental . There was no time or for that matter , anything else that would ensure what comes first and what comes second . Matter phenomena were independent from energy phenomena .

In such a world , mathematics did exist , but the lawlessness of physics and chemistry was delivering chaos as in [42-43]}.

Comment on Hesiod Theogony :

For Hesiod , → CAME , is The Work

Quantization process into →

Energy and Space or both .

CHAOS → is the Primary Point ,A, the Non-existence , from which came forth to Existence , (through the Virtual work) , [9 , 12 ,43]

EREBUS → is the Linear Space [S], Anti-space [AS] Equilibrium , the existence of PNS , with infinite points having a ± charge with $P = 0 \rightarrow P = \Lambda \rightarrow \infty$ which is the Continuity of points and the Discrete of monads following the Euclidean geometry logic . The Non-existence Exists by Becoming , Point A to its anti-point B .

In this state Time ,t, is not existing and $t = 0$. [20]

BLACK NIGHT → is the Curling property of stationary Points to Equilibrium , and exist as caves , ds = discrete = Quantization of points , following geometry moulds where , In caves → Opposite velocities are crushed which defines the motion , and are thrown OFF the cave through a Mechanism , The Six-Triple -Points -Line [STPL] Formulation . (STPL is a Mechanism in-where Curl-Opposites co-exist only by Rotational equilibrium) .Time ,t, is not existing , so $t = 0$.[17]

BORN → is the [STPL] Mechanism , which is a Geometrical mould on tiny caves where Spaces , Anti-spaces , Sub-spaces contribute on a common circle and produce particles and , which is the Navel cord , the string of galaxies in all universe .

AETHER → is the Gravity's Rest Medium-Field of Material-Fragment [MFMF] Field , and which Gravity dipole Field is connected by the Gravity Force , which is the minimum attractive and binding quantized force of cave , in which Time ,t, is Periodically ,T, i.e. Eternal , this because of the Internal Electromagnetic field of the Gravity Field , (and since stress $\sigma = 0$ then conserve and energy ,q, is not created-not destroyed) .

In Ether (Gravity) is included , Dark - matter and Dark - energy which are → the continually Moving with the light constant velocity ,c, and it is a Heap, composed of the two opposite signed elements separately and that of their Energy mixture connected by the Gravity Force , with Dark-energy as Thrust continually effecting on the Five +5 particle fragments separately and slinging them further . Thus is formulated the attracting mixture of the spherical opposite signed , the heavy and massive highlights elements , and also the Invisible (because moves with equal to light velocity) , Dark matter dipole connected with the Gravity's Electromagnetic Field which repel . The parallel motion of this mixture is not parallel universes but the rolling of the moving mixture on the rest Gravity Field , not expanding into , of moving mixture on the continuously moving Gravity field as the Base of expanding and ,

DAY → are the moving or not Particles Fermions-Bosons and Anti-particles with The Dark-matter and the Dark-energy in Chaos , all consisting Monads = Quaternions . Particles and others are different monads which follow Physical laws between them in the whole .

CONCEIVE AND BARE from union in love with Erebus → is , The Equilibrium , the Joint , of Particles-Anti particles in Spaces , Anti-spaces and Sub-Spaces following all laws of nature in PNS = (Primary Neutral Space) [27-28]. i.e.

Hesiod conceived Creation Hypothesis , with the then existing Instruments , and in later centuries Euclid transformed , this idea in Euclidean geometry . In my articles is shown the tightness of Mechanics and Physics with Euclidean Geometry analytically and in it also is shown the tightness of Mechanics and Physics in Philosophy , that what we call nature → and it is objective reality.

Neither Hesiod , nor Euclid , defined the Born Mechanism (i.e. the How is created Aether, the gravity field and force , and Day , Particles ,Dark-matter-energy) , which is the most important Geometrical mould in this universe and it is [STPL] Geometrical mould on an cave where Spaces , Anti-spaces and Sub-spaces co-exist on a common circle and by composition of Curl-opposites produce the Particles , Anti-particles the Gravity field and Force , the Dark matter-energy , and send them OFF mould in the line-cylinder and the Relative Inertial Frames .

Chaos , Erebus , Black-Night are timeless i.e.

T = 0 ,

Born mechanism and Aether are Stationary , but because of the internal Electromagnetic tiny volume, time ,t, is with period $T = \infty$, i.e. Eternal . In the Moving Dark-matter and in Dark-Energy , Time ,t, is of all types , $t = T = \infty$, $t = t$, $t = 0$, while in Day = Monads , all of them are moving , with their meter time ,t , which is the conversion factor of all changes of their motion . [16-17-18]

The Next Day is for Particles to follow the laws of Inorganic and Organic Chemistry to form Atoms , Molecules , bodies etc. embedded in Gravity-Field and in Spaces-Anti-spaces and Sub-spaces . Laws follow Mass conservation which is Energy conservation and which leads to equilibrium and energy-quanta of the Definite and Multiple Proportion . The definition of , separation of matter and energy is wrong , because matter is a conversion factor and nothing else which was not existing apriori . The Above analysis defines a Space - Energy universe , [39] and not a Space-time universe as it is in GR . Orpheus is wrong by the conceiving the edifications , Night = Caves = Volume = Curl motion , as the first principle , and not Chaos which is the Primary point and Erebus in Linear motion , the second.

It has been clearly shown that , Time is designated as the meter of changes in motion , or as the conversion factor, between time (second) and space (meter) units and not essence of Space-energy Configuration . Time exists only in motion which issues only for moving particles (Day).

Energy equations of Virtual Work issues for Rest Spaces , for equilibrium of opposites in caves and monads and do not need time because time $t = s / v$ and inner motion is periodical with $T = 0$ for Timeless space and $T = \text{constant or infinite}$, Eternal , for fields . This age-old question , of what is Time , was standing for many centuries in Philosophy , and has been recently adopted by GR by considering Time as an essence of Space-time and thus confined in an Eternal adventure of Nothing , and accepting also the wrong base on which are the Non-Euclidean geometries without elucidating the base of its Physical-content at the beginning [17], [38].

*Wisdom tetrad problems , **Quadrature** (a trial in [8]), (The solution in [46-47] , and now shown , **Doubling the cube** (The solution in [45-47]) and now shown , **Trisection** (The solution in [11-45]) , and now shown , **The Parallel Postulate** (The solution in [9 -32 -38 - 46]) and now shown , predispose the right direction for acquiring the Euclidean logic , and are the consistency Beacons of the Energy-Space universe .*

The three Milesian philosophers define Chaos to be the Apeiron , the very great or big or long , and in this way it is Erebus (\leftrightarrow) , which is a step after Hesiod . The good order to the infinite in Black night ($\cup\cup$) has to do with , genesis and decay , two steps after chaos .

Aristotle with its temporal nexus is referred to Aether ([+] \leftrightarrow [-]) and Day .

The Platonic position , Nothing can exist if it doesn't contain continually and simultaneously the limited and the unlimited , the definite and the indefinite , is right because thus is referred to Erebus , approaching to Chaos and because all existence is incorporated in all substitutes of point (Space) and Energy (the equilibrium of space) .

The Pythagoreans trying to find the incommensurability of numbers were confined in Black-Night and was wrongly thinking that numbers is the essence of universe .

Only Hesiod philosophically and in few words rightly conceived this outstanding reality which is the objective universe .

Philosophy (PH)	Euclidean Geometry (EG)	Mechanics - Physics (M - P)	The Creation Hypothesis (EXPANOB)
CHAOS	Point (0)	Schwarzchild radius $r_g = 2Gm/c^2$	Point $\rightarrow Lm = e^{i(N\pi/2)b = 10^N \bar{N} = \infty = 0}$
EREBUS	Straight Line $(-\infty, 0, +\infty)$	A Cloud for $-\infty$ and for $+\infty$ a web extended constituents	PNS \rightarrow Spaces , Anti-spaces, and Sub-spaces , in Monad [A \leftrightarrow B]
BLACK - NIGHT	Numbers $\pm (1, 2, 3, N)$	Entropy of invisible particles or Fluctuation of particles shape	Discrete Energy Monads $A_i - B_i =$ The Work = Quaternions in the tiny Curl volumes $\left[\frac{\text{Curl}}{\text{Volume}} \right] = \nabla = \frac{4\lambda^3}{3\pi} = \frac{4(w^2 r^2)^3}{3\pi}$
BORN	The different Homogeneous Coordinate Systems [A]-[R]	Big - Bang Theory	The Geometry mould , STPL Mechanism on tiny caves , is producing the material Points Sector and Particles
EATHER	The Non - Euclid geometries	The fluctuation of Spacetime <i>Quantized force $\nabla i = 2 S^2$ of Cave radius , r , and w , vibrating on length $[+ S^2 \leftrightarrow - S^2] = \lambda$ and creating on dipole , λ, the Stationary Electromagnetic Wave , the Field $E \perp P$ [$\{(1)(J=P1) \leftarrow 0 \rightarrow (J=P2)(2)\}$ of [MFMF] Base. (the gravity of inner velocity wr)</i>	<i>The Minimum attractive and binding</i>
DAY	Quaternion	Rest and Moving particles	<i>Moving or Rest Particles and Anti-Particles , Gravity Field and Gravity Force , Dark Matter and Dark-Energy, Atoms, Molecules and Bodies following Chemical laws in physical laws and everything derivative in this Cosmos .</i>
T-0			

Philosophy [PH] , E-Geometry [E-G] , Mechanics - Physics [M-P] , The New Hypothesis [NH]

Figure .16. The Philosophical , Geometrical , Mechanical-Physical Quantization and the Contemporary Quantization on Points (Geometry) , Creation Hypothesis .

9.1 A Parallel comparison of Hesiod , and the contemporary Creation Hypothesis :

The Properties on < Creation Hypothesis > of the Euclidean Space-Energy Configuration Geometry.

- 1.. Primary Point is nothing and it is the only Space , [\rightarrow **Chaos**]
- 2.. Since Primary point ,A, is the only Space then on this exists the Principle of Virtual Displacements which principle denotes that work $W = \int_A^B P \cdot ds = 0$ or $[ds \cdot (P_A + P_B) = 0]$, i.e. for any $ds = \text{vector} > 0$, Impulse $P = (P_A + P_B) = 0$ and $[ds \cdot (P_A + P_B) = 0]$,
Therefore , 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 Static equilibrium and Inner Impulse , on the contrary should be one point only (Primary Point A = Black Hole $\rightarrow ds = 0$ and $P = \infty$) , as the repellency of A , B points by $(P_A) , (P_B)$ opposite forces and which is the Primary-Dipole \rightarrow

$$[\{ A(P_A) \leftarrow 0 \rightarrow (P_B)B \}] , [\{ (+ P_A) \cup -0 \cup (-P_B) \}]$$

i.e. The discrete Energy monad $ds = AB$ as ,
[**Erebus** = (\leftrightarrow)] and [**Black-Night** = $(\cup\cup)$]

All points may exist with $P = 0 \rightarrow$ (PNS) and also with $P \neq 0$, $(P_A + P_B = 0)$, 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 and Elastic Medium , in spatial and Temporal domain) Field with infinite points which have a \pm Charge with $P = 0 \rightarrow P = \Lambda \rightarrow \infty$ and work (W) is quantized on material points as spin $\pm (\bar{p})$ and from this equilibrium of the quantized angular momentum $\bar{\Lambda}$, independently of time , is capable of forming the wave nature of Spaces , following the Boolean logic and distorting momentum $\bar{p} = \bar{\Lambda}$, as energy , on the intrinsic orientation position of points, on all points of the microscopic and macroscopic homogeneity, and since also in common circle rotational velocity , \bar{w} , and momentum, $\bar{\Lambda}$, are constants and thus consist a Pure quaternion , so conjugation of the two is as $(\partial/\partial t, \bar{w})$

© $(0, \Lambda) = (-\Lambda, \omega \times \Lambda) = (-\overline{H} \times \overline{P}, \nabla \times \overline{\Lambda}) = [\lambda, \nabla \times \overline{\Lambda}]$.
 [13-15]. This is permitted because Space is quaternion and is composed of Stationary quantities, the position $\vec{r}(t)$ and the kinematic quantities, velocity $\vec{v} = d\vec{r}/dt$ and acceleration $\vec{a} = d\vec{v}/dt = d^2\vec{r}/dt^2$.

Kinematic quantities are the tiny Energy volume caves (*cycloid is the*, λ , **Energy Space quantum of velocity** \vec{v} , and \vec{a} consist in gravity's field **the infinite Energy dipole Tanks** in where energy is conserved) as volume $V = 4 \lambda^3 / 3\pi = 4 \cdot (\omega r)^6 / 3\pi \rightarrow$ [**Erebus-Black-Night**],

$[\{A (P_A) \leftarrow 0 \rightarrow (P_B) B\}], [\{(+ P_A) \cup 0 \cup (- P_B)\}]$
 i.e. The equilibrium Dipoles and Caves in Chaos.

3.. The work W , of the two opposite dipole \overline{AB} , \overline{BA} in the same plane is equal to $W = [n.P.ds] = [\lambda = \Lambda \Lambda, \Lambda \times \Lambda]$ where,
 $\lambda =$ Displacement of A to B, and it is a scalar magnitude called wavelength of the new dipole \overline{AB}
 $\Lambda =$ The amount of Rotation on dipole \overline{AB} , (this is angular momentum \vec{L} , and it is a vector parallel to \vec{a} , axis.

Momentum $\pm \Lambda = r.m.v = r.m.\omega r = mr^2.\omega$, where r , is the radius and angular velocity $\vec{\omega} =$ (spin) which maps velocity vector \vec{v} , on the perpendicular to \vec{a} ,

axis plane with the two components $\vec{v} \perp E \perp \vec{v} \perp B$. Tangential velocity $\vec{v} \perp E = \vec{\omega}.r$ is a quaternion $\vec{v} \perp E = \vec{\omega}.r = \vec{z} = [s + \vec{v}.\nabla i]$ where $s = |\vec{v}.E| = |\vec{r}.\vec{\omega}|$ and $\vec{v}.\nabla i = |\vec{\omega} \times \vec{r}| = |\vec{\omega}|.|r| \perp |\vec{\omega}|.r$ where the two opposite biaxial ellipsoid equilibrium and it is the How conservation it happens. [26]. \rightarrow [**Erebus**]

4.. Momentum $\vec{p} = \vec{L}$ on the infinite dipole $A_i B_i$ of spaces with a momentum lever equal to zero (0) or equal to wavelength λ , create *linear motion*, while with a momentum lever $\neq 0$ creates the *rotational motion* (Euler, Coriolis, Centrifugal) $\rightarrow m.[(d^2\vec{r}/dt^2) + m.[[d\vec{\omega}/dt \times \vec{r} + 2\vec{\omega} \times (d\vec{r}/dt) + \vec{\omega} \times (\vec{\omega} \times \vec{r})]]$ where momentum $\vec{p} = m.r\vec{\omega}$ and mass m , is a constant equal to, *the Reaction to this motions*, or as Inertia (I) which are a natural property of dipole and both are conserved vice versa.

Forces $dP = P_A - P_B$ parallel to the Space, Anti-Space lines $[S] \perp [AS]$, create a Static force field B , and when Forces dP are perpendicular to the Space Anti-Space lines, create a Static force field E , which experience *Lorentz force* and it is the fundamental interpretation cause of motion, in small and large scales Spaces. On all dipole of wavelength λ , and momentum Λ , their product $\lambda.\Lambda = k_{1,2,3}$ constant for each energy cave level.

The fundamental force in universe is the total kinetic energy $T = 1/2 \vec{\omega} L = \Sigma (L^2/2.I)$, a repulsive

force following Pythagoras conservation law such that both T , *the kinetic energy*, and L , the *Potential energy*, be conserved (when T decreases then this lost energy is transferred to angular momentum L and the opposite, in L by *changing angular velocity vector* $\vec{\omega}$, differently is needed a speed faster than that of light which may happen elsewhere.

Energy is conserved on three perpendicular fields J, E, B , on dipoles such that the total kinetic energy to be the diagonal of the cuboids and it is the How this conservation happens [18-19]. \rightarrow

[**Black-Night + Day**]

5.. Geometrical caves: In 8.4. has been shown that Nature has not any $< \text{meter} >$ to measure

quantized quantities (that 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 W_d , which is the quantized Energy of the Quantity dissipated per cycle, [*and this because monads follow sinusoidal oscillation on wavelength = monads as the w.th power and the n.th root of this monad where $w.n = 1$*].

By extending $L_v = e^{i(\frac{\pi}{2} + 2k\pi).b} = e^{i(\frac{\pi}{2} + 2k\pi).10}$ then caves are produced as,

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

$\{ \sqrt{3}.\pi 1,616199.10^{-35} \text{ m} \}$, the known

Planck's constant from E-geometry produced.

6.. Conservative Planck's constant L-Planck = $1,616.10^{-35} \text{ m} = \sqrt{h.G^3}$ is consisted of the three compromising known constants h, G, c , instead that of geometry cave which is,

$L_p = e^{i(-5\pi/2).10}$, and is based on the two natural constants e, π . [29-30], \rightarrow

[**Black-Night + Born**]

7.. The action of a quaternion on point is equivalent as *-Energy Density and Pressure*-the state of stress at a point on the deformed placement or new configuration which is on the directional axis of the point. *Gravity* exists upon the point axis as $[[d\vec{\omega}/dt \times \vec{r} + 2\vec{\omega} \times (d\vec{r}/dt) + \vec{\omega} \times (\vec{\omega} \times \vec{r})]$ where angular velocity is $\vec{\omega} = |\vec{\Lambda}| / |\vec{r}| = k/(\lambda m)$ and so exerts a direct action between two events, i.e. *Stationary points of [PNS] are rotating dipole and may be pictured as wave existing in the infinite points of Spaces and exerting an action (pressure) on the moving Spaces, dipoles*. The Stability is achieved by the Anti-space and it is the How happens the interaction and equilibrium in spaces. [39]. \rightarrow [**Born + Aether**], ($[+] \leftrightarrow [-]$).

8.. In Black hole Energy scale ($\lambda, \Lambda = k 1$) there are infinite high frequency small amplitude vacuum fluctuations at Planck energy density of 10^{113} J/m³ that exert action (pressure) on the moving Spaces dipole and their Stability is achieved by Anti-space also. A wide analysis for gravity force and gravity medium is shown in Maxwell's Displacement field [39-40-41].
 →[**Born +Aether +Day**]

9.. The force between two charges (+ q) – (- q) of distance ,s, create an Electric field (-E),(+E) of Potential $U = q.E$. The force between the two charges is a) Attractive or b) Repulsive, *when both are Sources or Sinks and particles repel for equal charges* , $E = k.(2q/s^2)$. For non-uniform fields the force on the two equal but of opposite point charges do not cancel field. The dipole will rotate to align with the field, hence there must be a torque [Torque = $\bar{q} \times E = \mathcal{U} - 0 - \mathcal{U}$] on the dipole as well. → [**Born + Day**] .

10.. Dipole vectors are quaternion's (versors) of waving nature, i.e., one wavelength in circumference in energy levels, that conserve energy by transferring Total kinetic energy T into angular momentum $L = \bar{r} m \bar{v} = \bar{r} p = \bar{r} \Lambda$, where mass m = is a Constant .

Different versors with different Energy (scalar) possess the same angular momentum .

A Composition of Scalar Fields (s) and Vector Fields (\bar{v}) of a frame , to a new unit which maps the alterations of Unit by rotation only and transforms scalar magnitudes (particle properties) to vectors (the *wave properties*) and vice-versa , and so , has all particle-like properties of waves and particles .

In Planck Scale, when the electron is being accelerated by gravity which exists in all energy levels as above , the gravity is still exerting its force .

Matter is built only from primary dipole $AiBi$.

In a spherical cave the Biaxial Ellipsoid ($\sigma_x = \sigma_y$) exists as momentum + Λ on caves of diameter 2r with parallel circles → 0. The Biaxial Anti-Ellipsoid ($-\sigma_x = -\sigma_y$) exists as equal and opposite momentum - Λ on the same diameter 2r with anti - parallel circles $2r \rightarrow 0$. Equilibrium of the two Ellipsoids $\pm \Lambda$, presupposes a Stabilizer system attached to Ellipsoids such that opposite Momentum is distributed to the Center of Mass of the total system and , recover equilibrium , which is the center of the spherical cave .

The Biaxial Ellipsoid and Anti-Ellipsoid are inversely directed and rotated in the same circle ,

so the two opposite velocity vectors collide .

This collision of the two opposite velocity vectors is the Action (Thrust) of the two quaternion and since this is as , Action of quaternion's, → [**Born + Day**] .

$$\begin{aligned} \text{Opposite } (\bar{v} \rightarrow \leftarrow \bar{v}) \text{ are } (s + \bar{v} \cdot \nabla i)(\odot)(s + \bar{v} \cdot \nabla i) \\ = [s + \bar{v} \cdot \nabla i]^2 = s^2 + |\bar{v}|^2 \cdot \nabla i^2 + 2|s| \times \bar{v} \cdot \nabla i = \\ s^2 - |\bar{v}|^2 + 2|s| \times |\bar{w} \cdot \bar{r}| \cdot \nabla i = s^2 - |\bar{v}|^2 + [2\bar{w}] \cdot |s| |\bar{r}| \cdot \nabla i \end{aligned}$$

where,

$$[+s^2] \rightarrow s^2 = (w.r)^2, \text{ is the real part of a new}$$

quaternion which is, the positive *Scalar product*, of Space from the same scalar product ,s,s, with $1/2, 3/2, \dots$, spin, and represents the , Space , part of quaternion , the minimum Space - Quanta.

$[-s^2] \rightarrow -|\bar{v}|^2 = |\bar{w} \cdot \bar{r}|^2 = -[|\bar{w}| \cdot |\bar{r}|]^2 = - (w.r)^2 \rightarrow$ is the always , the negative *Scalar product* , of Anti-space from the dot product of \bar{w}, \bar{r} vectors ,with $-1/2, -3/2, \dots$, spin, and represents the , Anti-Space , part of quaternion , the minimum Anti - Space Quanta..
 → [**Born + Day**]. [35]

$[\nabla i] \rightarrow 2 \cdot |s| \times |\bar{w} \cdot \bar{r}| \cdot \nabla i = 2|w| \cdot |(w.r)| \cdot \nabla i = 2 \cdot (w.r)^2$
 → is a vector of , the velocity *Vector product* , from the cross product of \bar{w}, \bar{r} vectors with double angular velocity term and represents the, Velocity vector product , of quaternion giving 1,3,5, spin , the minimum Energy-Quanta . (this is the How Particles are originated) . The Geometrical formulation is →

Thrust [$\bar{c} \cdot \nabla i$] **acting on** the five Energy and Space Fragments ,→ { $(\nabla i), (+s^2), (-s^2), (+cs^2), (-cs^2)$ } where [$(\nabla i) \rightarrow (+s^2) \leftrightarrow (-s^2)$ = The dipole Gravity-field-energy] and [$(\nabla i) \rightarrow (+cs^2) \leftrightarrow (-cs^2) = c[(+s^2) \leftrightarrow (-s^2)]$]. The dipole Gravity-Dark-matter-energy **carry them** in the three dimensional parallel space , with the light velocity \bar{c} , as the Rest Gravity-field-Energy, and the rolling Movable Heap on it , the Dark - matter - energy }. This is the Expanding universe without Big-Bang. → [**Eather + Day**].

9.2. The [STPL] Mechanism : Fig.9-10, [35-36] ,

1.. [STPL] is a *Geometrical Mechanism* that produces and composite , **by quantization** , all opposite space Points from Spaces (A-B-C), to Anti-Spaces (A_E, B_E, C_E) and Sub-Spaces ($K_A K_B K_C$) in a Common Circle, *Sub-Space*, line or cylinder.

2.. Points A,B,C and lines AB,AC,BC of *Space*, communicate with the corresponding A_E, B_E, C_E and $A_E B_E, A_E C_E, B_E C_E$, of *Anti-Space*, separately or together with bands of three lines at points with bands of four lines at points D_A, D_B, D_C on the common circumscribed circle (O,OA) the *Sub-Space* .

3.. If any monad AB (*quaternion*), $[s, \bar{v} \cdot \nabla i]$, all or parts of it, somewhere exists at points A,B,C or at segments AB,AC,BC then [STPL] line or lines ,is the Geometrical expression of the Action of External triangle $K_A K_B K_C$, the tangents as extrema is the *Subspace* , on the two Extreme triangles ABC and $A_E B_E C_E$ (of *Space Anti- space*) of 1,3,5, spin, the minimum Energy – Quanta .(this is the How Opposites combine to produce the Neutral). [**Born**] .

In the recovery equilibrium (a surface of a cylinder with $2r$ diameter), and because velocity vector is on the circumference , the infinite breakages identify with points A,B,C (of the extreme triangles ABC of Space ABC) and with points A_E, B_E, C_E (of the extreme triangles $A_E B_E C_E$ of the Anti-Space) all , on the same circumference of the prior formulation and are rotated with the same angular velocity vector \bar{w} . The inversely directionally rotated Energy $\pm \bar{\Lambda}$ equilibrium into the common circle, so Spaces and Anti-Spaces meet in this circle which is the common Sub-space .

Extreme Spaces (the Extreme triangles ABC) meet Anti-Spaces (the Extreme triangles $A_E B_E C_E$) , through the only Gateway which is the Plane Geometrical Formulation Mechanism (mould) of the [STPL] line , or as cylinder. [17]

The \rightarrow [Space, Anti- Space equilibrium, $\pm \bar{\Lambda}$, Absolute System [S] \leftarrow], as Angular momentum $\bar{\Lambda} = \Omega = m.v.r$, is Crushed out into Fragments and , becoming the three Breakages $[s^2 = (wr)^2]$, $[-s^2 = -(wr)^2]$, $[\nabla i = 2(wr)^2]$, and after clashed with the velocity vector \bar{v} of [S] , (unless succeed to escape un-clashed through center O in STPL line and this because $\bar{v} = 0$) , are Thrown OFF this System [S] , conveyed into the Linear momentum , the Inertial and Energy-Space , the Relative [STPL] System [R] as Particles Fermions $\rightarrow [\pm \bar{v} \cdot s^2]$ and Bosons $\rightarrow [\bar{v} \cdot \nabla i]$. [27] \rightarrow [**Black-Night , Born**].

When the three Breakages succeed to escape un-clashed through center O, then these consist the Rest Gravity-field and force , and when clashed with the constant velocity ,c, then consist the Expanding with , light velocity ,c, the Rest Gravity – field and the continually parallel Moving Dark-matter-energy Heap .

Work : The work , W, of the Gravity is effecting on (-) Field-Medium only for the equilibrium of spaces . Electromagnetic waves are created by the vibration of an electric charge . This vibration creates a wave which has both an Electric and a Magnetic perpendicular component .

(**this is the How Work as Energy , travels**) . [41]

Work as Energy is Quantized , is converted , in Space monads , caves , the cells , $\bar{x} = d\bar{s} = \lambda \cdot m$, as pressure σ, τ , and principle pressure is converted as velocity , \bar{v} , in caves and as an Standing Electromagnetic Wave **E , P** which consists the Standing monad (Displacement current) and the moving Energy monad (by altering the inner wavelength or Period of monad) in Gravity`s field medium [MFMF] and is dissipated as Quaternion monads (Particles or Waves , matter or vectors) as Forces (displacements , masses , pressure etc.) using modulus , coefficients , reactions to the motion and all other geometrical indices .

Stability In-Out wavelength is obtained by the Isochronous Anti-Standing Electromagnetic Wave E,P which happens on Anti-cycloid , Evolute , and whirling , Curl , by the equality of the two transverse Complex Envelope displacements , Amplitudes , that consist the Standing monad .

(The Displacement current in monads) . [40] \rightarrow [**Aether**] , ([+] \leftrightarrow [-]) .

In [33-35], Un-clashed Fragments through center O, consist the Medium-Field Material-Fragment $\rightarrow [\pm s^2] = [MFMF]$ as the base for all motions, and Gravity as the binding force $[\nabla i]$, of this base , while the clashed with the constant velocity , \bar{c} , consist what is called the ,

Dark matter $[\pm \bar{c} \cdot s]$ and the Dark energy $[\bar{c} \cdot \nabla i]$, or from \rightarrow Breakages $[\pm s^2 = \pm (wr)^2]$ and $[\nabla i = 2(wr)^2]$ then become moving particles ,

- 1.. $[\pm \bar{v} \cdot s^2] \rightarrow$ Fermions and $[\bar{v} \cdot \nabla i] \rightarrow$ Bosons
- 2.. $[\pm s^2] \rightarrow$ [MFMF] Field , and into their dipole Field , $[\nabla i] \rightarrow$ Gravity force
- 3.. $[\pm \bar{c} \cdot s^2] \rightarrow$ Dark matter , and into their dipole Field Gravity force , $[\bar{c} \cdot \nabla i] \rightarrow$ Dark energy is Thrust.

All particles are characterized by their quantized

cave the minimum Space [$V = \frac{4\lambda^3}{3\pi} = \frac{4(w^2r^2)^3}{3\pi}$]

composed of an inner Electromagnetic wave constituent [$E \perp H$], $h=2\pi/\lambda$, the reaction to these velocity motions is what is called the mass ,

mass = [$m = (pr).w/c^2 = \frac{h.w}{2\pi.c^2}$], the external energy momentum [$p = \frac{h}{2\pi\lambda}$] and Spin (the helically rotating electric field vector corresponding to a circularly polarized Electromagnetic wave propagating with attenuation to velocity's direction). Conservation laws of energy linear and angular momentum are satisfied by the inner Anti-cycloidal motion , (on equilibrium evolute curve) . [40] . \rightarrow [Day]

9.3. Gravity-Field , Gravity - Force and How is Quantized . [36-37]

It was referred that Fragments $s^2=\pm|(\bar{w}.r)^2|$ occupying the minimum quantized space $|s^2|$ are deported and fill all [STPL] cylinder which is the Rest Quantized Field $\pm [(\bar{w}.r)^2]$ or it is ,the material point in mechanics as the base of all motions , where force $[(\bar{w}.r)^2\nabla i] = 2.[(\bar{w}.r)^2]$ is vibrating on length $2.[|(\bar{w}.r)^2|] = \lambda$ as a Stationary Wave , and creates the curl Electromagnetic Field ($E \perp P$) , on which is the Universal Quantized force called Gravity .

The Gravity - Force is equal to $F_g = |\bar{q}|.[E+\bar{v} \times P]$ and is exerted on any movable particle with charge \bar{q} . **Gravity – Field** $G_f = [E+ \bar{v} \times P]$, is the unmovable , Rest forced welded spinning dipole , $\rightarrow[|+(\bar{w}.r)^2| \leftrightarrow |-(\bar{w}.r)^2| = |\lambda|] \equiv [\{A(P_A) \leftarrow 0 \rightarrow (P_B)B\}] \leftarrow$ and because above is Rest then with three Unis becomes the un-movable Torsion $\pm \Lambda$ as ,

$$\rightarrow [|-(\bar{w}.r)^2| \leftrightarrow |+(\bar{w}.r)^2| \leftrightarrow |-(\bar{w}.r)^2|] = |\Lambda| \equiv \text{Spin} \leftarrow$$

Since for three Units is applicable the same and in Material Geometry then ,

$$\rightarrow [|c(-\bar{w}.r)^2| \leftrightarrow |c(\bar{w}.r)^2| \leftrightarrow |c(\bar{w}.r)^2|] = c [|-(\bar{w}.r)^2| \leftrightarrow |+(\bar{w}.r)^2| \leftrightarrow |-(\bar{w}.r)^2|] = c . \{ \emptyset \leftrightarrow \emptyset \}$$

i.e. Gravity travelling at light speed = $c|\Lambda| \equiv c$ Spin and also because jointed with forces , this means

that Newton`s laws issue in both , Absolute System [S] and to the Relative System [R].

The Material wavelength of two Units (1),(2), or the sector $\lambda = (1)-(2)$ or the minimum energy Space of the two material Units as above is as $\rightarrow \{ [\text{Medium-Field Material Fragment}] \rightarrow [\pm s^2] = \pm | \bar{w}. \bar{r} |^2 = [\text{MFMF}] \text{Field} \leftarrow \}$ the Electromagnetic Field [$\bar{E} \times \bar{H}$] or the field $\rightarrow [|+(\bar{w}.r)^2| \leftrightarrow |-(\bar{w}.r)^2| = |\lambda|] \equiv [\{ (1)(J=P1) \leftarrow 0 \rightarrow (J=P2)(2) \}] \leftarrow$ which is the Standing wave in cavity (1)-(2) , of the two scalar breakage $| \pm (\bar{w}.r)^2 |$ as medium (1)-(2) field , and (J1) $= 2 | \bar{w}. \bar{r} |^2$ as energy at point (1) and carried to point (2) by following the cycloid motion from (1) to (2) with an isochrones Velocity \bar{v} , and during shifting is analyzed into two velocity vectors \bar{v}_1 , \bar{v}_2 , and which undergo vibrations causing two waves that represent the two , Electric E and Magnetic H , perpendicular components following the trajectory, in=(c1), out=(c2) .

Gravity - Force in Rolling Heap is equal to

$$F_D = |\bar{q}|.[E_D + \bar{v}.P_D] = |\bar{q}|.[E_D + \bar{c}.P_D] .$$

It was referred that Thrust [$\bar{c}.\nabla i$] is acting on the five Energy-Space Fragments $\{ (\nabla i) , (+s^2) , (-s^2) , (+cs^2) , (-cs^2) \}$ and on the two Dipole-Couples , where for Couple $[(\nabla i) \rightarrow (+s^2) \leftrightarrow (-s^2) =$ Is the dipole Gravity-field-energy] , and for the Couple $[(\nabla i) \rightarrow (+cs^2) \leftrightarrow (-cs^2) =$ Is the Gravity dipole Dark-matter-energy] , i.e.

The same force for the two Couples .

The two , opposite signed , Fragments $s^2 = \pm |(\bar{w}.r)^2|$ consist the under Gravity primary Dipole, [$|+s^2| \leftrightarrow |-s^2|] = |\lambda| \equiv [|+(\bar{w}.r)^2| \leftrightarrow |-(\bar{w}.r)^2|]$ where on this, Force $[\nabla i = 2.s^2 = 2(wr)^2]$ as velocity $\bar{v} = \bar{c}$, the Thrust , causes the Gravity`s Electromagnetic Field $\{E \perp P\}$ as $\rightarrow [\nabla i]. (+s^2) ,$

$$[\nabla i]. (-s^2) , [\nabla i] |. (\pm s^2)| = [\nabla i]. [|+s^2| \leftrightarrow |-s^2|] [\nabla i]. [|+s^2| \leftrightarrow |-s^2|] , [40-41] ,$$

In Figure 6 [F-G] is shown the How Alternative Current is produced and how Gravity acts on any movable object with velocity \bar{v} . In F-17 . Electric Gravity-Field is $E_1 + \bar{v}_1.P$ and Magnetic Gravity- Field is $E_2 + \bar{v}_2.P$ and Gravity-Force their sum $\rightarrow E + \bar{v}.P$.

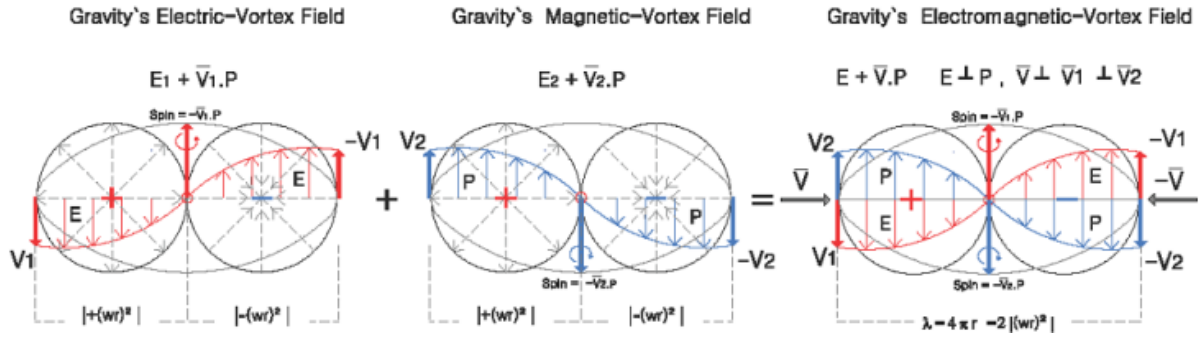


Figure. 17 Fragments $[+|wr|^2] \leftrightarrow (-|wr|^2)$ as Dipole are joined by Gravity Force that causes the Electromagnetic Gravity - Field \rightarrow a forced welded Spinning dipole .

It was referred that Fragments $s^2 = \pm |(\bar{w}.r)^2|$ occupying the minimum quantized space $|s^2|$ are deported and fill all [STPL] cylinder which is the Rest Quantized Field $\pm [(\bar{w}.r)^2]$ or it is, the material point in mechanics, as the base of all motions where force $[(\bar{w}.r)^2 \nabla_i] = 2.[(\bar{w}.r)^2]$ is vibrating on the rest length $2.[|(\bar{w}.r)^2|] = \lambda$, as a Stationary Wave, and creates the **Curl Electromagnetic Field** $E \perp P$, on which is the Universal Quantized force called Gravity, **The Gravity - Force is equal to**, $F_g = q.[E + \bar{v} \times P]$ and is exerted on any movable particle with charge \bar{q} .

Gravity - Field is $G_f = [E + \bar{v} \times P] = [E + \bar{c} \times P]$, the unmovable, forced welded spinning dipole, and because jointed with force, means that Newton's laws issue in both, Absolute System [S], and

Relative System [R]:

On cycloid,

Thrust $\rightarrow g = \text{Force } F = \text{velocity}$, where

Velocity $\bar{v} = [\sqrt{g/4r}]$, $\rho = [\sqrt{g/4r}]$, on $|(1)-(2)|$ length.

Acceleration $\bar{a} = (d^2s/dt^2) = -(g/4r).s$

Trajectory acceleration $\bar{a}_q = g.\sin\phi = [g/4r].s$

Centripetal acceleration

$$\bar{a}_r = (v^2/\rho) = [g/4r] \cdot \rho = [g/4r].AA'$$

where point A' is on anti-cycloid.

Ratio $v/\cos\phi = \sqrt{4gr} = \text{constant}$ and velocity of center K of rolling circle is,

$$\bar{v}_k = v.r/PA = (1/2).v/\cos\phi = \sqrt{gr} \rightarrow \text{i.e.}$$

The motion, the velocity \bar{v}_k , of the rolling circle center is linear.

Force $2.[(\bar{w}.r)^2]$ as velocity \bar{v} is acting at point (1) and since $dF=0$ then is analyzed into the two equal velocity vectors $\bar{v}_x = \bar{v}_1 = (\bar{w}.r)^2\sqrt{2}$, $\bar{v}_y = \bar{v}_2 =$

$(\bar{w}.r)^2\sqrt{2}$ as the cross-product $\bar{v} = \bar{v}_1 \times \bar{v}_2$. F-2

i.e. **Motion occurs in two perpendicular planes.**

Energy as the horizontal constant velocity $\bar{v}_1 =$ (thrust), is transported at point (2) by following the tangential trajectory at A, forming on cycloid the Electric field ,E, and for stability the anti-trajectory A' on Evolute, the Anti-Electric field -E, both decomposed in a velocity $\bar{v}_1 r$ perpendicular to the trajectory and thus executing zero work, and $v_1 q$ tangential to the trajectory executing the work on dipole (1)-(2).

The equation of Gravity's Standing waves E,P, The Wave function and other Wave Properties .

The equation of motion of a standing wave is as,

$$Y = [2A \sin kx].\cos wt =$$

$$[2A \sin \left(\frac{2\pi}{\lambda}\right) \cdot x].\cos 2\pi \left(\frac{t}{T}\right), \text{ where}$$

$$A = v_1 = v_2 = |v|/\sqrt{2} \rightarrow \text{Wave's Amplitude, } kx = \pi/2, \pi, 3\pi/2, 2\pi \rightarrow$$

The Wave's number, location, $w = 2\pi f = 2\pi/T$ and is the, Oscillating and Angular frequency of motion, where then **Equations of the Gravity's Electromagnetic Field** become,

$$E = 2A.\sin kx.\cos wt = \sqrt{2}.|(\bar{w}r)^2|.\sin kx.\cos wt$$

$$P = 2A.\sin kx.\cos wt = \sqrt{2}.|(\bar{w}r)^2|.\sin kx.\cos wt$$

which consist the Gravity's Electromagnetic wave equations, The energy of a particle which is the intrinsic stored work, is the Energy flow $S_p = E \times P$ along the direction of motion. Particles have either rest or motional mass or both. From Lagrange's equations of the first kind, $2E = mv^2 = (mv).v = p.v = p.(wr) = (pr).w = (pr).[2\pi/T] = 2\pi(pr).[c/\lambda] = hc/\lambda$ since $\lambda = cT$, and $2\pi(pr) = h =$ Planck's constant i.e. \rightarrow

Mass $m = (pr).w/v^2 =$ the meter of reaction to the

motion \leftarrow and \rightarrow

Momentum $p = 2\pi(pr).[c/\lambda]$ the Anti-reaction \leftarrow and for $v = c =$ velocity of light , then Planck's energy equations for \rightarrow mass and momentum is ,

$\mathbf{m} = (p.r).w/c^2 = \frac{h.w}{2\pi.c^2}$ and momentum $\mathbf{p} = \frac{h}{2\pi\lambda}$ where ,

$\mathbf{w} =$ Particle's oscillation frequency which is that of inner common circle and it is constant , and , r , the rolling circle's radius . All waves oscillate with energy $2E = p.v = [pr].w$, which awareness translational motion (pr) at light , c and rotational at spin(w) motion in helical behavior. The Work Quantization process occurs as this compound helical motion and is conserved in $<$ translational motion (p.r) and rotational motion at spin (w) $>$ wavelength of particles (monads) following all known physical laws . Plane wave's Energy is stored as Stationary wave's Energy in case (knot points) of wave Interference . From wave equations is holding ,

The equal phase, Plane Wave equations are ,

$$A_{x,t} = A_o.\cos(kx - wt + \varphi) \text{ where } k = 2\pi/\lambda , \\ w = 2\pi/T = 2\pi f , \varphi = kx, c = \lambda/T = \lambda.f = w/k$$

$$E_{x,t} = E_o.\cos(kx - wt) \text{ Electromagnetic waves.,} \\ H_{x,t} = H_o.\cos(kx - wt)$$

$$S = [\bar{E}x\bar{H}]/\mu = [|\bar{E}|x|\bar{H}|].[S_o/\mu].\cos^2(kx - wt) \\ \text{Energy density with translational outer velocity} \\ \bar{v}(t) = p / m = \bar{\Lambda} / m.$$

The Equal Phase, Stationary Wave equations are,

$$E = 2A.\sin kx.\cos wt = 2.A.\sin\left(\frac{2\pi}{\lambda}\right).\cos wt$$

$$P = 2A . \sin kx.\cos wt = 2.A.\sin\left(\frac{2\pi}{\lambda}\right).\cos wt$$

and **a.** $A = v1 = v2 = |v|/\sqrt{2}$, $kx = \pi/2, \pi, 3\pi/2, 2\pi$, $w = 2\pi f = 2\pi/T$ with inner velocity $v(i) = \lambda/T = \lambda.f = w.r$ and phase velocity $\bar{v}(r) = w / k = w\lambda/2\pi$. [41]

b. Intensity I_d and pressure Amplitude P_d in volume is ,

$$P_d = \rho.c.w.A_o = \rho.c.w.[\epsilon E^2 + \mu H^2]/2 \text{ and} \\ \text{the Intensity of Dark-Fringes is ,}$$

$$I_d = \frac{\rho\pi^2 c^3}{2\lambda^2} . [\epsilon E^2 + \mu H^2]$$

This tiny Energy Volume for wave's case , is the Cycloidal volume $V = 4/3.\pi.ab^2 = 4\lambda^3/3\pi$, [because $a = \lambda$, $b = \lambda/\pi$] of the Electromagnetic

stationary field $[\bar{E}x\bar{H}]$ where the Intensity $S_c = [\epsilon.E^2/2 + \mu.H^2/2]$ and ϵ, μ the Permittivity , (the Dielectric constant multiplier) , Permeability (the Dielectric constant multiplier) .

Electromagnetic waves are able to transmit Energy through a vacuum (empty space) by storing their energy in a Standing Transverse Electromagnetic dipole wave as above , and thus considered completely particle like , and in transverse interference pattern to be considered as completely wave . So when ,

c. Energy $I_d = \frac{\rho\pi^2 c^3}{2\lambda^2} [\epsilon E^2 + \mu H^2]$, in tiny volume V , where $V = \left[\frac{4(w^2 r^2)^3}{3\pi}\right] \rightarrow$ **then appearance**

is as Particle

d. Energy $I_d = \left(\frac{\rho.c}{2}\right).(wA_o)^2$, in Interference pattern \rightarrow **then appearance is as Wave**

e. The field Intensity estimation $S = h.f$ becomes ,

$$S = [\bar{E}x\bar{H}] = \left[\frac{\epsilon.E^2}{2} + \frac{\mu.H^2}{2}\right].\left[\frac{4}{3}\pi\lambda.\left(\frac{\lambda}{\pi}\right)^2\right] = h.f$$

and Energy as Electromagnetic field is $E = H$ and so

$$E = H = \sqrt{\frac{3h}{\pi.c(\epsilon+\mu)}} . \left[\frac{w^2}{2\pi c}\right]$$

9.4. **Dark Matter – Dark Energy . The Dipole Dark – Matter - Energy : [43] , Fig. 18 ,**

Dark-matter becoming from the center , O , of common circle where there , $v = 0$, and it is $(\pm c.s^2)$ moves with the constant light velocity, \bar{c} , and is composed of the two opposite signed elements, $(+cs^2), (-cs^2)$, and Dark-energy $[\bar{c}.\nabla i]$ moves also with the same velocity of light , so is continually effecting *on the two* fragments separately and *on their dipole* jointed by the Gravity Thrust (∇i) as $[(\nabla i) \rightarrow (+cs^2) \leftrightarrow (-cs^2)$ and it is the Gravity Dark-matter-energy] and by slinging them further , thus formulating the attracting , *the mixture of the spherical opposite signed elements which highlights , while dipole form the heavy and massive invisible dark matter which repel , the dipole energy blobby volumes as the massive Dark –Fringes . The parallel motion of this mixture, not*

The Quantization of E-geometry to its moulds as Energy Quanta
parallel universes , is the rolling on Gravity field as is *Geometrically Rolling*] *Expansion of the Heap*
the Base of the expanding heap-mixture . with light velocity is the How is , the constructing
The Continuous [*The light Moved mixture DM-DE* universe as in diagram .
The Expansion of the Universe with light velocity and all Fundamental elements .

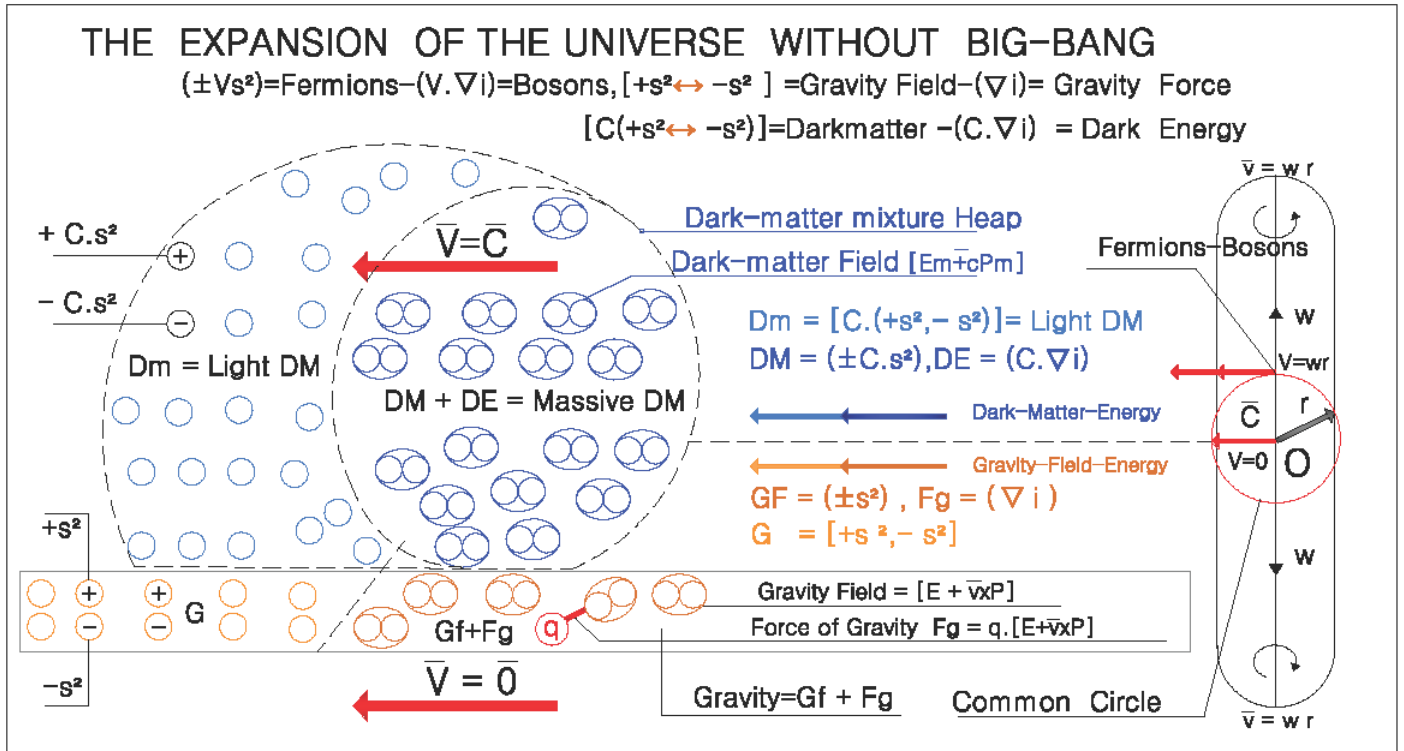


Figure.18 The Cause of Expansion of the Universe , is the continuous and simultaneous effect of Dark-energy $DE = [\bar{c} \cdot \nabla i]$ on all Five Fragments with light velocity \bar{c} , as, $[\bar{c} \cdot \nabla i] \rightarrow \{ (\nabla i), (+s^2), (-s^2), (+cs^2), (-cs^2) \}$ which is the rolling Heap . Energy Quantities $\nabla i = 2(wr)^2$ in the rolling Heap ,acting on dipole breakages $[\pm s^2]$ formulate the Gravity-Field and Gravity-force while acting on dipole breakages $[\pm \bar{c} \cdot s^2]$ formulate Dark matter and Dark Energy respectively ,while DE acting on Leptons and Quarks , Anti-Leptons and Anti-Quarks , Bosons , formulate Material worlds . This is the quantization effect of DE . Breakages $(+s^2) = +(wr)^2 = \oplus$, $(-s^2) = -(wr)^2 = \ominus \rightarrow$ are \oplus , \ominus cells . Neutral $\rightarrow \emptyset = \oplus \ominus = 2(wr)^2 \neq \pm$, i.e. neutral to them , and it is **Zero** .

The three consistencies of Dark-matter [DM] are , $\rightarrow [(+c.s^2), (-c.s^2), (\pm c.s^2)]$ and Dark-energy $\rightarrow [DE] = \rightarrow [\bar{c} \cdot \nabla i]$:
Since [DM] = $(\pm \bar{c} \cdot s^2)$, is of opposite signed (\pm), then consists the Dipole , $[+c.s^2 \leftrightarrow -c.s^2] = |\lambda| = [+c.(\bar{w} \cdot r)^2 \leftrightarrow -c.(\bar{w} \cdot r)^2] = c[+(\bar{w}r)^2 \leftrightarrow -(\bar{w}r)^2] =$ Gravity travelling at light speed = $c|\Lambda| = c \text{ Spin}$.
Dark matter is a more massive base than that of gravity , and this because of \bar{c} , so for DM field issues , $[E_m + \bar{c} \cdot P_m] = [c \cdot E_g + \bar{c}^2 \cdot P_g]$, and as this is also a Stationary field then follows the equation,
 $E_m = 2 \cdot A \cdot c \cdot \sin(\frac{2\pi}{\lambda}) \cdot \cos wt$, where $P_m \perp E_m$.
Gravity Thrust (∇i) acting on $(\pm s^2)$ dipole

$[(\nabla i) \rightarrow (+s^2) \leftrightarrow (-s^2)]$, creates the Rest Gravity - Field -Force , while Thrust (∇i) acting on $(\pm cs^2)$ the dipole , $[(\nabla i) \rightarrow (+cs^2) \leftrightarrow (-cs^2)]$, then creates the Gravity Dark-matter-Energy-field.
Since also the tiny volume of $|\lambda| = [+c.s^2 \leftrightarrow -c.s^2]$, consists a , sink , then DM attracts and it is an infinite ocean in all universe .
Since also dark Energy is effecting then ,
 $DE = q.[E_m + \bar{c} \cdot P_m]$ align with the field , so on DM dipole $[E_m + \bar{c} \cdot P_m]$ exist also a torque (τ) and in this way DE repels .
Dark-Energy is acting on all , In and Out the cylinder Breakages $\{ (\nabla i), (+s^2), (-s^2), (+cs^2), (-cs^2) \}$ with velocity $\bar{v} = \bar{v}$ or and $> \bar{c}$ for Expanding , and carry them .

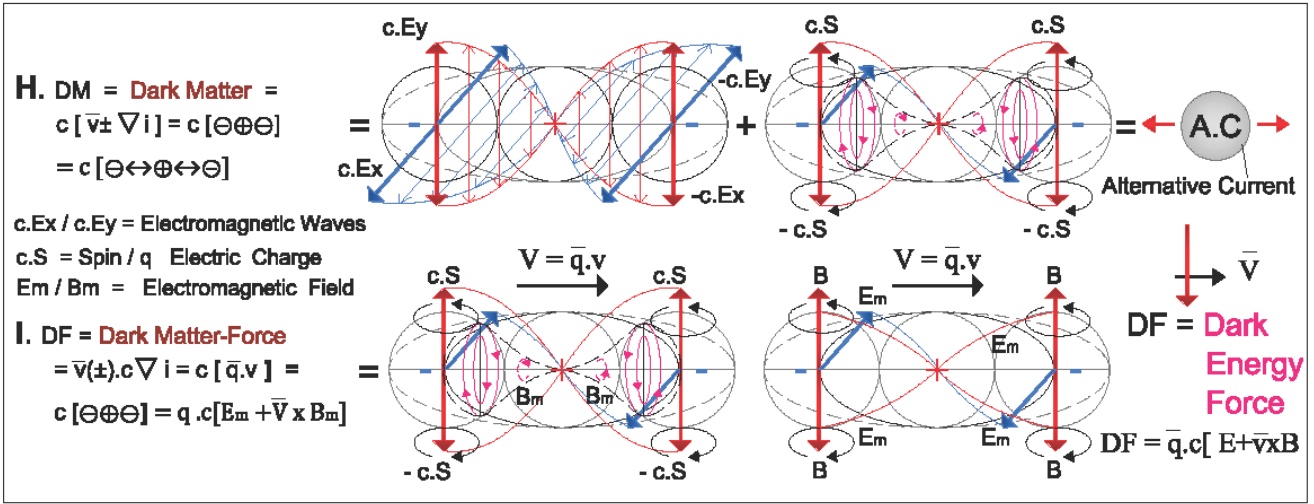


Figure .19. Dark Matter [A] →DM , Dark , Energy , Force [B] →DF. And the three
 DM → $c[|-s^2|↔|+s^2|↔|-s^2|] = c.\{\emptyset↔\emptyset\}$, i.e. Gravity travelling at light speed = $c|\Lambda|≡ c$ Spin
 DF → $\bar{q}.[E + \bar{v}B]$, acting on all Breakages In and Out of rolling Heap .
 Dark Matter travelling at light speed is Invisible , for the Rest In rolling Heap mixture.

Dark-energy [$\bar{c}.\bar{\nabla}i$] acting on the three constituents of DM = $[(+c.s^2), (-c.s^2), (\pm c.s^2)] = [|+s^2|↔|-s^2|]$ separately and being also a non-uniform field , then is not canceled but is a pushing force . As space expands, energy is not diluted because heap is also travelling with the same constant light velocity ,c, and so universe is normally expanding Since Dark –matter is a heavy and massive material , then is opposite to all kinds of matter and this heavy matter bend light passing near from objects further away i.e. DE is influencing in expanding of the Discrete universe . Because DE is a stationary force on DM , so participates in gravity and is exerting a strong gravitational pull on gravity field.

Action of [DE] ⊙ [DM] ≡ [$\bar{c}.\bar{\nabla}i$] ⊙ [DM] → [$\bar{c}.\bar{\nabla}i$]. $(+c.s^2)$, [$\bar{c}.\bar{\nabla}i$]. $(-c.s^2)$, [$\bar{c}.\bar{\nabla}i$]. $(\pm c.s^2)$ = [$\bar{c}.\bar{\nabla}i$] . $[|+c.s^2|↔|-c.s^2|]$, and Results to →

- 1.. DM → $[|+c.s^2|↔|-c.s^2|] = \bar{c}.[|+s^2|↔|-s^2|]$ attracts but how and why , and DE → [$\bar{c}.\bar{\nabla}i$] = $\bar{c}.\bar{\nabla}i$ repels and not competing
- 2.. DE is exerting a pull and a gravitational pull on all visible matter on the largest cosmic

scale of the universe and this because , being in the Heap , is travelling with the light velocity.

- 3.. DE by exerting pull on DM → [$\bar{c}.$]. $(+c.s^2)$ and on [$\bar{c}.\bar{\nabla}i$]. $(-c.s^2)$ highlights, and on → $\bar{c}.\bar{\nabla}i$. $[|+c.s^2|↔|-c.s^2|]$ the Darkness which is the tiny energy volume consisting the dipole of dark matter , and formulates the massive Dark Fringes jointed by gravity force [$\bar{\nabla}i$] and this because are not particles . [41]
- 4.. DM and DE are not visible because both travel with light velocity and so light is not interacting with them . Light , which is a particle , is interacting with the Rest Gravity field and all others with less velocity and so are detectable . Only velocities greater than that of light , or a New simultaneity mechanism , can make them visible .

When Anti-matter annihilates with matter , gamma rays are produced because in Energy-space continuum remains only the energy while DE acting on DM fragments $|+c.s^2|$, $|-c.s^2|$ formulates the massive compact spherical objects and the massive compact anti-spherical Anti-objects. Energy is stored in Electromagnetic Resonance of the other Sub-particles.

Dark-energy $[\bar{c} \cdot \nabla i]$ acting on the three constituents of DM = $[(+c.s^2), (-c.s^2), (\pm c.s^2)] = [|+s^2| \leftrightarrow |-s^2|]$ separately and being also a non-uniform field, then is not canceled but is a pushing force. As space expands, energy is not diluted because heap is also travelling with the same constant light velocity, c , and so universe is normally expanding. Since Dark-matter is a heavy and massive material, then is opposite to all kinds of matter and this heavy matter bend light passing near from objects further away i.e. DE is influencing in expanding of the Discrete universe. Because DE is a stationary force on DM, so participates in gravity and is exerting a strong gravitational pull on gravity field.

Action of $[DE] \odot [DM] \equiv [\bar{c} \cdot \nabla i] \odot [DM] \rightarrow [\bar{c} \cdot \nabla i] \cdot (+c.s^2), [\bar{c} \cdot \nabla i] \cdot (-c.s^2), [\bar{c} \cdot \nabla i] \cdot (\pm c.s^2) = [\bar{c} \cdot \nabla i] \cdot [|+c.s^2| \leftrightarrow |-c.s^2|]$, and Results to \rightarrow

- 1.. DM $\rightarrow [|+c.s^2| \leftrightarrow |-c.s^2|] = \bar{c} \cdot [|+s^2| \leftrightarrow |-s^2|]$ attracts but how and why, and DE $\rightarrow [\bar{c} \cdot \nabla i] = \bar{c} \cdot \nabla i$ repels and not competing
- 2.. DE is exerting a pull and a gravitational pull on all visible matter on the largest cosmic scale of the universe and this because, being in the Heap, is travelling with the light velocity.
- 3.. DE by exerting pull on DM $\rightarrow [\bar{c} \cdot \nabla i] \cdot (+c.s^2)$ and on $[\bar{c} \cdot \nabla i] \cdot (-c.s^2)$ highlights, and on $\rightarrow \bar{c} \cdot \nabla i \cdot [|+c.s^2| \leftrightarrow |-c.s^2|]$ the Darkness which is the tiny energy volume consisting the dipole of dark matter, and formulates the massive Dark Fringes jointed by gravity force $[\nabla i]$ and this because are not particles. [41]
- 4.. DM and DE are not visible because both travel with light velocity and so light is not interacting with them. Light, which is a particle, is interacting with the Rest Gravity field and all others with less velocity and so are detectable. Only velocities greater than that of light, or a New simultaneity mechanism, can make them visible.

When Anti-matter annihilates with matter, gamma rays are produced because in Energy-space continuum remains only the energy while DE acting on DM fragments $|+c.s^2|, |-c.s^2|$ formulates the massive compact spherical objects and the massive compact anti-spherical Anti-objects.

- 5.. Because of the DM and DE structure, which is breakages and force, collision of galaxies does not predict stars to be smashed into others. As above are created the, gas clouds, which are smashed into the other and get heated and so be a visible effect.
- 6.. Because light is a particle with velocity, c , interacts with the REST gravity field by the Gravity force while DM, DE having the same velocity have a parallel motion, *not parallel universes*, which cannot see it. DE has exactly the same effect as that of a very small constant vacuum energy MFMF field. Energy density of the Rest base MFMF is that of gravity, I_G , while of the Moving DE, DM is that of, $c \cdot I_G$, so in this way occurs expansion of the universe. GR being confined in Planck's length L_p , could not see the whole Energy-space beyond this length, the empty space, and the way and the how could expansion occurs.

Cosmological constant is the value of the energy density of the vacuum in the tiny space, without describing the how this tiny volume is expanded, so why to presume this as constant? The answer is that this was then introduced just to surpass the problem. [41]

- 7.. Because DM, DE consist a not homogeneous heap of mass and energy distribution (anomalous mass) and permeate in the whole universe, is causing what is said, the expansion of the universe to accelerate without any Big-Bang explanation and of any other mysteries forces. The motion of this DM, DE, mixture of the spherical opposite signed materials and dipole energy blobby volumes, is not in contrary to gravity, FG , because both have already passed from the center of STPL contracted mechanism and Both Dipole are jointed by the same force, the Gravity (∇i) forming the Electromagnetic Gravity field which is the Rest base of all universe and which doesn't exist apriori, but it is the Base, and this because of the zero velocity, on which the moving Electromagnetic Gravity Dark-Matter-Field the DE- DM heap mixture, with the same velocity, c , is rolling, expanding, with the maximum constant velocity, c , and is

continually formulating the ,

Zero → Discrete → Infinite Geometrical Universe.

8.. Black holes are gravitational wells ,caves, in EREBUS and BLACK-NIGHT , so any next constituent is dissipated or collapsed , swallowed . Following above analysis it is a kind of mechanism which is source of energy and because of conservation of energy law, Black-holes , the Quasars , exist in the centers of galaxies and are the beacons for astronomers and consist the *recycled Space machines of the universe* . DE,DM being also constituents are also recycled in Black-holes. The why are embedded in DM is a problem of stability and conservation of space and energy . Black-hole growth is connected with their existence in the center of every Galaxy , and the returning through STPL entrance , the pole entrance where $v = \pm w.r = 0$, to energy cave , **Black-Night** . [52]

9.. The principle of Virtual Work is the energy method for static procedure of interconnected Systems of material points or bodies of higher DOF and associated with the equilibrium of them and may be stated as follows

< If a system in equilibrium under the action of a set of forces is given a virtual displacement , the virtual work done by the forces will be zero , and the opposite , and the Virtual work done by the forces is zero for any equilibrium system under the action of a set of forces > .

In case of two material points the static procedure is , the Virtual work done by two forces is zero for a dual , *the dipole*, equilibrium system which results to the equality of two opposite signed forces . [34] .

10.. Dark Matter travelling with Light velocity is not visible unless another light with velocity faster than that of light exists , while this Velocity $v > c \rightarrow = \infty$ exists only in [PNS] in contradiction to destructive Interference . Because DM-DE , are both travelling with light velocity therefore Dark Energy ,DE, is stored in ,DM, fringes . [49]

The destructive Interference :

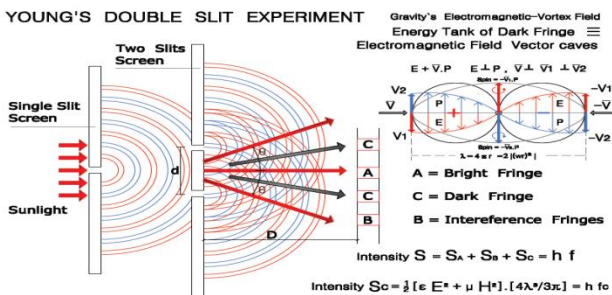


Figure. 20 The destructive Interference creates Dark fringes ,C, which conserve Energy in wavelength's Electromagnetic field $E \perp P$, in a Standing Wave , not travelling .

10. The creation, Quantization, Processes

10.1. The Geometrical , Quantization ,of the New Creation Hypothesis is as follows , [43]

a.. From Nothing (i.e. the Point) to Existence (i.e. to be another Spherical Point) issues the zero Virtual work law , which Work is the equilibrium of the two equal and opposite forces on points . Thus , Space is the Point and Anti- space is the Other Point . Infinite points are between , the Point and Other Point , and between the Infinite points also which consist the Primary Neutral Space , i.e. the infinite points and discrete and the in between infinite distances .

b.. The Work from , *the Linear motion of opposite forces* ,exist on the infinite points between , the Point , and , the Other Point, which Opposite forces with different lever-arms exert the equal and opposite Momentums which equilibrium in a rest and of opposite motion system , where the total Work done in System is zero.

c.. The Work from , *the Rotational motion of opposite forces* , exists on Opposite Momentums which are only in the Rest curl Energy volumes differently would not be rest . This inverse vertical motion results to velocity vectors collision which are so crushed into fragments , and after clashed with the velocity vectors \vec{v}, \vec{c} are thrown OFF , the curl Ellipsoid energy volume (*the Quanta Absolute System*) , and through an Anti-diffused geometrical mechanism , again in a new energy volume (the Relative System are the parallel Inertial systems) . Black holes , exist on the inverse vortical motion in zero poles where missing mass is recycled through this tiny volumes.

d.. This Anti-diffused mechanism drives all clashed fragments either through the , Centre of Common circle curl Ellipsoid forming the continuously created Rest Gravity Field-energy and the Movable Dark Matter-energy , or through the Tangents on Circumference of Common circle curl Ellipsoid and forming through STPL , the Movable Particles-Antiparticles-Bosons , all , to an Simultaneity Relative cylindrical volume.

e.. In this cylindrical volume , which are the parallel inertial systems , exists the Rest and discrete Electromagnetic Gravity Field , which is the Base carpet , for the Movable and discrete Electromagnetic Gravity Field of Dark Matter and for all Formation in Rest or Movable , by Pulling and Repelling and also all moving Particles –Antiparticles and Bosons , on where are applied laws of Chemistry and Physics.

10.2. The Mechanical , Quantization , process , in [43].

The principle of Virtual Work is the motion of a force ,P, executed on a point A → P_A to reach point B, so P_A force acting on point A (which is Nothing) reaches point B (which is also Nothing) as P_B , i.e. stability of the system A-B is obtained by the equal and opposite forces acting on points A , B .

On the infinite points between the two infinite and opposite forces are also acting on them and resulting to a Whirling on a line perpendicular to A-B axis . Because of unbalance of Whirling, *it is a common source of vibration excitation* , the Rotating unbalanced is then represented by an angular velocity ,w. The rest system of this opposite Whirling Energy , *the vortices* , exists in the vibrating Ellipsoid volume which is a geometrical cave .

This inverse vortical motion as (w, - w) , in cave results to velocity vectors collision which are crushed into fragments and after clashed with the velocity vectors are thrown OFF this , curl Ellipsoid energy volume (the Absolute System) , through an Anti – diffused geometrical mechanism [the STPL] to a new energy parallel volume (the rest and Relative System) .

Fragments through ,The Centre (where v=0) of the Common circle Ellipsoid , form → The Rest Gravity Field-energy and the Movable Dark Matter-energy , *and through The Tangent (where v = v) on the Circumference of the curl Ellipsoid circle* , form the Movable Particles–Antiparticles-Bosons , DM-DE , to an Simultaneity Relative cylindrical volume.

All movable elements are formulated , by Pulling and Repelling , i.e. all moving Particles–Antiparticles and Bosons and all their producing`s on where laws of Chemistry and Physics are applied.

Thrust [$\bar{c} \cdot \nabla i$] with light velocity , \bar{c} , acting on the

five Energy and Space Fragments ,i.e. → [$\bar{c} \cdot \nabla i$]⊙[(∇i), (+s²),(-s²), (+cs²),(-cs²)] and on Particles , Antiparticles and Bosons , where it is holding on the , *energy cycloidal volumes* , { [(∇i) → (+s²)↔(-s²)] = The Energy -dipole Gravity-field] and on [(∇i)→(+cs²)↔(-cs²) = The Energy -dipole Gravity-Dark-matter - field] } , and carry them in the three dimensional parallel space with the light velocity , \bar{c} , as the Rest Gravity–field–Energy, and the rolling Movable Heap on it , the Dark–matter–energy}. This is the Expanding Universe without any Big-Bang , becoming from Virtual Work Principle and on Euclidean-geometry-moulds only .[43,49]

10.3.The Philosophical Quantization, Setting,[43]

- [A] All comments and critique become from article [some-physics],[42-43]
- [B] The , **Chaos** = Point , the **It is** = Anti-point , *the discrete* → *Chaos* ↔ *It is* and , **What is done** = The Energy quanta consistence in Monads , i.e the Primary Dipole .

Explanatory – Interpretation :

- 1.. CHAOS is that is , extremely Big and small magnitude with finite or infinite directions, and simultaneously to be nothing and without Position , *the Non-existence*. This exists only in Euclidean geometry , on Points only, and is the only model for Universe.
- 2.. POSITIVE INFINITE (+ ∞) : It is the Inexperienced Space of the Universe with any Expanding Position (Direction → >) and Unlimited dimension, with no Form of Matter inside Chaos.
- 3.. NEGATIVE INFINITE (- ∞) : It is the Inexperienced Space of the Universe with any Shrinking Position (Direction < ←) and Unlimited dimension, with no Form of Matter inside Chaos.
- 4.. INFINITE : Innumerable, without Beginning and finally, without Size and Volume either this is Small or Big.
- 5.. MATTER : It is the Substance from which it is constituted any Thing or any Volume and in generality the substance of Units (it is a relative measure for the changes in motion) .
- 6.. BODY : It is the each one , the Material Object.
- 7.. SUBSTANCE : It is also the main Component of a Material or not Body.
- 8.. OBJECT : It is Anything that becomes perceptible with the five senses or and with other means.
- 9.. QUALITY : It is the Inner Nature of

things (Body, Unit or monad)

10..QUANTITY : Is Each what it can be Measured (the inner or the outer numerical value).

11..BE BORN : Everything coming from something else , or from mechanism.

12..EVOLUTION : The Step by step , differentiation inside the same Quality.

13..TIME : Time in Euclidean geometry is not extra distinguished , because time is a conversion factor existing only in its confined-Plank's length level - , and neither Space from Energy because Energy exists as the quanta on any first dimensional Unit AB , - which is connecting the only two fundamental elements of Universe , that of points and that of energy in the material dipole which is the same for all , *The Standing Electromagnetic Field* , units AB .

14..CONVERSION : The Changes , Alters , the mechanism of Changes in something else or a copy of itself.

15..POTENTIAL : The Sum of Work where it produces a Force when It acts.

16..EXPERIENCE : The conscious conceive of knowledge , *via our mind* , of the Objective and reflected to us reality.

17..EXISTENCE : This which Exists in Universe and can be measured inside Chaos , *That which it Is = The discrete* . The composition of Existence is the joint of Oppositions. Quanta of energy is the first material dipole of existence i.e .

The Finite exists because of the opposite Infinite , and this is the Potential of dipoles in tiny volumes).

18..BECOMING : This which Alters and is Altered in Universe and it is found inside Existence . The Becoming is the Conversion (Evolution=Quanta) where becomes , in various organized Levels of Matter with main Component, *motion*, and finally to the New Units and to the Material Worlds . This where it becomes , (Becoming) it is Twin because of the two directions of Units (the Matter and Anti-Matter) , via a symmetrical Transformation of any System and it is its Idol , *as Space and Anti-space* , so much in Spaces and also in Time , *all changes* . Stability of the infinite opposite directional forces presupposes equilibrium of vortices . Points of a Space with different lever-arms exert the equal and opposite Momentums for equilibrium , i.e. The Opposite Momentum in the Rest- Curl-Energy volume.

[C] Continuous transformations with time-moments $\rightarrow t-1, t-2, t-3, t-4 \leftarrow$ and conservation laws (time or space change - turn - addition - with elementary steps)

A : ***Continuous Transformation*** is a Natural System (a continuous Space-System with points , which are nothing) where it is moved or it is turned Territorial and it is temporally realized , *discrete* , with successively elementary steps.

B : ***Discontinuous Transformation*** is a Natural System (a discrete Space-System with monads) where it changes the same System (*continuous Space*) to its Idol (to the discrete Anti-space) , and is realized with one unique and indivisible step . This position defines the correlation steps of the Euclidean geometry (Point , Segment , line ,Plane Volume , etc.) and Physics.

C : The ***Homogeneity*** of Empty- Space , and of Empty-Time.

The Empty Space is Homogeneous , that is to say each of its point is equivalent with all the other points wherever they are .

In nature , the Gravity field with material points , *the infinite curling Energy dipole* , is the empty homogeneous space beyond Planck's level .

All moved System remain unchangeable in Empty Space , and their Dynamic Energy is depended only from their Relative Place , and this because of **master-meters** , due to linear relation (*continuous analogy*) of Systems , where the position and the distance of points can be calculated between the points only , and to **perform Operations** (Divergence , Gradient , Curl , Laplacian) on points , where is in effect the Principle of Equality , i.e. Action-Reaction , and as generally imposed like T-1 ,

T-1 For $\rightarrow F = \text{Force}, m = \text{Mass}, v = \text{Speed}, g = \text{Acceleration}, R = \text{Impetus}$, then $F(ab) = F(ba)$ or $m(a)g(a) + m(b)g(b) = 0$ and after integration $\int F(ab)$, The Total Impedus $\rightarrow m(a).v(a) + m(b).v(b) = \text{constant}$		
That is to say Total Impetus From	$P = m(a).v(a) + m(b).v(b)$ is in Effect	= const i.e It Springs
Homogeneity of Empty Space \rightarrow	Principle of Equality Action of - Reaction \rightarrow	The Law of Conservation of Total Impetus ($\Sigma m.v$)
Homogeneity of Empty Time \rightarrow	Principle of Equality Independent of Time \rightarrow	The Law of Conservation of Total Energy

This conclusion defines Virtual work principle which issues between Primary Point and Anti-point and Physical laws on monads (discrete space \rightarrow *The Non-existence becomes existence by Becoming*).

D : The *Isotropia* of Empty - Space and of , Empty-Time.

$$dV = d[1/2.ma.Ua^2 + 1/2.mb.Ub^2] \text{ or } d(V+T) = 0 \text{ or } V + T = \text{Constant.}$$

The Empty Space is Isotropic when all its Directions are Equivalent . That is to say , all Relatively Natural Sizes and Laws remain Inalterable with Rotation , therefore is in effect via , *master-meters* .

Let \rightarrow

R (a) = The Place (Position) of the System (a) , *i.e. the Distance* , from a reference point 0 .

U (a) = The total Impetus of System (a).

La = The Impulse of any System from a fixed beginning , *reference* , point 0.

Via two Systems (a) and (b) , or any dipole systems (a),(b) is holding ,

Total Impulse $L = La + Lb = R(a).P(a) + R(b).P(b)$

$$= R(a).[m(a).\gamma(a)] + R(b).[m(b).\gamma(b)] =$$

$$= R(a).F(ab) + R(b).F(ba) = 0 \text{ or } \rightarrow$$

$$R(a).F(ab) - R(b).F(ba) = R(ab).F(ab) = 0$$

because equilibrium ,

and since $F(ab) = m(a).\gamma(a)$, $F(ba) = m(b).\gamma(b)$

hence is $R(a).[m(a).\gamma(a)] + R(b).[m(b).\gamma(b)] = 0$

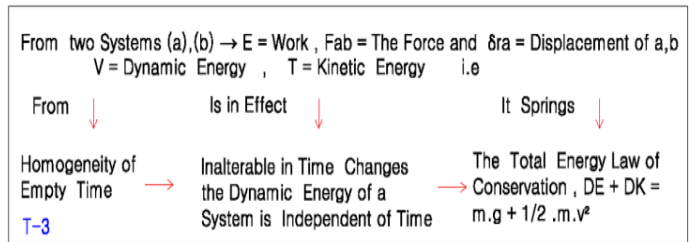
and is in effect \rightarrow

$$R(a).U(a) + R(b).U(b) = \text{Constant} \quad \text{i.e.}$$

Work \rightarrow as *Impetus* , *Momentum* and *Energy* \leftarrow produced in all Systems , is Conserved . (*Quantized*) as T-2 ,

Above conclusion define the , time moments , or Time periods , to be a relative measure of changes in any Dynamic Energy system and not essence , Continuous or Discrete . Empty space and generally the beyond gravity space is \rightarrow The Energy-Space-Continuum \leftarrow and not Space-time as in GR referred . [39]

The dynamics of any System = Work = Total



Energy, is transferred as generalized force Q_n as, $Q_n = \partial W / \partial (\delta \bar{q}_n)$, $(\delta \bar{q}_n) = \bar{v}_n . \delta t = [\bar{v}c + \bar{\omega} . \bar{r}_n] \delta t = (\text{Translational} + \text{Rotational velocity}) . \delta t$ as velocity and $Q_n = [\bar{v}c . (\partial T / \partial t) + \bar{\omega} . \bar{r}_n] . (\partial T / \partial t) \rightarrow$ Translational kinetic energy + Rotational kinetic energy as the Total Energy of the system which is constant . [40]

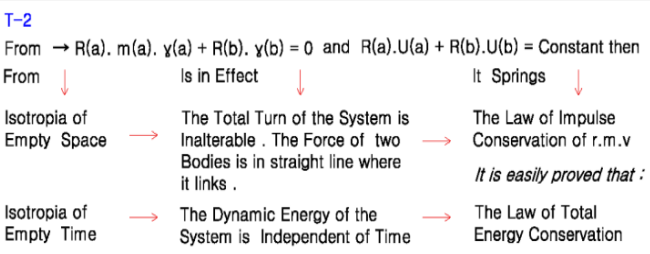
All above happen because , Space (System) is Quaternion and is composed of Stationary quantities , the position $\bar{r}(t)$, and the kinematic quantities , velocity $\bar{v} = dr/dt$ and acceleration , $\bar{a} = d\bar{v}/dt = d^2r/dt^2$. Kinematic quantities maybe also the tiny Energy Volume Caves (*cycloid is the λ , Space of velocity \bar{v} , and \bar{a} consist in gravity's field the infinite Energy dipole Tanks in where energy is conserved*) .

In this way all operations on points are possible and applicable because the position and the distance of points can be calculated between the points , and thus to ***perform the independent Operations*** (Divergence , Gradient , Curl , Laplacian) on points. F-21

F.. The *Isotropia* of Empty – Time :

It can be said that it is the case where Time Intervals follow one another and there is a Continuous and Objective Flow of succession of , no-Time , and also because of Homogeneity of

Empty Time and from the , \rightarrow Isotropia of Springs = equal to The Dynamic Energy of System which obeys \rightarrow The Total Energy laws , then Empty Time is Independent of Time of Conservation because of , *master -meters* , as this in table T4 .



E : The *Homogeneity* of Empty - Time.

It is the case where do not exist Time Moments or also time periods where from alone , them , they distinguish from remainder. That is to say each Time moment it is from alone Equivalent with any other and whenever . A Direct consequence of the Empty Time is that the Dynamic Energy of a System (a) or (b) does not depend from Time , but only from the Relative Places of the Elements where are the points , *Master -Meters* , *i.e. Energy-Space* and not Space-time T-3

$$\text{Work } W = F_{ab} . \delta r_a = ma.(dUa/dt).dr = 1/2 d [ma.Ua^2] + F_{ba} . \delta r_b = 1/2.d[mb.Ub^2] , \text{ therefore}$$

Dynamic Energy change is $\delta V = - F_{ab} . \delta r_a - F_{ba} . \delta r_b$, and $D - W \rightarrow DV$, T is kinetic Energy , is

Territorial Reflection	→	Changes a System to its Idle	→	Symmetry of System - Idle $ra = -ra$
Time Reflection	→	Inversion of Flow - Time is equal to the alternation of Past with Future, or, does not exist also Objective Flow-Time	→	In Time t of the System and in time $-t$ of the Idle is in effect Symmetry $t = -t$, concerning any axis
T-4				

The Principle of Relativity Excess Homogeneity and the Isotropic of Empty Space and Time, and also that the Laws of Mechanics remain Inalterable and axiom, *The Constancy of the light speed for Transformations*, without any prof. The why speed of light is constant is **proved and is given** in [40-41].

Discontinuous Transformation and because of proved **Master - Meters** (*Temporally - Territorial where the Territorial Reflection changes a System to its Idle, or is holding, $ra = -ra$*) then issues Virtual work Principle.

(Time Reflection reverses the Flow of Time and consequently becomes an alternation of Past with the Future, that is to say does not exist objective Flow of Time where then is in effect Symmetry $t = -t$), Territorial Reflection is Anti-space where exists either in the tiny monads or in any other monad or body or,

System or anything which is in motion and simultaneously is in equilibrium, as this is the inner stability of wavelengths of monads which is obtained by the Evolute line of motion only. F-5

Relativity has nothing to say about Transformations, beyond Planck's level, because considers Time as one of the two elements of nature which is not.

There is not existing any Flow of Time, neither any other inversion because,

Time is a relative Measure of Changes, and not any Essence in transformations.

A simplified approach of these Transformation exist on the moving monads, where this Model of this, space Transformation, exists in case of Two Equal and perpendicular Units OA and OB and which they shape the Rectangle Isosceles triangle OAB on which are created all Squares and Anti-Squares, and which is

(The Plane procedure Mechanism = Mould)

Transformation exists in case of one Unit OA and on a point B, which they shape the triangle OAB on which are created all Anti-triangles and Sub-triangles as this is STPL < *The Six, Triple Concurrency Points, Line* > is an extension of two Fundamental branches of geometry that of

Perspectivity (*Desargues's theorem where 3 concurrency Points in a center of Perspectivity, and 3 concurrency points on a line of Perspectivity, per two sides*) and that of **Projective** geometry (*Pascal's theorem, with the 3 concurrency Points on a line, per two sides*). Analyzing Extrema Principle (Extrema) on lines and Points, it was found that in any triangle (*three points only, which form a Plane*) and on the circumcircle exist one Inscribed and one Circumscribed, *Extrema Triangle*, such that on the six Extrema lines (*with a common concurrency point only*), both Perspectivity and Projective geometry concurrence on Common points on the *Extrema Lines*, i.e. Non-Euclidean geometries exist as Extrema in Euclidean geometry.

Because of **master-meters**, due to linear relation (*the geometrically continuous analogy*) of Systems, where the position and the distance of points can be calculated between the points, *and to perform Operations as prior referred*, then in this geometrical Mechanism where 18+3 lines concurrence in Six Points on a line, *the STPL line*, then in this *Territorial Reflection*, *changes a System to its Idle as the prior* → i.e. ($ra = -ra$)

where then on this mould issues the Virtual work Principle. The Physical analogue of this mould is the eternal composition of infinite opposite derivatives, where the Ratio of the geometrical magnitudes, is such that have a linear relation (*the continuous analogy*) in all Spaces, as this happens to the Compatible Coordinate Systems as this is the Rectangular $[x,y,z],[i,j,k]$, and Cylindrical. The position and the distance of points can be then calculated between the points, and thus to **perform independent Operations** (Divergence, Gradient, Curl, Laplacian) on points only. [47]

Manifold of mathematics from Astrophysics to Quantum mechanics has progressively developed on Non-Euclid Geometries, so resulting to Relativity's Space-time confinement, unable to conceive, under Planck's cavity energy existence, and fundamental elements of Universe that of Space (*points*) and that of Work =Energy (*motion*).

11. The Unsolved Greek Problems.

The Special Problems of E-geometry consist the , Mould Quantization , of Euclidean Geometry in it , to become → Monad , through mould of Space –Anti-space in itself , which is the material dipole in inner monad Structure and which is identical with the Electromagnetic cycloidal field → Linearly , through mould of Parallel Theorem ,which are the equal distances between points of parallel and line → In Plane ,through mould of Squaring the circle , where the two equal and perpendicular monads consist a Plane acquiring the common Plane-meter , π , → and in Spaces (volume) , through mould of the Duplication of the Cube ,where any two Unequal perpendicular monads acquire the common Space meter $^3\sqrt{2}$, to be twice each other , as analytically all methods are proved and explained . [44-50] The Unification of Space and Energy becomes through [STPL] Geometrical Mould Mechanism of Elements , the minimum Energy-Quanta , In monads → Particles , Anti-particles , Bosons , Gravity Force , Gravity -Field , Photons , Dark Matter , and Dark-Energy ,consisting the Material Dipoles in inner monad Structures which is the Electromagnetic Cycloidal Field of monads . The solution of these problems are Part of the current article so are again presented .

11.1. The Extrema method of Squaring the circle .

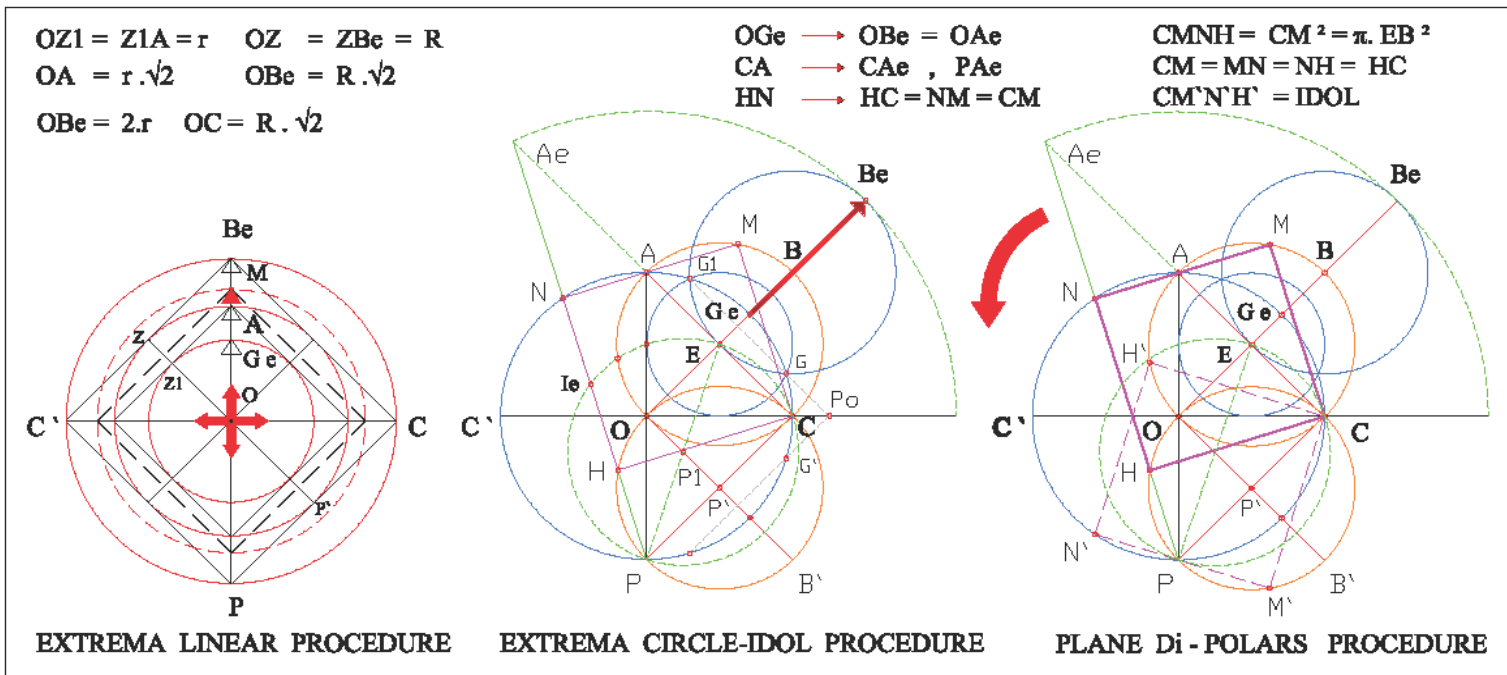


Figure.21 → The steps for Squaring any circle (E ,EA = EC) on diameter CA through the –Four-Polar Extrema Procedure method .

In (1) Expanding Inscribed circle O,OGe to → to circle O, OA → to circumscribed O,OM .

In (2) Expanding Inscribed square CBAO to → to square OMNH → to circumscribed CAC'P

In (3) Extrema Edge circle O,OBe to → to Ae point → to extrema square $CMNH = NH^2 = \pi \cdot EA^2$

The Plane Procedure method is consisted of two equal and perpendicular vectors CA, CP , **the Mechanism**, where $CA = CP$ and $CA \perp CP$, such, that the Work produced is zero and this because each area produced by them is zero, with three conjugate Poles A, C, P related to central pole O , with three Pole-lines CA, CP, AP and three perpendicular Anti - Pole-lines OB, OB', OC , and is proved that \rightarrow

is Converting the Rectilinear motion on the Mechanism, to Four - Polar Expanding motion.

The formulated Five Conjugate circles [F21-1, F22-4] with diameters $\rightarrow CA = OB, CP = OB', EBe = OB, P'Pe = OB', PoP1 = PoP2 = CA$ and also the common circumscribed circle $(O, OA = OC = OP)$ on them, and this because no other figure may be mapped on them, \leftarrow define **A System of infinite Changable Squares from the Inscribed $\rightarrow CBAO$, to any other in Square and to that equal to the circle $\rightarrow CMNH$ and, to the Circumscribed $\rightarrow CAC'P$, through the Four - Poles of rotation.**

The Geometrical construction : F.21-(2) – F.22

- 1.. Let E be the center, and CA is the diameter of any circle $(E, EA = EC)$.
- 2.. Draw $CP = CA$ perpendicular at point C and also the equal diameter circle $(P', P'C = P'O)$.
- 3.. From mid-point O of hypotynuse AP as center, Draw the Circumscribed circle $(O, OA = OP = OC)$ and complete Inscribed squares $OCBA$ and $OCB'P$.

On perpendicular diameters OB, OB' and from points B, B' draw circles $(B, BE = Be), (B', B'P')$ intersecting $(O, OA) = (O, OP)$ circle at double points $[G, G1], [G'G'1]$ respectively, and OB, OB' produced at points $Be, B'e$, respectively.

4.. Draw on the symmetrical to OC axis, lines $GG1$ and $G'G'1$ intersecting OC axis at point Po .

5.. Draw the edge circle (O, OBe) intersecting CA produced at point Ae and draw PAe line intersecting the circles $(O, OA), (P', P'P)$ at points $N-H$, respectively.

6.. Draw line NA produced intersecting the circle (E, EA) at point M and draw Segments CM, CH and complete quadrilateral $CMNH$, calling it the *Space = the System*.

Draw line CM' and line $M'P$ produced intersecting circle (O, OA) at point N' and line AN' intersecting circle (E, EA) at point H' , and complete quadrilateral $CM'N'H'$, calling it *the Anti-space = Idol = Anti-System*.

7.. Draw the circle $(P1, P1E)$ of diameter PE intersecting OA at point Ig , and (E, EA) circle at point Ib .

A.. Show that $CMNH, CM'N'H'$ are Squares.

B.. Show that it is an Extrema Mechanism, on

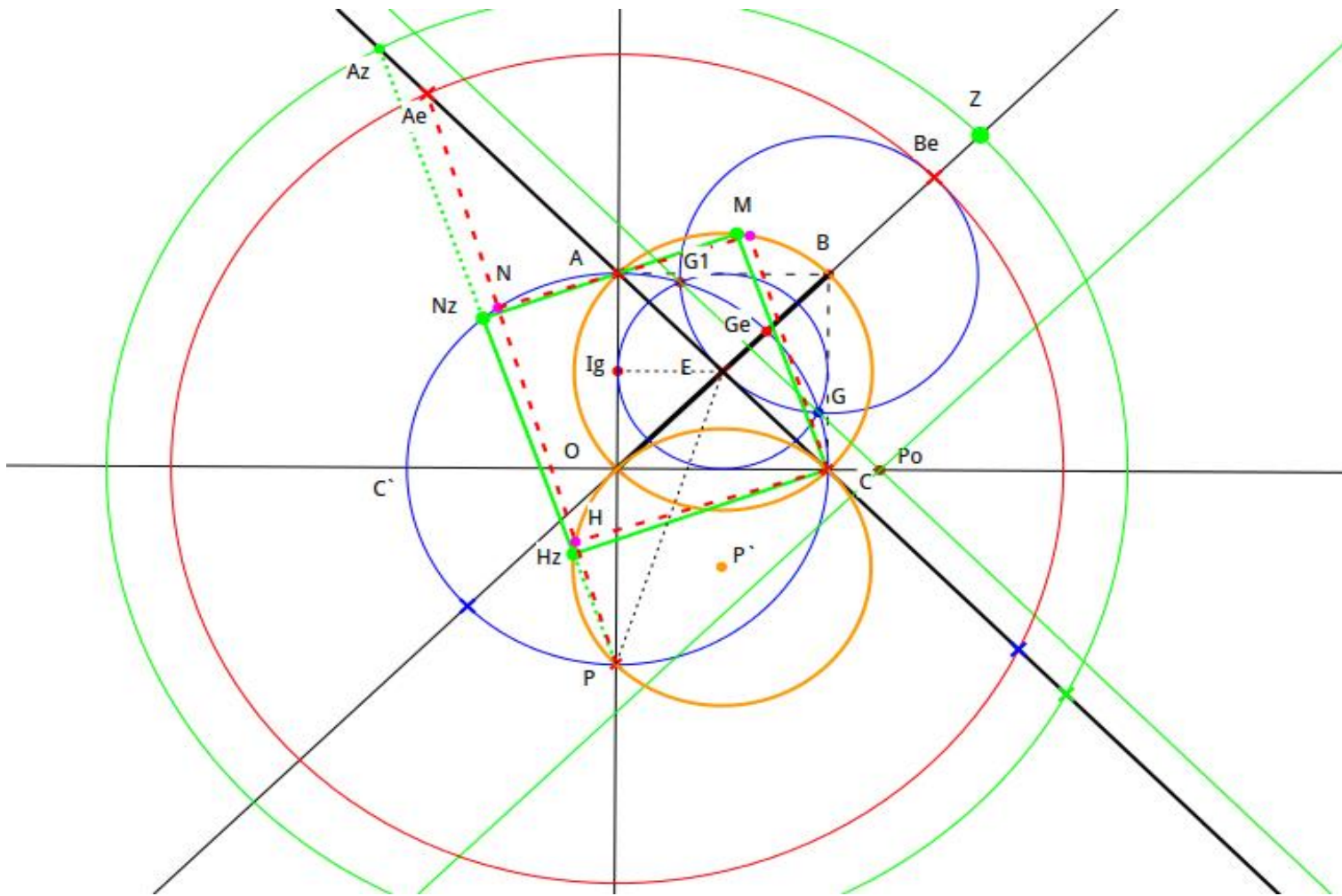
Four Poles where, **The Two dimensional Space (the Plane) is Quantized to a System of infinite Squares $\rightarrow CBAO \rightarrow CMNH \rightarrow CAC'P$, and to $CMNH$ square of side $CM = HN$, where holds**

$$CM^2 = CH^2 = \pi \cdot EA^2 = \pi \cdot EO^2$$

THE PROCESS OF SQUARING THE CIRCLE

The Geometrical construction follows Euclidean logic only for all steps, i.e. using the Ruler and the Compass.

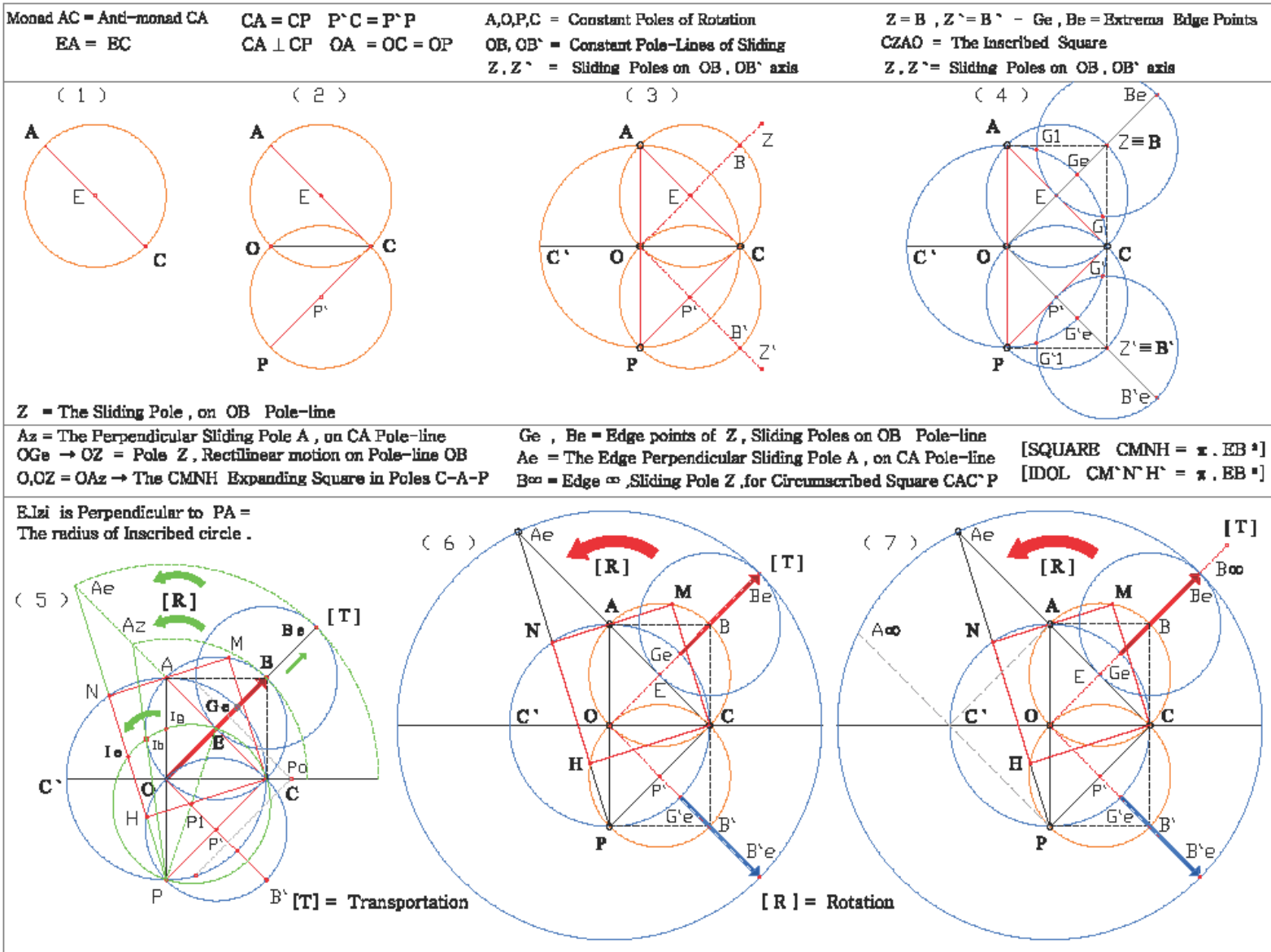
This E- logic when transfered to Computer's programs does not change the essence or any other characteristic of the problem.



F.21-A → *A Presentation of the Quadrature Method on Dr. Geo-Machine Macro - constructions*

The Inscribed Square CBAO , with Pole-line AOP , rotates through Pole P , to the → Circle-Square CMNH with Pole-line NHP , and to the → Circumscribed Square CAC'P , with Pole-line C'PP = C'P , of the circle E , EO = EC .

In (21-A) Expanding Inscribed square CBAO circulates on E,EO circle and on O,OA circumscribed circle , becoming the CMzNzHz square at sliding point Z and circle O,OZ , and CMNH square at point Be and circle O,Be = OAe , where then square CMNH = NH² = π.EA² equal to the circle , and CAC'P circumscribed square at point Z∞ ,and circle O,Z∞ , where Pole-line PA∞ // CA . A marvellous presentation on Dr.Geo machine constructions .



F.22 → The steps for Squaring the circle (E , EA = EC) on diameter CA through Plane Procedure Mechanism Inscribed Square CBAO → Circle-Square CMNH → Circumscribed Square CAC'P. *Extrema* Inscribed Circle [B ,BO/2] → rotates to Circle - Squared [S ,SM=SH=MH/2] → rotates to Circumscribed Circle [O ,OA= OP = AP/2] .

Analysis :

In F.22 - (1) $EA = EC$ and the unique circle (E, EA) of Segment AC , where AC, CA is monad Anti-monad.

In (2) Since circles $(E, EA), (P', P'P)$ are symmetrical to OC axis (line) then are equal (*conjugate*) and since they are Perpendicular so, \rightarrow No work is executed for any motion \leftarrow .

In (3) Points A, C, P and O are the constant **Poles** of Rotation, and $OB, OB', OC - CA, CP, AP$ the Six, **Pole** and **Anti - Pole**, lines, of sliding points $Z, Z',$ and $Az, A'z$, while CA, CP are the constant Pole -lines $\{ PA, PAz, PAe, PC' \}$, of Rotation through pole P .

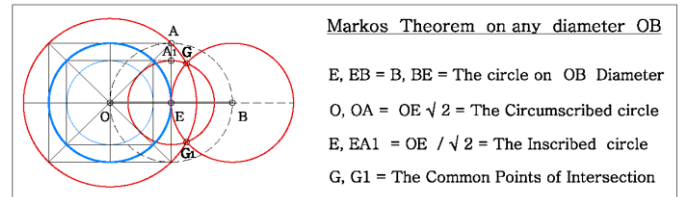
In (4) Circles $(E, EO), (P', P'O)$ on diameters OB, OB' follow, *Markos Theorem of the three circles on any Diameters on a circle*, where the pair of points $G, G1$ and $G', G'1$ consist a Fix and Constant system of lines $GG1$ and $G'G'1$. When Points Z, Z' coincide with the Fix points B, B' and thus forming the inscribed Square $CBAO$ or $CZAO$, (*this is because point Z is at point A*). The PA , *Pole-line*, rotates through pole P where Ge, Be , are the Edge points of the sliding poles on this Rectilinear-Rotating System.

In (5) Points $Z \equiv B, Z' \equiv B'$ on lines OB, OB' , and points $Az, A'z$ are the Sliding points while CA, CP , are the constant Pole -lines $\{ PA, PAz, PAe, PC' \}$, of Rotation through pole P .

Sliding points $Z, Z', Az, A'z$ are forming Squares $CMNH, CM'N'H'$, and this as in Proof A-B below, where PN, AN' are the *Pole-lines* rotating through poles P, A , and diamesus HM passes through O . The circles $(E, EO), (P', P'O)$ on diameters OB, OB' follow also, *my Theorem of the Diameters on a circle*.

In (6), Sliding poles Z, Z' being at Edge point $Ge \equiv Z$ formulates $CBAO$ Inscribed square, at Edge point $Be, Be \equiv Z$ formulates $CMNH$ equal square to that of circle and, at Edge point B^∞ , formulates $CAC'P$ square, which is the Extrema Circumscribed square.

In (7), are holding $\rightarrow CBAO$ the Inscribed square, $CMNH$ The equal to the $(E, EO = P'O)$ circle square, and $CAC'P$ the Circumscribed square.



F.23. \rightarrow *Markos theorem on any OB diameter.*

Theorem : [F.21-(5)], F.22

On each diameter **OEB** of a circle (E, EB) we draw,

- 1.. *the circumscribed circle* $(O, OA = OE \cdot \sqrt{2})$ at the edge point O as center,
- 2.. *the inscribed circle* $(E, OE/\sqrt{2} = OA/2 = EG)$ at the mid-point E as center,
- 3.. *the circle* $(B, BE = B.Be) = (E, EO)$ at the edge point B as center,

Then the three circles pass through the common points $G, G1$, and the symmetrical to OB point $G1$ forming an axis perpendicular to OB , which has the Properties of the circles, where the tangent from point B to the circle $(O, OA = OC)$ is constant and equal to $2EB^2$, and has to do with, *Resemblance Ratio equal to 2*.

A-B. The Common-Proof :

In F.21-(2-5),

Angle $\angle CHP = 90^\circ$ because is inscribed on the diameter CP of the circle $(P', P'P)$. The supplementary angle $\angle CHN = 180 - 90 = 90^\circ$. Angle $\angle PNA = \angle PNM = 90^\circ$ because is inscribed on the diameter AP of the circle (O, OA) and Angle $\angle CMA = 90^\circ$ because is inscribed on the diameter CA of the circle $(E, EA = EC)$.

The upper three angles of the quadrilateral $CHMN$ are of a sum of $90+90+90 = 270$, and from the total of 360° , the angle $\angle MCH = 360 -$

$270 = 90^\circ$, Therefore shape CMNH is **rightangled** and exists $CM \perp CH$.

Since also $CM \perp CH$ and $CA \perp CP$ therefore , angle $\angle MCA = \angle HCP$.

The rightangled triangles CAM , CPH are equal because have hypotynousa $CA = CP$ and also angles $\angle CMA = \angle CHP = 90^\circ$, $\angle MCA = \angle HCP$, **therefore side CH = CM** , and **Because CH = CM , the rectangle CMNH is Square** . The same for Square CM'N'H' . (o.e.δ),(q.e.d) .

This is the General proof of the squares on this Mechanism without any assumptions .

From the equal triangles COH , CBM angle $\angle CHO = \angle CHM = 45^\circ$ because lie on CO chord and so points H,O,M lie on line HM *i.e.*

Any segment PA → PAz → PAe → PC' = CA , drawn from Pole , P , beginning from A to ∞ , intersecting the circumscribed (O,OA) circle , and the circle (P' , P'P = P'C = EO = EC) at the points N,H, Formulates Squares CBAO , CMzNzHz , CAC'P respectively , which are , The Inscribed , In-between , Circumscribed Squares , of circle (O,OE) = (E,EO = EB) = (P,P'P) .

Since angles $\angle CAzP$, $\angle HCP$ have their sides CAz , CP – AzP,CH perpendicular each other , then are equal so angle $\angle PAzC = \angle PCH = \angle OZZm$, and so point Az , is common to circle O,OZ , Pole-line CA , and Pole-axis PN , where Z.Zm the perpendicular to CM .

Since PE is diameter on (P1,P1P) circle , therefore triangle E.Ig.P is right-angled and segment ,EIg, perpendicular to OA and equal to $OE/\sqrt{2} = OA/2$, the radius of the Inscribed circle . Since also point ,Ig, lies on PA , therefore moves on (P1 , P1.O) circle and point A on CA Pole-line and since point B is on the same circle as Az then point B moves on circle E , EB .

B.. Proof : F.22-5

In (1) Point Z , which moves on diameter OB produced , Beginning from Edge-point Ge of the first circle , Passing from center B of the second circle , Passing from Edge-point Be of the third circle , and Ending to infinite ∞ , → **Creates on**

the three circles (O,OA) , (E,EO/√2) , (B,BE) , the **Changeable moving Squares**

- a)..The Inscribed **CBAO** , at $Z \equiv Ge$
- b)..The In-between **CMzNzHz** , at $Z \equiv B$
- c)..The Extrema **CMNH** , at $Z \equiv Be$
- d)..The Circumscribed **CAC'P** . at $Z \equiv B\infty$

In (2). Through the four constant Poles A,C,P – O of the *Plane Procedure Mechanism* , pass (rotate) the Sides and Diamesus (from O) of Squares , Anti-Squares.

In (3). Point Z moving from Edge points Ge and , (forming inscribed square CBAO) , in-between points Ge-Be (forming any square CMzNzHz) , at Extrema point Be (forming that square CMNH equal to the circle) , and between points , Be - ∞ , (forming the circumscribed square CAC'P) .

In (4). Point Ig , belongs to the Inscribed circle (E , EG) and it is the Rotating , expanding , Inscribed Edge point on (P1,P1P) circle to Ig,Ib,Ie and to → P point . The other two , Sliding , Edge moving points B,A slide on OB , CA , Pole-lines respectively .

A – Proof (1) :

Since $BC \perp CO$, the tangent from point B to the circle (O , OA) is equal to :

$BC^2 = BO^2 - OC^2 = (2 \cdot EB)^2 - (EB \cdot \sqrt{2})^2 = 2EB^2 = (2EB) \cdot EB = (2 \cdot BG) \cdot BG$ and since $2 \cdot BG = BG1$ then $BC^2 = BG \cdot BG1$, where point G1 lies on the circumscribed circle , and this means that BG produced intersects circle (O, OA) at a point G1 twice as much as BG . Since E is the mid-point of BO and also G midpoint of BG1, so **EG** is the diamesus of the two sides BO,BG1 of the triangle BOG1 and equal to $1/2$ of radius $OG1 = OC$, the base , and since the radius of the inscribed circle is half ($1/2$) of the circumscribed radius **then the circle (E , EB / √2 = OA/2) passes through point G** . Because BC is perpendicular to the radius OC of the circumscribed circle , **so BC is tangent and equal to $BC^2 = 2 \cdot EB^2$. (o.e.δ).(q.e.d)**

Proof F.21- (5-6) :

The point **Z** moving on **OB** Pole-line, defines on **CA**, point **Az** as that of intersection of circle (O,OZ) and this line. Polar-line PAz defines N,H points such that CHNM right angled is completed as Square without any more assumptions.

Following again prior A-B common proof, Angle < CHP = 90° because is inscribed on the diameter CP of the circle (P', P'P).

The supplementary angle < CHN=180 - 90 = 90°. Angle < PNA = PNM = 90° because is inscribed on the diameter AP of the circle (O, OA) and Angle < CMA = 90° because is inscribed on the diameter CA of the circle (E, EA = EC). The upper three angles of the quadrilateral CHMN are of a sum of 90+90+90 = 270, and from the total of 360°, the angle < MCH = 360 - 270 = 90°, therefore shape CMNH is rightangled and exists CM ⊥ CH. Since also CM ⊥ CH and CA ⊥ CP therefore angle < MCA = HCP.

The rightangled triangles CAM, CPH are equal because have hypotynousa CA = CP and also angles < CMA = CHP = 90°, < MCA = HCP and side CH = CM therefore, rectangle CMNH is Square on **CA,CP** Mechanism, through the three constant Poles C,A,P of rotation. The same for square CM'N'H'. (o.ε.δ)-(q.e.d).

From the equal triangles COH, CBM angle < CHO = CHM = 45° and so points H,O,M lie on line HM .i.e. Diagonal **HM** of squares CMNH on Mechanism passes through central Pole O. (o.ε.δ)-(q.e.d).

The two equal and perpendicular vectors CA, CP, *the Plane Mechanism*, of the Changable Squares through the two constant Poles C, P of rotation, is converting *the Circular motion to Four-Polar Rotational motion*.

Transferring the above property to [F.21 -(5)] then when point Z moves on OB → Point Az moves on CA and → PAz line defines on circle of diameter PE the points Iz, on circles O,OA = Circumscribed P'P'O = The Circle, and points H,N such that shapes → CHNM are all Squares between the Inscribed and Circumscribed circle. Since the Areas of above circles are →

$$\begin{aligned} \text{Area of Inscribed} &= \frac{1}{2} \pi \cdot OE^2 \\ \text{Area of Circle} &= 1 \pi \cdot OE^2 \\ \text{Area of Circumscribed} &= 2 \pi \cdot OE^2 \end{aligned}$$

and those of corresponding squares, then one square of the *Plane Mechanism* is equal to the circle, but, Which one ??.

→ **That square which is formed on Extrema Case. The Plane Mechanism :**

The radius of the inscribed circle is AB/2 and equal to the perpendicular distance between center E and OA, so any circle of EP diameter passes through the edge-point (Ig), and point (Ib) is the Edge common point of the two circles.

The Common Edge-Point of the three circles is (Ie) belongs to the Edge point Be of circle (B, BE = B.Be), so exists,

Case :	[1]	[2]	[3]	[4]
Point Z at →	Ge	B	Be	B ∞
Point A at →	A	A(I)	Ae	A ∞
Point Ig at →	Ig	Iz = Ib	Ie	P
	↓	↓	↓	↓
Square	CBAO, CmiNiHi, CMNH, CAC'P			

i.e. Square CMNH of case [3] is equal to the circle, and $CM^2 = CH^2 = \pi \cdot EA^2 = \pi \cdot EO^2$
On the three Circles and Lines exist →

- a).. Circle (O,OZ = OGe) is Expanding to → (O,OZ = OBe) Circumscribed circle, for the CBAO square.
- b).. Point (A-Ag) to → (A-Az) is The Expanding Pole-line A-Az for the In-between CMzNzHz square,
- c).. Circle (P1,P1-Ig) is Expanding to → (P1,P1-Ib) Inscribed circle (E,E-Ig) to Ib point.
- d).. Point (P-Pg) to → (P-Pe) is The Expanding Pole-line P-Pe for the Extrema CMNH = $\pi \cdot EA^2$ and is the square equal to the circle,
- e).. Circle (O,OZ=OB∞), Pole-line (A-AZe = A∞), Pole-line (P-PIe = PP → P), for CAC'P square, Point N on (O,OA), belongs to Circumscribed circle, Point Ie on circle with diameter ,PE, belongs to the Inscribed circle (E, EIg = EG), while Point H on (P',P'O), belongs to the Circle.

i.e. It was found a Mechanism where the Linearly Expanding Squares \rightarrow CBAO – CMNH – CAC`P, and circles \rightarrow (P1,P1E) – (B, BE) – (O,OA) , which are between the Inscribed and Circumscribed ones, are Polarly – Expanded as Four – Polar Squares .

The problem is in two dimensions determining an edge square between the inscribed and the circumscribed circle . A quick measure for radius $r = 2694$ m gives side of square 4775 m and $\pi = 3,1416048 \rightarrow 11/10/2015$

Segments CM = CM` is the Plane Procedure Quantization of radius EC = EO in Euclidean Geometry, through this Mould (The Plane Procedure Method is called so, because it is in two dimensions \rightarrow CA \perp CP) as this happens also in Cube mould for the three dimensions of the spaces, which is a Geometrical machine for constructing Squares and Anti - Squares and that one equal to the circle . This is the Plane Quantization of, E - Geometry, i.e. The Area of square CMNH is equal to that of one of the five conjugate circles, or $CM^2 = \pi \cdot CE^2$, and System with number π to be a constant .

B – Proof (1) :

Since circle (O,OGe) intersects CA vector at point A forming the inscribed square CBAO , the circle (O,OZ) is intersecting CA at point Az forming square CMzNzHz then F-16A edge circle (O,ObE) intersecting CA at point Ae is forming square CMNH equal to the circle . The circle (O,OB ∞) intersecting CA at point A ∞ (and Pole-line PAz becomes PC` which is parallel to PA) is forming the circumscribed square CAC`P .

B – Proof (2) :

Since PE is diameter on (P1,P1P) circle , therefore triangle E.Ig.P is right-angled and ,EIg, perpendicular to OA and equal to , OE / $\sqrt{2}$ = OA/2 , to the Inscribed circle . Since also point ,Ig, lies on PA , therefore moves on (P1,P1O) circle and point A on CA Pole-line and since point B is on the same circle as Az then B moves on OB Pole-line .

Remarks :

Since Monads $AC = ds = 0 \rightarrow \infty$ are simultaneously (actual infinity) and (potential infinity) in Complex number form , this defines that the infinity exists also between all points which are not coinciding , and **ds** comprises any two edge points with imaginary part , for where this property differs between the infinite points between edges .This property of monads shows the link between space and energy which Energy is between the points and Space on points.

In plane and on solids , energy is spread as the Electromagnetic field in surface .

The position and the distance of points , can be calculated between the points and so to **perform independent Operations** (Divergence, Gradient , Curl , Laplacian) on points only .

This is the Vector relation of Monads , ds = CA ,(or , as Complex Numbers in their general form $w = a + b \cdot i = discrete\ and\ continuous$) , and which is the Dual Nature of Segments =

monads in Plane, to be discrete and continuous). Their monad-meter is CM in Plane , and in two dimensions is CM , the analogous length , in the above Mechanism of the Squaring the circle with monad the diameter of the circle .

Monad is length ds = CA= OB , the diameter of the circle (E , EA) with CBAO Square , on the Expanding by Transportation and Rotation Mechanism which is \rightarrow {Circumscribed circle (O,OA) – Inscribed circle (E , EG = E.Ig) - Circle (B, BE) } \leftarrow In extended moving System \rightarrow {OB Pole-line – CA Pole-line – Circle (P1,P1.B = P1.Ig) } ,and **Is quantized to CMNH square.**

A deeper analysis for , Mechanics and Physics , concerning the Theorem of the three circles and applications , in [51]

11.2.. The Duplication of the Cube , or the Problem of the two Mean Proportionals .

The Extrema method for the Duplication of the cube ? [44-45]

This problem is in three dimensions as this first was by Archytas proposed by determining a certain point as the intersection of three surfaces , a right cone , a cylinder, a tore or anchoring with inner diameter nil . Because of the three master - meters where is holding the Ratio of two or three

geometrical magnitudes , is such that they have a linear relation (continuous analogy) in all Spaces , the solution of this problem , as well as that of squaring the circle , is linearly transformed .

The geometrical construction is in F-24 :

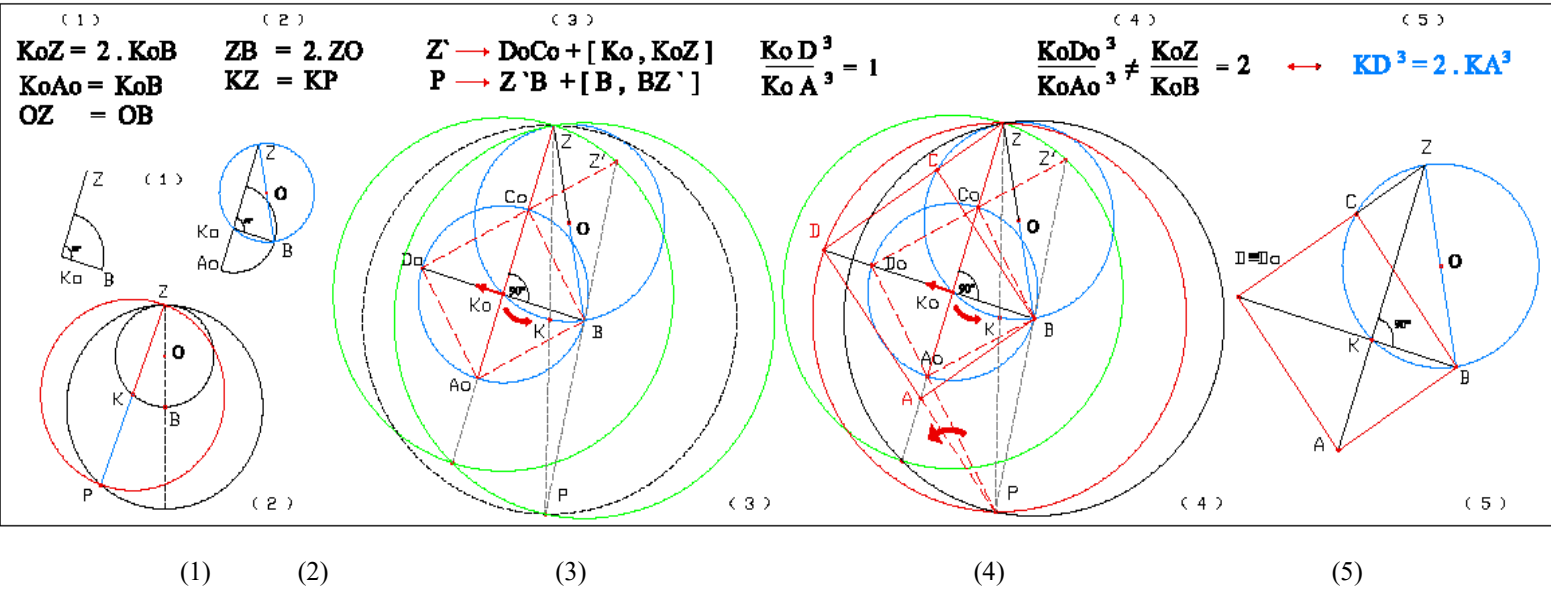
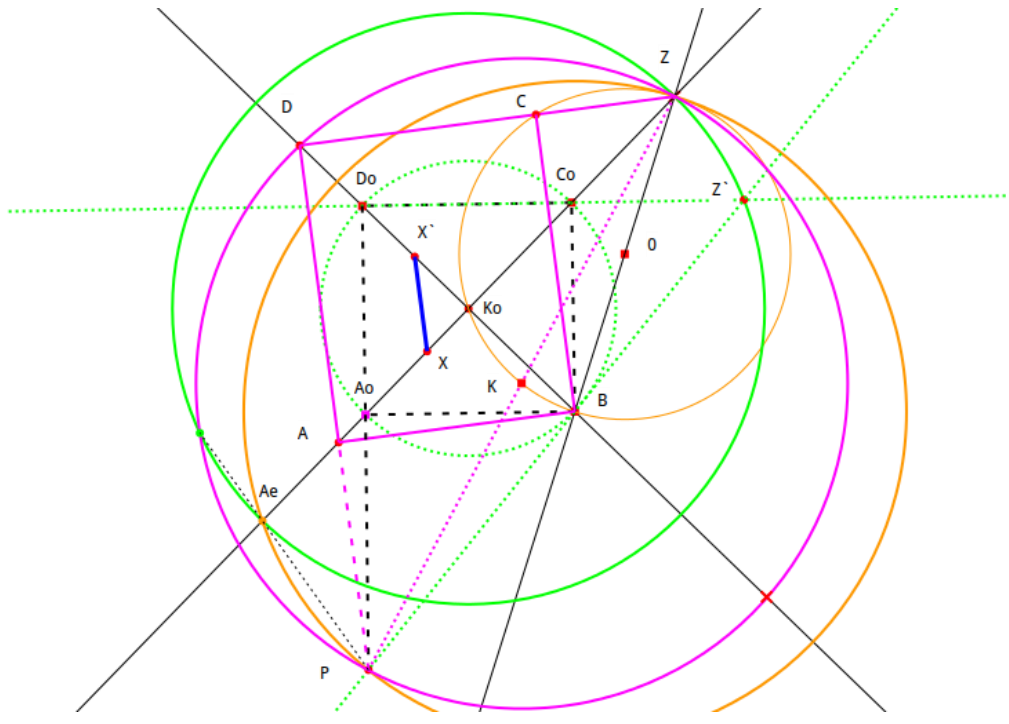


Figure .24. The Mechanical Extrema Poles of rotation in any circumcircle of triangle ZKoB



F.24-A. → A Presentation of the Duplication Method on Dr.Geo - Machine Macro – construction. BCoDoAo Is the initial Basic Quadrilateral , square , on KoZ , KoB ,Extrema-lines mechanism which rotates through ,P, Pole to BCDA Extrema quadrilateral.

→ BCDA Is the In-between Quadrilateral , on (K,KZ) Extrema-circle , and on KoZ-KoB Extrema – lines of common poles Z , P , mechanism . *The Initial Quadrilateral BCoDoAo , with Pole- lines DoAoP - DoCoZ , rotates through Pole P and the moveable Pole Z` on Z`Z arc , to the → Extreme Quadrilateral BCDA through Pole-lines DAP - DCZ with point Do , sliding on BKoDo Pole-line .*

Draw Line segment KoZ to be perpendicular to its half segment KoB or as $KoZ = 2.KoB \perp KoB$ and the circle (O, BZ/2) of diameter BZ . Line - segment ZKo produced to $KoAo = KoB$ (or and $KoXo \neq KoB$) is forming the Isosceles right-angled triangle AoKoB.

Draw segments BCo , AoDo equal to BAo and be perpendicular to AoB such that points Co , Do meet the circle (Ko,KoB) in points Co , Do

respectively, and thus forming the inscribed square BCoDoAo . Draw circle (Ko ,KoZ) intersecting line DoCo produced at point Z` and draw the circle (B , BZ) intersecting diameter Z`B , produced at point P (*the Pole*) . Draw line ZP intersecting (O , OZ) circle at point K , and draw the circle (K , KZ) intersecting line BDo produced at point D .

Draw line DZ intersecting (O , OZ) circle at point C and Complete Rectangle DCBA on diamesus BD and triangle BCD.

Show that this is an Extrema Mechanism on where , *The Three dimensional Space KoA , is Quantized to KoD as → $KoD^3 = 2. KoA^3$.*

Analysis : F-24

In (1) $KoZ = 2.KoB$ and $KoAo = KoB$, $KoB \perp KoZ$ and so $KoZ / KoB = 2$.

In (2) Circle (B, BZ) with radius twice of circle (O, OZ) is *the extrema* case where circles with radius $KZ = KP$ are formulated and are the locus of all moving circles on arc BK as F23-(2), F.24.

In (3) Inscribed square BCoDoAo passes through middle point of KoZ so $CoKo = CoZ$ and since angle $\angle ZCoO = 90^\circ$, then segment $OCo \parallel BKo$ and $BKo = 2.OCo$.

Since radius OB of circle (O,OB = OZ) is $\frac{1}{2}$ of radius OZ of circle (B,BZ = 2.BO) then ,D, is *Extrema* case where circle (O,OZ) is the *locus of the centers* of all circles (Ko, KoZ) ,

(B, BZ) moving on arc ,KoB, as this was proved.

All circles *centered on this locus* are common to circle (Ko,KoZ) and (B,BZ) separately.

The only case of being together is the common point of these circles which is their common point P , where then → *centered circle exists on the Extrema edge , ZP diameter.*

In (4) , F24-(4) Initial square AoBCoDo , *Expands and Rotates* through point B , while segment DoCo limits to DC , where *extrema point Z`* moves to Z . Simultaneously , the circle of radius KoZ moves to circle of radius BZ on the locus of $\frac{1}{2}$ chord KoB . Since angle $\angle Z`DoAoP$ is always 90° so , exists on the diameter Z`P of circle (B, BZ`) and is the limit point of chord DoAo of the rotated square BCoDoAo , and not surpassing the common point Z .

Rectangle BAoDoCo in angle $\angle PDoZ`$ is expanded to Rectangle BADC in angle $\angle PDZ$ by existing on the two limit circles (B,BZ` = BP) and (Ko, KoZ) and point Do by sliding to D .

On arc KoB of these limits is *centered circle on ZP diameter* ,

i.e. *Extrema* happens to → *the common Pole of rotation through a constant circle centered on KoB arc* , and since point Do is the intersection of circle (Ko , KoB = KoDo) which limit to D , therefore the intersection of the common circle (K , KZ = KP) and line KoDo denotes that extrema point , where the expanding line DoCoZ` with leverarm DoAoP *is rotating through Pole P* , and limits to line DCZ ,

where , Point P is the common Pole of all circles on arc KoB for the Expanding and simultaneously rotating Rectangles BCoDoAo.

In (5) rectangle BCDA formulates the two right-angled Perpendicular triangles ADZ ,ADB

which solve the problem.

Segments KoD, KoAo = KoB are the two Quantized magnitudes in Space (volume) such that Euclidean Geometry Quantization becomes through the Mould of Doubling of the Cube . [This is the Space Quantization of E-Geometry]. i.e. The cube of Segment KoD is the double magnitude of KoA cube , or monad $KoD^3 = 2$ times the monad KoA^3] . About Poles in [5] .

Proof : F.24. (3)-(4).

1.. Since $KoZ = 2.KoB$ then $(KoZ / KoB) = 2$, and since angle $\angle ZKoB = 90^\circ$ then BZ is the diameter of circle (O,OZ) and angle $\angle ZKoB = 90^\circ$ on diameter ZB

2.. Since angle $\angle ZKoAo = 180^\circ$ and angle $\angle ZKoB = 90^\circ$ therefore angle $\angle BKoAo = 90^\circ$ also .

3.. Since $BKo \perp ZKo$ then Ko is the midpoint of chord on circle (Ko, KoB) which passes through Rectangle (square) BAoDoCo . Since angle $\angle ZDP = 90^\circ$ (because exists on diameter ZP) and since also angle $\angle BCZ = 90^\circ$ (because exists on diameter ZB) therefore triangle BCD is right-angled and BD the diameter .

Since Expanding Rectangles BAoDoCo , BADC rotate through Pole , P, then points Ao , A lie on circles with BDo , BD diameter , therefore point D is common to BDo line and (K , KZ = KP) circle , and BCDA is Rectangle . F.23-(4)

i.e. Rectangle BCDA possess $AKo \perp BD$ and DCZ line passing through point Z .

4.. From right angle triangles ADZ , ADB holds ,

$$\Delta ADZ \rightarrow KD^2 = KA \cdot KZ \quad \dots (a)$$

$$\Delta ADB \rightarrow KA^2 = KD \cdot KB \quad \dots (b)$$

and by division (a) / (b) then \rightarrow

$$\frac{KD^2 = KA \cdot KZ}{KA^2 = KD \cdot KB} = \frac{KD^2}{KA^2} = \frac{KA \cdot KZ}{KD \cdot KB} \quad \text{or} \quad \frac{KD^3}{KA^3} = \frac{KZ}{KB} = 2$$

$$(o.e.\delta), (q.e.d) \quad \text{i.e.} \rightarrow KoD^3 = 2 \cdot KoA^3 ,$$

which is the Duplication of the Cube .

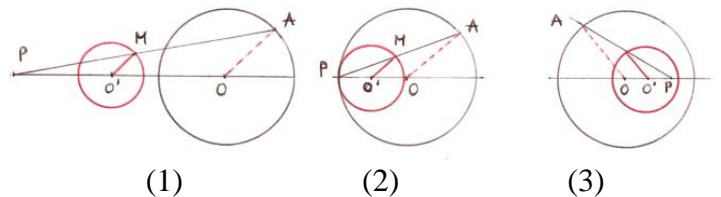
In terms of Mechanics , Spaces Mould happen through , Mould of Doubling the Cube , where for any monad ds = KoA analogous to KoAo , the

Volume or The cube of segment KoD is the double the volume of KoA cube , or monad $KD^3 = 2.KoA^3$. This is one of the basic Geometrical Euclidean Geometry Moulds , which create the METERS of monads \rightarrow where Linear is the Segment MA1 , Plane is the square CMNH equal to the circle and in Space , is volume KD^3 in all Spaces , Anti-spaces and Sub -spaces of monads = Segments \leftarrow i.e

The Expanding square BAoDoCo is Quantized to BADC Rectangle by Translation to point Z` , and by Rotation , through point P (the Pole of rotation) to point Z .

The Constructing relation between segments KoX , KoA is $\rightarrow (KoX)^2 = (KoA)^2 \cdot (XX1 / AD)$ such that $XX1 \parallel AD$, as in Fig.26 -(4).

All comments are left to the readers , 30/8/2015.



F.25. \rightarrow For any point A on , and P Out-On-In circle [O, OA] and $O'P = O'O$, exists $O'M = OA / 2$.

11.2.1 The Quantization of E-Geometry, {Points , Segments , Lines , Planes , and the Volumes} , to its moulds F-26 .

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) , (Non-equal Segments and twice-Perpendicular-segments = The Space Vectors = Quaternion) , by defining the mould of quantization .

The three Ways of quantization are \rightarrow for Monads the mould is the *Cycloidal Curl* Electromagnetic field , **for Lines** the mould is that of *Parallel Theorem with the least constant distance* , **for Plane** the mould is the *Squaring of the circle* and , **for Space** is the mould of the *Duplication of cube* . All methods in, F- 26 .

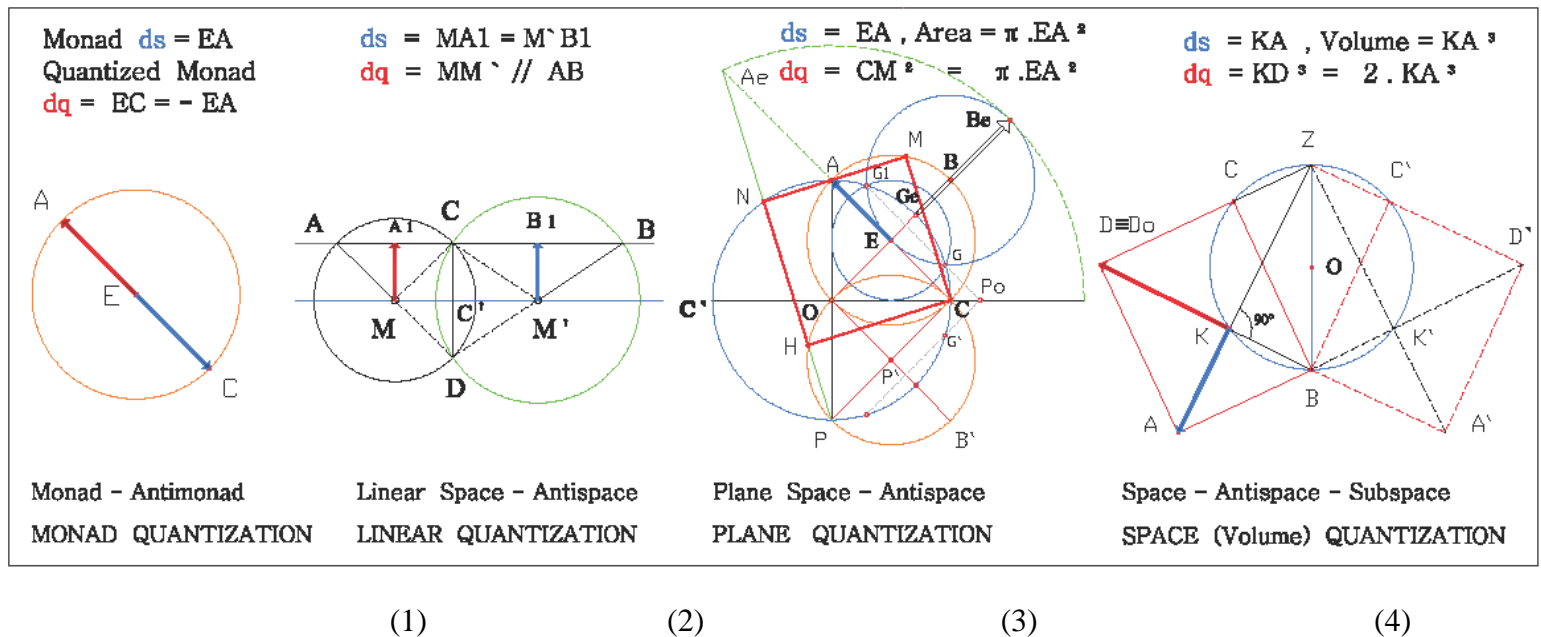


Figure .26. → The Point , Linear , Plane , Space (volume) Mould for E-geometry Quantization , of monad EA to Anti-monad EC – of AB line to Parallel line MM' - of CE Radius to the CM Square Segment of KA Segment to KD Cube Segment - .

The METERS of Quantization of monad $ds = AB$ are these of Spaces Anti-spaces as , In any point A , happens through Mould in itself (The material point as a → ± dipole) in [43] In monad $ds = AC$, happens through Mould in itself for two points (The material dipole in inner monad Structure as the Electromagnetic Cycloidal field which equilibrium in dipole by the Anti-Cycloidal field as in [43]). For monad $ds = EA$ the quantized and Anti-monad is $dq = EC = \pm EA$

Remark : The two opposite signs of monads EA , EC represent the two Symmetrical equilibrium monads of Space-Antispace , the Geometrical dipole AC on points A,C which consist space AC as in F25 - (1)

Linearly , happens through Mould of Parallel Theorem , where for any point M not on $ds = \pm AB$, the Segment $MA1 = Segment M'B1 = Constant$. F26 - (1-2)

Remark : The two opposite signs of monads represent the two Symmetrical monads in the

Geometrical machine of the equal and Parallel monads [$MM' // AB$ where $MA1 \perp AB$, $M'B1 \perp AB$ and $MA1 = M'B1$] which are → The Monad $MA1 - Antimonad M'B1$, or → The Inner monad $MA1$ Structure –The Inner Anti monad structure $M'B1 = -MA1 = Idle$, and { The Space = line AB , Anti-space = the Parallel line $MM' = constant$ }.

The Parallel Axiom is no-more Axiom because this has been proved as a Theorem [9-32-38-44]. **Plainly , happens through Mould of Squaring of the circle , where for any monad $ds = CA = CP$, the Area of square $CMNH$ is equal to that of one of the five conjugate circles and $\pi = constant$, or as $CM^2 = \pi \cdot CE^2$. On monad $ds = EA = EC$, the Area = $\pi \cdot EC^2$ and the quantized Anti-monad $dq = CM^2 = \pm \pi \cdot EC^2$. F25-(3)**

Remark : The two opposite signs represent the two Symmetrical squares in Geometrical machine of the equal and perpendicular monads [$CA \perp CP$, and $CA = CP$] , which are → The Square $CMNH$

– Antisquare $CM^{\wedge}N^{\wedge}H^{\wedge}$, or \rightarrow The Space – Idle = Anti-space .

In Mechanics this property of monads is very useful in Work area , where two perpendicular vectors produce Zero Work . {Space = square $CMNH$,Anti-space = Anti-square $CM^{\wedge}N^{\wedge}H^{\wedge}$ } . In three dimensional Space , happens through Mould Doubling of the Cube , where for any monad $ds = KA$, the Volume or , The cube of a segment KD is the double the volume of KA cube , or monad $KD^3 = 2.KA^3$.

On monad $ds = KA$ the Volume = KA^3 and the quantized Anti-monad , $dq = KD^3 = \pm 2. KA^3$. F26-(4)

Remark : The two opposite signs represent the two Symmetrical Volumes in Geometrical machine of triangles [$\Delta ADZ \perp \Delta ADB$] , which are \rightarrow The cube of a segment KD is the double the volume of KA cube – The Anti-cube of a segment $K^{\wedge}D^{\wedge}$ is the double the Anti-volume of $K^{\wedge}A^{\wedge}$ cube , in every direction and thus getting in maxima cases (the limits) the properties of radiation in free space . The electromagnetic vibrations in this volume is analogous to vibrations of an Elastic body (Photo-elastic stresses in an elastic

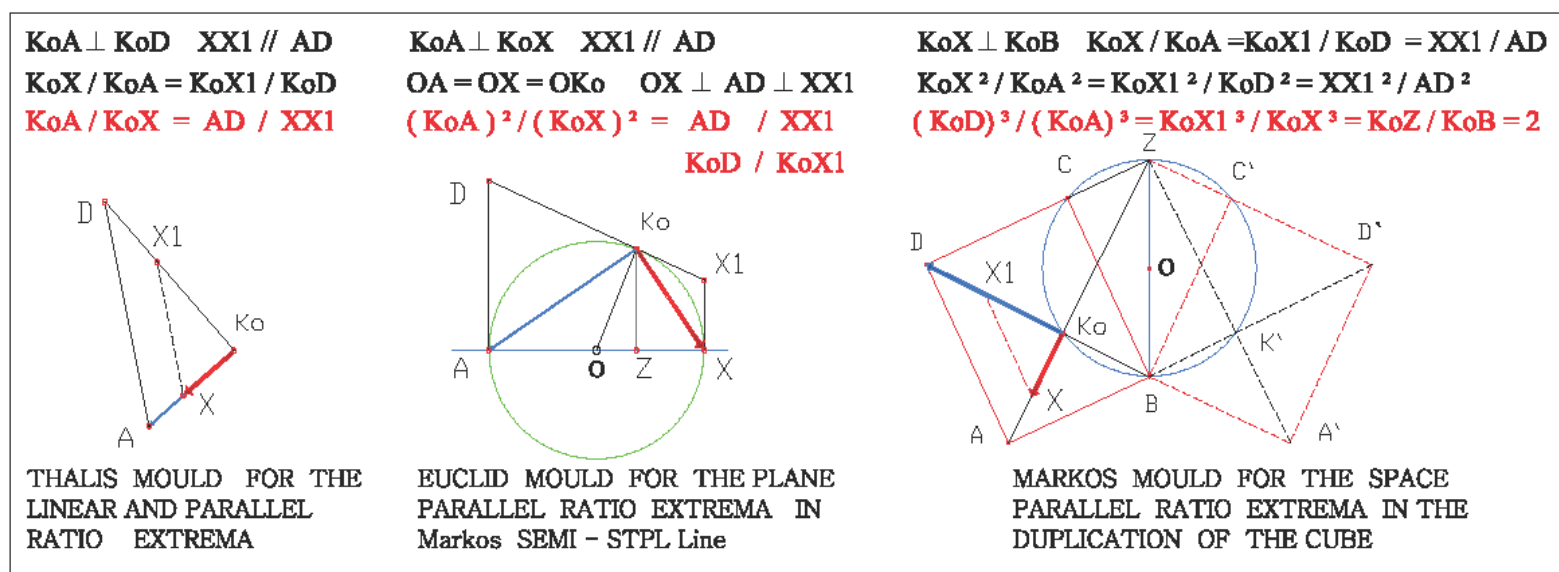
material [18]) in this tiny volume , and thus Fringes are a superposition of these standing (stationary) vibrations .[41]

Above are analytically shown , the Moulds (The three basic Geometrical Machines) of Euclidean Geometry which create the METERS of monads

Linearly is the Segment $MA1$, In Plane the square $CMNH$, and in Space is volume KD^3 in all Spaces , Anti-spaces and Sub-spaces .

This is the Euclidean Geometry Quantization in points to its constituents , i.e. the

- 1.. **METER** of Point A is the Material Point A , the ,
- 2.. **METER** of line is the discrete Segment $ds = AB = monad = constant$, the
- 3.. **METER** of Plane is that of circle on Segment = monad , which is the Square equal to the area of the circle , and the
- 4.. **METER** of Volume is that of Cube on any Segment = monad , which is the Double Cube of Segment and Thus is the measuring of the Spaces , Anti-spaces and Sub-spaces in this cosmos . markos 11/9/2015 .



(1)

(2)

(3)

Figure 27. \rightarrow The Thales , Euclid , Markos Mould , for the Linear – Plane - Space , Extrema Ratio Meters. All Space-dimensions are Linear and compatible to coordinate systems [x,y,z,k,...].

11.2.2 The Three Master - Meters in One , for E-geometry Quantization ,

Monad $ds = KA$, the *Volume* $= KA^3$ and the *quantized Anti-monad* $dq = KD^3 = \pm 2. KA^3$.
{The *Space = the cube* KA^3 , The *Anti-space*
 $=$ *the Anti-cube* KD^3 } .

In Mechanics this property of Material monads is very useful in the Interactions of the Electromagnetic Systems where Work of two perpendicular vectors is Zero .
{ *Space = Volume of KA* , *Anti-space = Anti - Volume of KD*, and this as applied to *Dark - matter , Energy in Physics* } . [43]

Radiation of Energy is enclosed in a cavity of the tiny energy volume λ , (which is the cycloidal wavelength) with perfect and absolute reflecting boundaries where this cavity may become infinite

It is the linear relation of the Ratio (*continuous analogy*) of geometrical magnitudes , in all Spaces and Anti-spaces

Saying **master-meters** , we mean That the Ratio of two or three geometrical magnitudes , is such that they have a linear relation (*continuous analogy*) in all Spaces , *in one in two in three dimensions*, as this happens to the Compatible Coordinate Systems as it is the Rectangular [x,y,z] , [i,j,k] , the Cylindrical and Spherical - Polar . The position and the distance of points can be then calculated between the points , and thus to **perform independent Operations** (Divergence , Gradient , Curl , Laplacian) on points only .

Remarks :

In F27-(1) , The Linear Ratio , *for Vectors* , begins from the same Common point Ko , of the two Non-equal , Concentrical and Co-parallel Direction monads .

In F27-(2) , The Linear Ratio , *for Plane* , begins from the same Common point Ko , of the two Non-equal , Concentrical and Co-perpendicular Direction monads.

In F27-(3) , The Linear Ratio , *for Volume* , begins from the same Common point Ko , of

the two Non-equal , Concentrical and Co-perpendicular Direction monads.

In (1) \rightarrow Segment $KoA \perp KoD$, Ratio $KoX / KoA = KoX1 / KoD$, and Linearly (*in one dimension*) the Ratio of $KoA / KoX = AD / XX1$

i.e. in Thales linear mould [$XX1 \parallel AD$] , **Linear Ratio of Segments $XX1$, AD is , constant and Linear , and it is the Master key Analogy of the two Segments , monads .**

In (2) \rightarrow Segment $KoA \perp KoX$, $OKo = OA = OX$ and since $OX1$, OD are diameters of the two circles then $KoD = AD$, $KoX1 = XX1$, and Linearly (*in one dimension*) the Ratio of $KoA / KoX = AD / XX1$, in Plane (*in two dimensions*) the Ratio $[KoA]^2 / [KoX]^2 = AD / XX1$,

Proof :

Segment $KoA \perp KoX$ because triangle $AKoX$ is rightangled triangle and $KoZ \perp AX$. Radius $OKo = OA = OX$. Since DA , $X1X$ are also perpendicular to AX , therefore $KoZ \parallel X1X \parallel DA$. According to Thales theorem ratio $(ZA/ZX) = (KoD/KoX1)$ and since tangent $DA = DKo$ and $X1Ko = X1X$ then $AZ / ZX = DA / XX1$. From Pythagorean theorem (Lemma 6) $\rightarrow KoA^2 / KoX^2 = (AZ/ZX) = (DA/XX1) = (KoD/KoX1)$ i.e. The ratio of the two squares KoA^2 , KoX^2 are proportional to line segments $KoD, KoX1$ (o.e.δ).

i.e. in Euclid's Plane mould [$KoA \perp KoX$] ,
The Plane Ratio square of Segments - KoA , KoX - is constant and Linear , and for any Segment KoX on circle (O,OKo) exists KoA such that ,

$$\rightarrow KoA^2 / KoX^2 = AD / XX1 = KoD / KoX1 \leftarrow$$

i.e. the Square Analogy of the sides in any rectangle triangle $AKoX$ is linear to Extrema Semi-segments AD , $XX1$ or to KoD , $KoX1$.

In (3) \rightarrow Segment $KoB \perp KoX$, $OKo = OB = OZ$ and since $XX1 \parallel AD$, then $KoA / KoD = KoX / KoX1 = AD / XX1$, and Linearly (*in one dimension*) the Ratio of $KoA / KoX = AD / XX1$ and in Space (*Volume*) (*in three dimensions*) the Ratio $[KoA]^3 / [KoD]^3 = [KoX / KoX1]^3 = 1/2$.

i.e. in Euclid's Plane mould [KoA // KoX , KoD // KoX1] , **Volume Ratio of volume Segments – KoA , KoD - , is constant and Linear , and for any Segment KoX exists KoX1 such that $\rightarrow KoX1^3 / KoX^3 = 2 \leftarrow$**

i.e. the Duplication of the cube.

In F-27 , The **three** dimensional Space [KoA \perp KoD \perp Ko...] , where XX1 // AD , The **two** dimensional Space [KoA \perp KoX] , where XX1// AD , The **one** dimensional Space [XX1 // AD] , where XX1 // AD , is constant and Linearly Quantized in each dimension.

i.e. All dimensions of Monads coexist linearly in Segments – monads separately (they are the units of the three dimensional axis x,y,z - i , j , k -) and consequently in Volumes , Planes , Lines , Segments , and Points of Euclidean geometry, which are all the one point only and which is nothing. For more in [49-50] . 25/9/2015 At the beginning of the article it was referred to Geometers scarcity from which instigated to republish this article and to locate the weakness of proving these Axioms which created the Non-Euclid geometries and which deviated GR in Space-time confinement .Now is more referred ,

a). There is not any Paradoxes of the infinite because is clearly defined what is a Point and what is a Segment .

b). **The Algebra of constructible numbers and number Fiels is an Absurd theory** based on groundless Axioms as the fields are , and with directed non-Euclid orientations which must be properly revised .

c). **The Algebra of Transcental numbers has been devised to postpone the Pure geometrical thought** , which is the base of all sciences , by changing the base-field of solutions to Algebra as base . Pythagorians discovered the existence of the incommensurable of the diagonal of a square in relation to its side without giving up the base , which is geometrical logic.

d). All theories concerning **the Unsolvability of the Special Greek problems are based on Cantor's shady proof** , < that the totality of

All algebraic numbers is denumerable > and not edified on the geometrical basic logic which is the foundations of all Algebra .

The problem of Doubling the cube , as that of the Trisection of any angle , is a Mechanical problem and could not be seen differently and the proposed Geometrical solutions is clearly exposed to the critic of all readers .

All trials for Squaring the circle are shown in [46] and the set questions will be answered on the Changeable System of the two Expanding squares , Translation [T] and Rotation [R] .

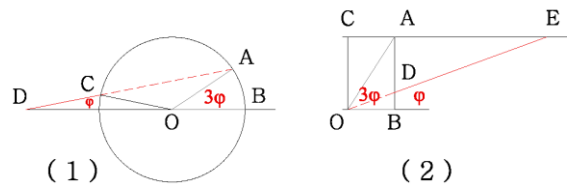
The solution of Squaring the circle using the Plane Procedure method is now presented in F.20,21 , and consists an , Overthrow , to all existing theories in Geometry , Physics and Philosophy .

e). Euclidean Geometry is the base of all sciences and it is the reflective logic from the objective reality and which is nature .

11.3.. The Trisection of Any Angle .

Because of the three *master-meters* , where is holding the Ratio of two or three geometrical magnitudes , is such that they have a linear relation (*a continuous analogy*) in all Spaces , the solution of this problem , as well as of those before , is linearly transformed .

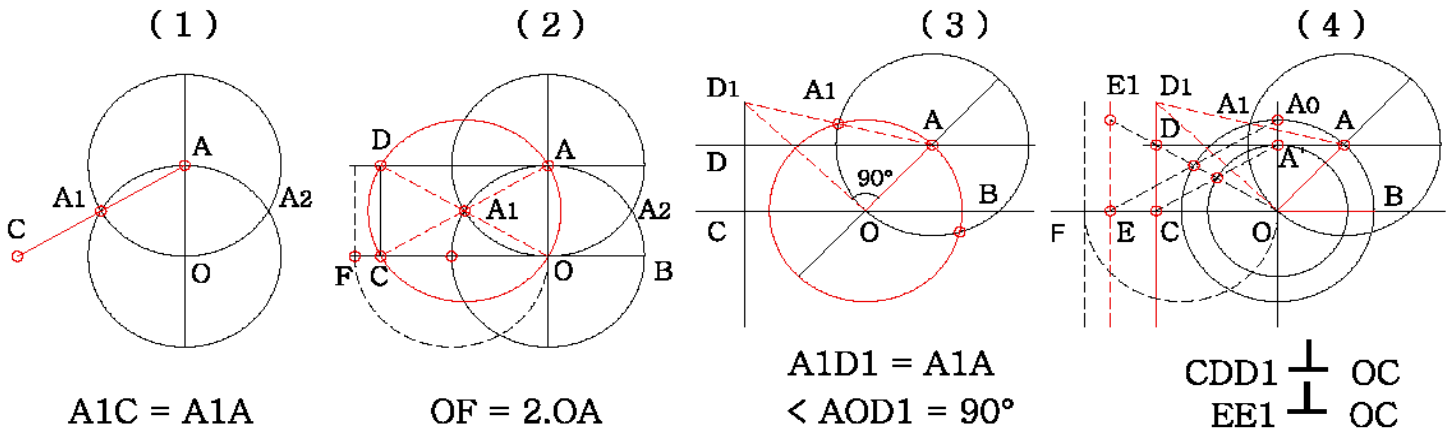
The present method is Plane method , *i.e. straight lines and circles* , as the others and is not required the use of conics or some other equivalent .



F .28. \rightarrow (1) Archimedes , (2) Pappus Method

The Present method :

It is based on the Extrema geometrical analysis of the mechanical motion of shapes related to a system of poles of rotation .The classical solutions by means of conics , or reduction to a , νεύσις , is a part of Extrema method . This method changes the Idle between the edge cases and Rotates it through constant points , *The Poles* , [11] .



F.29. → *The steps of the rotating Triangle AOD1 , (2) , (3) , (4)*

The proposed Contemporary Trisection method .

We extend Archimedes method as follows :

a . F29.-(2) . Given an angle $\angle AOB = \angle AOC = 90^\circ$

1.. Draw circle (A , $AO = OA$) with its center at the vertex A intersecting circle (O , $OA = AO$) at the points A1 , A2 respectively .

2.. Produce line AA1 at C so that $A1C = A1A = AO$ and draw $AD \parallel OB$.

3.. Draw CD perpendicular to AD and complete rectangle AOCD .

4.. Point F is such that $OF = 2 . OA$

b . F29.(3-4) . Given an angle $\angle AOB < 90^\circ$

- 1.. Draw AD parallel to OB .
- 2.. Draw circle (A , $AO = OA$) with its center at the vertex A intersecting circle (O , $OA = AO$) at the points A1 , A2 .
- 3.. Produce line AA1 at D1 so that $A1D1 = A1A = OA$.
- 4.. Point F is such that $OF = 2 . OA = 2.OA_0$
- 5.. Draw CD perpendicular to AD and complete rectangle A'OCD .
- 6.. Draw AoE Parallel to A'C at point E (or sliding E on OC) .
- 7.. Draw AoE' parallel to OB and complete

rectangle AoOEE1 .

- 8.. In F29 - (1-2-3) , Draw AF intersecting circle (O,OA) at point F1 and insert on AF segment F1F2 equal to OA → $F1F2 = OA$.
- 9.. Draw AE intersecting circle (O , OA) at point E1 and insert on AE segment E1E2 equal to OA → $E1E2 = OA = F1F2$.

To show that :

- a). For all angles equal to 90° Points C and E are at a constant distance $OC = OA . \sqrt{3}$ and $OE = OA_0 . \sqrt{3}$, from vertices O , and also $A'C \parallel AoE$.
- b). The geometrical locus of points C , E is the perpendicular CD , EE1 line on OB .
- c). All equal circles with their center at the vertices O , A and radius $OA = AO$ have the same geometrical locus $EE1 \perp OE$ for all points A on AD , or All radius of equal circles drawn at the points of intersection with its Centers at the vertices O , A and radius $OA = AO$ lie on CD , EE1 .
- d). Angle $\angle D1OA$ is always equal to 90° and angle AOB is created by rotation of the right-angled triangle AOD1 through vertex O .
- e). Angle $\angle AOB$ is created in two ways , by

constructing circle (O, OA = OAo) and by sliding, of point A1 on line A1D Parallel to OB from point A1, to A.

f). Angle $\angle AOB$ is created in two ways, by constructing circle (O, OA = OAo) and by sliding, of point A' on line A'D Parallel to OB from point A', to A.

g). The rotation of lines AE, AF (minimum and maximum edge positions) on circle (O, OA = OAo) from point E to point F which lines intersect circle (O, OA) at the points E1, F1 respectively, fixes a point G on line EF and a point G1 common to line AG and to the circle (O, OA) such that $GG1 = OA$.

Proof :

a) .. F.29.(1 - 2)

Let OA be one-dimensional Unit perpendicular to OB such that angle $\angle AOB = \angle AOC = 90^\circ$

Draw the equal circles (O,OA), (A, AO) and let points A1, A2 be the points of intersection. Produce AA1 to C.

Since triangle AOA1 has all sides equal to OA (AA1 = AO = OA1) then it is an equilateral triangle and angle $\angle A1AO = 60^\circ$

Since Angle $\angle CAO = 60^\circ$ and $AC = 2.OA$ then triangle ACO is right-angled and angle $\angle AOC = 90^\circ$, and so the angle $\angle ACO = 30^\circ$.

Complete rectangle AOCD, and angle $\angle ADO = 180 - 90 - 60 = 30^\circ = \angle ACO = 90^\circ / 3 = 30^\circ$

From Pythagoras theorem $AC^2 = AO^2 + OC^2$ or $OC^2 = 4.OA^2 - OA^2 = 3.OA^2$ and $OC = OA . \sqrt{3}$.

For $OA = OAo$ then $AOE = 2.OAo$ and $OE = OAo . \sqrt{3}$.

Since $OC/OE = OA/OAo \rightarrow$ then line CA' is parallel to EAo.

b) .. F.29.(3 - 4)

Triangle OAA1 is isosceles, therefore angle $\angle A1AO = 60^\circ$. Since $A1D1 = A1O$, triangle D1A1O is isosceles and since angle $\angle OA1A = 60^\circ$, therefore angle $\angle OD1A = 30^\circ$ or, Since $A1A = A1D1$ and angle $\angle A1AO = 60^\circ$ then triangle AOD1 is also right-angle triangle and angles $\angle D1OA = 90^\circ, \angle OD1A = 30^\circ$.

Since the circle of diameter D1A passes through point O and also through the foot of the perpendicular from point D1 to AD, and since also $\angle ODA = \angle ODA' = 30^\circ$, then this foot point coincides with point D, therefore the locus of point C is the perpendicular CD1 on OC. For $AA1 > A1D1$, then D1 is on the perpendicular D1E on OC.

Since the Parallel from point A1 to OA passes through the middle of OD1, and in case where $\angle AOB = \angle AOC = 90^\circ$ through the middle of AD, then the circle with diameter D1A passes through point D which is the base point of the perpendicular, i.e.

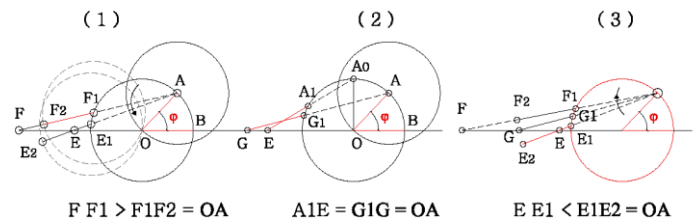
The geometrical locus of points C, or E, is the perpendicular CD, EE1 on OB.

c) .. F.29.(3 - 4)

Since $A1A = A1D1$ and angle $\angle A1AO = 60^\circ$ then triangle AOD1 is a right-angle triangle and angle $\angle D1OA = 90^\circ$.

Since angle $\angle A-D1-O$ is always equal to 30° and angle $\angle D1-O-A$ is always equal to 90° , therefore angle $\angle AOB$ is created by the rotation of the right-angled triangle A-O-D1 through vertex O.

Since tangent through Ao to circle (O, OA') lies on the circle of half radius OA then this is perpendicular to OA and equal to A'A.



F.30. → The three cases of the Sliding segment OA = F1F2 = E1E2 between a line OB and a circle (O,OA) between the Extrema, Maxima edge cases F1F, E1E or F,E points On AF, AE lines exists :

$FF1 > OA$ $GG1 = OA$, $A1E = OAo$ $EE1 < OA$
 $F2F1 = OA$ $A1E = OAo$, $EA1 = OA$ $E1E2 = OA$

d) .. F.29-(4) - (F.30)

Let point G be sliding on OB between points

E and **F** where lines **AE**, **AG**, **AF** intersect circle (O, OA) at the points **E1**, **G1**, **F1** respectively where then exists $FF1 > OA$, $GG1 = OA$, $EE1 < OA$

Points E, F are the limiting points of rotation of lines **AE**, **AF** (because then for angle $< AOB = 90^\circ \rightarrow A1C = A1A = OA$, $A1A_o = A1E = OA_o$ and for angle $< AOB = 0^\circ \rightarrow OF = 2 \cdot OA$). Exists also $E1E2 = OA$, $F1F2 = OA$ and point **G1** common to circle (O, OA) and on line **AG** such that $GG1 = OA$.

AE Oscillating to **AF** passes through **AG** so that $GG1 = OA$ and point **G** on sector **EF**. When point **G1** of line **AG** is moving (rotated) **on circle** $(E2, E2E1 = OA)$ and Point **G1** of **G1G** is stretched on circle (O, OA) then $G1G \neq OA$.

A position of point G1 is such that, when GG1 = OA point G lies on line EF.

When point **G1** of line **AG** is moving (rotated) **on circle** $(F2, F2F1 = OA)$ and point **G1** of **G1G** is stretched on circle (O, OA) then length $G1G \neq OA$.

A position of point G1 is such that, when GG1 = OA point G lies on line EF without stretching.

For both opposite motions there is only one position where point **G** lies on line **OB** and is not needed point **G1** of **GA** **to be stretched** on circle (O, OA) .

This position happens at the common point P, of the two circles which is their point of intersection. At this point P exists only rotation and is not needed G1 of GA to be stretched on circle (O, OA) so that point G to lie on line EF.

This means that point P lies on the circle (G, GG1 = OA), or GP = OA.

Point **A** of angle $< BOA$ is verged through two different and opposite motions, i.e.

1.. From point **A'** to point **Ao** where is done a parallel translation of **CA'** to the new position **E Ao**, this is for all angles equal to 90° , and from this position to the new position **EA** by

rotating **E Ao** to the new position **EA** having always the distance $E1E2 = OA$.

This motion is taking place on a circle of center **E1** and radius $E1E2$.

2.. From point **F**, where $OF = 2 \cdot OA$, is done a parallel translation of **A'F** to **FAo**, and from this position to the new position **FA** by rotating **FAo** to **FA** having always the distance $F1F2 = OA$.

The two motions coexist again on a point **P** which is the point of intersection of the circles $(E2, E2E1 = OA)$ and $(F2, F2F1 = OA)$. f) .. $(F.29.3 - 4) - (F.30 - 3)$

Remarks – Conclusions :

1.. Point **E1** is common of line **AE** and circle (O, OA) and point **E2** is on line **AE** such that $E1E2 = OA$ and exists $E1E1 < E2E1$. Length $E1E2 = OA$ is stretched, moves on **EA** so that point **E2** is on **EF**. Circle $(E, E1E1 < E2E1 = OA)$ cuts circle $(E2, E2E1 = OA)$ at point **E1**.

There is a point **G1** on circle (O, OA) such that $G1G = OA$, where point **G** is on **EF**, and is not needed **G1G** to be stretched on **GA** where then, circle $(G, GG1 = OA)$ cuts circle $(E2, E2E1 = OA)$ at a point **P**.

2.. Point **F1** is common of line **AF** and circle (O, OA) and point **F2** is on line **AF** such that $F1F2 = OA$ and exists $F1F1 > F2F1$.

Segment $F1F2 = OA$ is stretched, moves on **FA** so that point **F2** is on **FE**. Circle $(F, F1F1 > F2F1 = OA)$ cuts circle $(F2, F2F1 = OA)$ at point **F1**.

There is a point **G1** on circle (O, OA) such that $G1G = OA$, where point **G** is on **FE**, and is not needed **G1G** to be stretched on **OB** where then circle $(G, GG1 = OA)$ cuts circle $(F2, F2F1 = OA)$ at a point **P**.

3.. **When point G is at such position on EF that GG1 = OA, then point G must be at A COMMON, to the three lines EE1, GG1, FF1, and also to the three circles (E2, E2E1 = OA), (G, GG1 = OA), (F2, F2F1 = OA)**

This is possible at the common point P of Intersection of circle (E2, E2E1 = OA) and (F2, F2F1 = OA) and since GG1 is equal to OA without G1G be stretched on GA, then also GP = OA.

4.. In additional, for point G1 :

a.. Point G1, from point E1, moving on circle (E2, E2E1 = OA) formulates AE1E such that $E1E = G1G < OA$, for G moving on line GA. There is a point on circle (E2, E2E1 = OA) such that $GG1 = OA$.

b.. Point G1, from point F1, moving on circle (F2, F2F1 = OA) formulates AF1F such that $F1F = GG1 > OA$, for G moving on line GA. There is a point on circle (F2, F2F1 = OA) such that $GG1 = OA$.

c.. Since for both Opposite motions there is a point on the two circles that makes $GG1 = OA$

then point say P, is common to the two circles.

d.. Since for both motions at point P exists $GG1 = OA$ then circle (G, $GG1 = OA$) passes through point P, and since point P is common to the three circles, then fixing point P as the common to the two circles (E2, $E2E1 = OA$), (F2, $F2F1 = OA$), then point G is found as the point of intersection of circle (P, $PG = OA$) and line EF.

This means that the common point P of the three circles is constant to this motion.

e.. Since also happens, motion of a constant Segment on a line and a circle, then it is Extrema Method of the moving Segment as stated. The method may be used for part or Blocked figures either sliding or rotating.

From all above the geometrical trisection of any angle is as follows, Fig.31

Figure . 31 → The extrema Geometrical method of Trisection of any angle < AOB .

In F.30- (1) Basic triangle AOD1 defines E point such that angle $AEO = 30^\circ = AOB/3$.

In F.30- (2) Basic triangle AOD1 defines D1 point such that angle $AD1O = 30^\circ = AOB/3$.

In F.30- (3) Basic triangle AOD1 defines E` point such that angle $AE`O = 30^\circ$, and it is the Extrema Case for angles $AOB = 0^\circ$, $B`OB = 180^\circ$

In F.30- (4) The two Edge cases (1), (3) issue for any angle $AOB = \phi^\circ$.

In F.30- (5) The two circles corresponding to Edge cases (1), (3) issuing for any angle $AOB = \phi^\circ$.

In F.30- (6) The three circles corresponding to Edge cases (1), (3) defining the common pole ,P, of the rotational system, which issues for any angle $AOB = \phi^\circ$

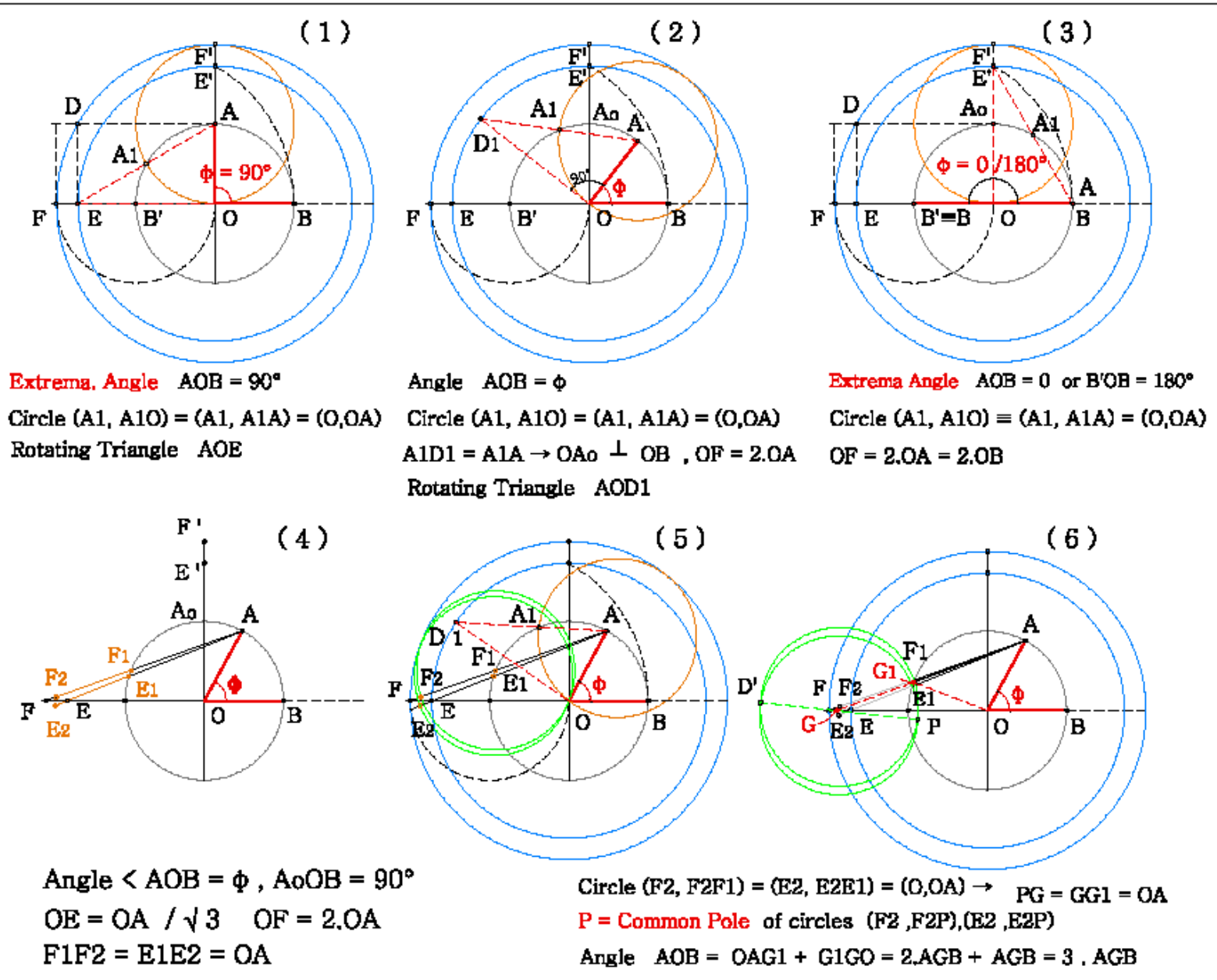


Figure . 31 → The extrema Geometrical method of Trisection of any angle $\angle AOB$

Point G , of Extrema length GG1 , is Sliding on PE line and Rotating through the Instaneous Center ,G, and fits to GA line and thus angle $\angle AOB$ is Trisected according to Archimedes indication .

F.31-A. → Presentation of the Trisection Method on Dr. Geo - Machine Macro – construction .

f. The steps of Trisection of any angle

$\angle AOB = 90^\circ \rightarrow 0^\circ$ F.31-[1-6]

- 1.. Draw circles (O , OA = OZ) , (A , AO) , intersected at $A1 \equiv Z1$ point .
- 2.. Draw $OAO \perp OB$ where point Ao is on the circle (O , OA) and on general circle (Z , D-E = 2OA) , the circle (O , OD-E) intersects line OB at the point E .
- 3.. Fix point F on line OB such that $\rightarrow OF = 2. OA$
- 4.. Draw lines AF , AE intersecting circle (O,OA) at points F1 , E1 respectively .
- 5.. On lines F1A , E1A fix points F2 , E2 such that $F1F2 = OA$ and $E1E2 = OA$.
- 6.. Draw circles (F2 , F2F1 = OA) , (E2, E2E1 = OA) and fix point P as their common point of intersection . Point P is the polar point of the two circles .
- 7.. Draw circle (P , PG = OA) intersecting line OB at point G and draw line GA intersecting circle (O ,OA) at point G1.

Then Segment $GG1 = OA$, and angle $\angle AOB = 3. \angle GB$.

Proof :

- 1.. Since point P is common to circles (F2, F2F1 = OA) , (E2 , E2E1 = OA) , then $PG = PF2 = PE2 = OA$ and line AG between AE , AF intersects circle (O,OA) at the point G1 such that $GG1 = OA$. (F30.1 -2) - (F.31-5)
- 2..Since point G1 is on the circle (O , OA) and since $GG1 = OA$ then triangle GG1O is isosceles and angle $\angle AGO = G1OG$.
- 3..The external angle of triangle GG1O is $\angle AG1O = \angle AGO + G1OG = 2. \angle AGO$.
- 4..The external angle of triangle GOA is angle $\angle AOB = \angle AGO + OAG = 3.\angle AGO$.

Therefore angle $\angle AGB = (1/3) . (\angle AOB)$ (o.ε.δ.)

Analysis : Figure 30 .

Since angle $\angle D1OA$ is always equal to 90° then angle $\angle AOB$ is created by rotation of the right-angled triangle AOD1 through vertex O . The circle (A , AO = A1O) and triangle AOD1 consists the geometrical Mechanism which creates the maxima at positions from , $\angle AOE$, to $\angle AoOE$ and to $\angle BOF'$ triangles , on (O , $OE = \sqrt{3}.OA$) , (O, $OF = 2.OA$) circles.

In (1) Angle $\angle AOB = 90^\circ$, $AE = 2.OA = OF$, and point A1 common to circles (O , OA) , (A, AO) define point E on OB line such that $A1E = OA$. This happens for the extrema angle $\angle AOB = 90^\circ$.

In (2) Angle is , $0 < \angle AOB < 90^\circ$, $AE = 2.OA$ and point A1 common to circles (O,OA) , (A,AO) defines point D1 on (O, $OE = \sqrt{3}.OA$) circle such that $A1D1 = OA$ and on (O, $OF = 2.OA$) circle at point Df .

In (3) Angle $\angle AOB = 0$ or $\angle B'OB = 180^\circ$, $AE = 2.OA = BB'$ and point A1 common to (O , OA) , (A, AO) circles define point E on OAO line such that $E \equiv E'$, where then point $D \equiv F'$. This happens for the extrema angle $\angle AOB = 0$ or 90° .

In (4-5) where angle is , $0 < \angle AOB < 90^\circ$, and Segments $F1F2 = E1E2 = OA$ the equal circles (F2,F2F1),(E2,E2E1) define the common point P . Since this geometrical formulation exists on Extrema edge angles , 0 and 90° , then this point is constant to this formulation , and this point as centre of a radius OA circle defines the extrema geometrical locus on it.

In (6) Since angle $\angle AOB$ is , $0 \rightarrow 90^\circ$, and point P is constant , and this because extrema circle (P,PG=OA) where G on OB line , then is defining (G,GG1) circle on GA segment such that point G1 , to be the common point of segment AG and circles (O, OA) , (G,GG1) .

11.4. The Parallel Postulate , Axiom , is a Theorem .

The Parallel Postulate. F.33

General : Axiom or Postulate is a statement checked if it is true and is ascertained with logic (the experiences of nature as objective reality).

Theorem or Proposition is a non-main statement

requiring a proof based on earlier determined logical properties.

Definition is an initial notion without any sensible definition given to other notions.

Definitions, Propositions or Postulates created Euclid geometry using the geometrical logic which is that of nature, the logic of the objective reality.

Using the same elements it is possible to create many other geometries but the true uniting element is the before refereed.

11.1. The First Definitions (D) , of Terms in Geometry but the true uniting D1: A point is that which has no part (Position).

D2: A line is a breathless length (for straight line, the whole is equal to the parts) .

D3: The extremities of lines are points (equation).

D4: A straight line lies equally with respect to the points on itself (identity).

D: A midpoint C divides a segment AB (of a straight line) in two. $CA = CB$ any point C divides all straight lines through this in two.

D: A straight line AB divides all planes through this in two.

D: A plane ABC divides all spaces through this in two .

11.2. Common Notions (Cn)

Cn1: Things which equal the same thing also equal one another.

Cn2: If equals are added to equals, then the wholes are equal.

Cn3: If equals are subtracted from equals, then the remainders are equal.

Cn4: Things which coincide with one another, equal one another.

Cn5: The whole is greater than the part.

11.3. The Five Postulates (P) for Construction

P1. To draw a straight line from any point A to any other point B .

P2. To produce a finite straight line AB continuously in a straight line.

P3. To describe a circle with any centre and distance. P1, P2 are unique.

P4. That, all right angles are equal to each other.

P5. That, if a straight line falling on two straight lines make the interior angles on the same side less than two right angles, if produced indefinitely, meet on that side on which are the angles less than the two right angles, or (for three points on a plane) . Three points consist a Plane .

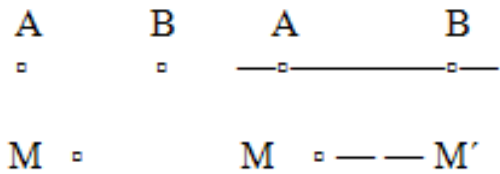
P5a. The same is plane's postulate which states

that, from any point M, not on a straight line AB, only one line MM' can be drawn parallel to AB.

Since a straight line passes through two points only and because point M is the third then the parallel postulate it is valid on a plane (three points only).

AB is a straight line through points A, B , AB is also the measurable line segment of line AB , and M any other point . When $MA+MB > AB$ then point M is not on line AB . (differently if $MA+MB = AB$, then this answers the question of why any line contains at least two points) ,

i.e. for any point M on line AB where is holding $MA+MB = AB$, meaning that line segments MA,MB coincide on AB , is thus proved from the other axioms and so D2 is not an axiom . → To prove that , one and only one line MM' can be drawn parallel to AB.



F.32. → The three points (a Plane).

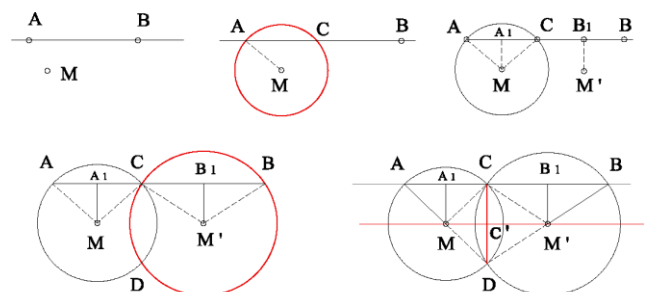
In F.31 , are shown the three non-coinciding Points A ,B ,M , and in order to prove the above Axiom is necessary to show :

a..The parallel to AB is the locus of all points at a constant distance **h** from the line AB, and for point M is MA_1 ,

b..The locus of all these points is a straight line.

Construction :

This is done by the three Steps as in Figure 32 using Euclidean logic only for the Definitions , Common Notions and Postulates.



F.33. → The Parallel Method

Step 1

Draw the circle (M, MA) be joined meeting line AB in C. Since MA = MC, point M is on mid-perpendicular of AC. Let A1 be the midpoint of AC, (it is $A1A+A1C = AC$ because A1 is on the straight line AC). Triangles MAA1, MCA1 are equal because the three sides are equal, therefore angle $\angle MA1A = MA1C$ (CN1) and since the sum of the two angles $\angle MA1A + MA1C = 180^\circ$ (CN2, 6D) then angle $\angle MA1A = MA1C = 90^\circ$.(P4) so, MA1 is the minimum fixed distance **h** of point M to AC.

Step 2

Let B1 be the midpoint of CB,(it is $B1C+B1B = CB$ because B1 is on the straight line CB) and draw $B1M' = h$ equal to A1M on the mid-perpendicular from point B1 to CB. Draw the circle (M', M'B = M'C) intersecting the circle (M, MA = MC) at point D.(P3) Since M'C = M'B, point M' lies on mid-perpendicular of CB. (CN1)

Since M'C = M'D, point M' lies on mid-perpendicular of CD. (CN1) Since MC = MD, point M lies on mid-perpendicular of CD. (CN1) Because points M and M' lie on the same mid-perpendicular (This mid-perpendicular is drawn from point C' to CD and it is the midpoint of CD) and because only one line MM' passes through points M, M' then line MM' coincides with this mid-perpendicular (CN4)

Step 3

Draw the perpendicular of CD at point C'. (P3, P1)

a..Because $MA1 \perp AC$ and also $MC' \perp CD$ then angle $\angle A1MC' = A1CC'$. (Cn 2,Cn3,E.I.15) Because $M'B1 \perp CB$ and also $M'C' \perp CD$ then angle $\angle B1M'C' = B1CC'$. (Cn2, Cn3, E.I.15)

b..The sum of angles $A1CC' + B1CC' = 180^\circ = A1MC' + B1M'C'$. (6.D), and since Point C' lies on straight line MM', therefore the sum of angles in shape A1B1M'M are $\angle MA1B1 + A1B1M' + [B1M'M + M'MA1] = 90^\circ + 90^\circ + 180^\circ = 360^\circ$ (Cn2) , i.e. The sum of angles in a Quadrilateral is 360° and in Rectangle all equal to 90° . (m)

c.. The right-angled triangles MA1B1, M'B1A1 are equal because $A1M = B1M'$ and A1B1 common, therefore side $A1M' = B1M$ (Cn1). Triangles A1MM',B1M'M are equal because have the three sides equal each other, therefore angle $\angle A1MM' = B1M'M$, and since their sum is 180° as before (6D), so angle $\angle A1MM' = B1M'M = 90^\circ$ (Cn2).

d.. Since angle $\angle A1MM' = A1CC'$ and also angle $\angle B1M'M = B1CC'$ (P4), therefore the three

quadrilaterals $A1CC'M$, $B1CC'M'$, $A1B1M'M$ are Rectangles

(CN3). From the above three rectangles and because all points (M , M' and C') equidistant from AB, this means that C'C is also the minimum equal distance of point C' to line AB or , $h = MA1 = M'B1 = CD / 2 = C'C$ (Cn1) Namely , line MM' is perpendicular to segment CD at point C' and this line coincides with the mid-perpendicular of CD at this point C' and points M , M' ,C' are on line MM'. Point C' equidistant ,h, from line AB , as it is for points M ,M', so the locus of the three points is the straight line MM', so the two demands are satisfied, ($h = C'C = MA1 = M'B1$ and also $C'C \perp AB$, $MA1 \perp AB$, $M'B1 \perp AB$) . (o.e.d.) –(q.e.d)

e.. The right-angle triangles A1CM , MCC' are equal because side $MA1 = C'C$ and MC common so angle $\angle A1CM = C'MC$, and the Sum of angles $C'MC + MCB1 = A1CM + MCB1 = 180^\circ$

11.4.1 The Succession of Proofs

1.. Draw the circle (M , MA) be joined meeting line AB in C and let A1, B 1 be the midpoint of CA, CB.

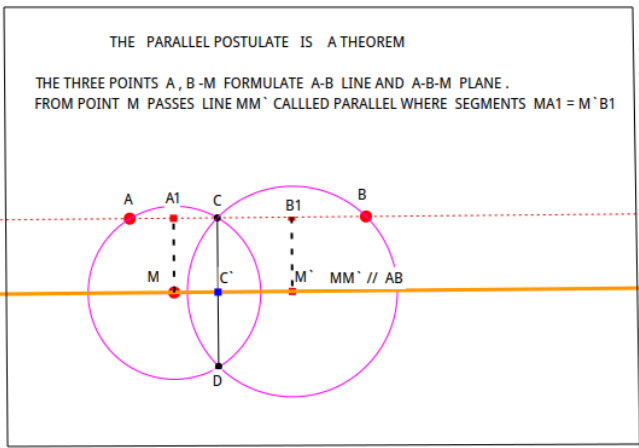
2.. On mid-perpendicular B1M' find point M' such that $M'B1 = MA1$ and draw the circle (M' , M'B = M'C) intersecting the circle (M , MA = MC) at point D.

3.. Draw mid-perpendicular of CD at point C'.

4..To show that line MM' is a straight line passing through point C' and it is such that $MA1 = M'B1 = C'C = h$, i.e. a constant distance h from line AB or , also The Sum of angles $C'MC + MCB1 = A1CM + MCB1 = 180^\circ$

F.32-A. → Presentation of the Parallel Method on Dr. Geo - Machine Macro – Constructions .

- a.. The three Points A , B , M consist a Plane and so this Proved Theorem exist only in plane .
- b.. Points A , B consist a Line and this because exists postulate P1 .
- c.. Point M is not on A B line and this because when segment $MA+MB > AB$ then point M is not on line AB according to Markos definition .
- d.. When Point M is on A B line , and this because segment $MA+ MB = AB$ then point M being on line AB is an Extrema case , and then formulates infinite Parallel lines coinciding with AB line in the Infinite (∞) Planes . All for the extrema Geometry cases in [44-46].



F.33-A → The Parallel Method on Dr.- Geo.

11.4.2 Proved Succession

1.. The mid-perpendicular of CD passes through points M, M'.

2.. Angle $\angle A1MC' = \angle A1MM' = \angle A1CC'$, Angle $\angle B1M'C' = \angle B1M'M = \angle B1CC' < \angle A1MC' = \angle A1CC'$ because their sides are perpendicular among them i.e.

$$MA \perp CA, MC' \perp CC'$$

a.. In case $\angle A1MM' + \angle A1CC' = 180^\circ$ and $\angle B1M'M + \angle B1CC' = 180^\circ$ then $\angle A1MM' = 180^\circ - \angle A1CC'$, $\angle B1M'M = 180^\circ - \angle B1CC'$, and by summation $\angle A1MM' + \angle B1M'M = 360^\circ - \angle A1CC' - \angle B1CC'$ or Sum of angles $\angle A1MM' + \angle B1M'M = 360 - (\angle A1CC' + \angle B1CC') = 360 - 180^\circ = 180^\circ$

3.. The sum of angles $\angle A1MM' + \angle B1M'M = 180^\circ$ because the equal sum of angles $\angle A1CC' + \angle B1CC' = 180^\circ$, so the sum of angles in quadrilateral MA1B1M' is equal to 360° .

4.. The right-angled triangles MA1B1, M'B1A1 are equal, so diagonal MB1 = M'A1 and since triangles A1MM', B1M'M are equal, then angle $\angle A1MM' = \angle B1M'M$ and since their sum is 180° , therefore angle $\angle A1MM' = \angle MM'B1 = \angle M'B1A1 = \angle B1A1M = 90^\circ$

5.. Since angle $\angle A1CC' = \angle B1CC' = 90^\circ$, then quadrilaterals A1CC'M, B1CC'M' are rectangles and for the three rectangles MA1CC', CB1M'C', MA1B1M' exists $MA1 = M'B1 = C'C$

6.. The right-angled triangles MCA1, MCC' are equal, so angle $\angle A1CM = \angle C'MC$ and since the sum of angles $\angle A1CM + \angle MCB1 = 180^\circ$ then also $\angle C'MC + \angle MCB1 = 180^\circ \rightarrow$ which is the second to show, as this problem has been set at first by Euclid.

All above is a Proof of the Parallel postulate due to the fact that the parallel postulate is dependent of the other four axioms (*now is proved as a theorem from the other four*). Since line segment

AB is common to ∞ Planes and only one Plane is passing through point M (Plane ABM from the three points A, B, M, then the Parallel Postulate is valid for all Spaces which have this common Plane, as Spherical, n-dimensional geometry Spaces. It was proved that it is a necessary logical consequence of the others axioms, agree also with the Properties of physical objects, $d + 0 = d$, $d * 0 = 0$, now is possible to decide through mathematical reasoning, that the geometry of the physical universe is Euclidean. Since the essential difference between Euclidean geometry and the two non-Euclidean geometries, Spherical and hyperbolic geometry, is the nature of parallel line, i.e. the parallel postulate so,

<< *The consistent System of the - Non - Euclidean geometry - have to decide the direction of the existing mathematical logic* >>.

The above consistency proof is applicable to any line Segment AB on line AB, (segment AB is the first dimensional unit, as $AB = 0 \rightarrow \infty$), from any point M not on line AB, $[MA + MB > AB$ for three points only which consist the Plane. For any point M between points A, B is holding $MA + MB = AB$ i.e. from two points M, A or M, B passes the only one line AB. A line is also continuous (P1) with points and discontinuous with segment AB [14], which is the metric defined by non-Euclidean geometries, and it is the answer to the cry about the < crisis in the foundations of Euclid geometry >

11.4.3 A Line Contains at Least Two Points, is Not an Axiom Because is Proved as Theorem

Definition D2 states that for any point M on line AB is holding $MA + MB = AB$ which is equal to < segment MA + segment MB is equal to segment AB > i.e. the two lines MA, MB coincide on line AB and thus this postulate is proved also from the other axioms, thus D2 is not an axiom, which form a system self consistent with its intrinsic real-world meaning. F.32-33.

12. Mechanics and Relativity.

A Summary of Newton, Euler - Lagrange Einstein, Equations of motion :

12.1. Newtonian mechanics, start with the three laws that define the behavior of Objects to, *Stand Still, when Moving, and when Forces act upon them*. \rightarrow It is required mainly a rectangular coordinate system on which are considered all constraint forces. The laws,

a.. *Every body persists in its state of Rest or uniform Motion in a straight line unless it is compelled to change that state by forces impressed on it , is (The Inertia law) ,*

b.. *Force is equal to the change in momentum (r.mv Rotational , mv Linear) per change in time. For a constant mass , force equals < mass times acceleration $F = ma$ > , or $F = dp/dt = d(mv)/dt = m(dv/dt) = m.a$,*

c.. *For every Action , there is an equal and opposite Reaction ,*

Remarks :

In Euclidean logic , Points follow Principles as ,
 $A = B$ *The Principle of Equality* ,
 $A \neq B$ *The Principle of Inequality* ,
 $PA + PB = 0$ *The Principle of Stability* ,
 $A \equiv B$ *Principle of infinite Superposition (extrema)*
 $A/B = C/D$ *The Principle of Proportionality (analog) And in Mechanics the one = monad is ,*
 $A \leftrightarrow B = \infty$ *The Principle of Virtual Displacements*
 $\Sigma [Pi + Hi] . \delta \bar{r}_i = 0 \rightarrow W = \int P . ds = 0$,

1).. *The state is the reaction to the change of motion (in magnitude and direction) which presupposes Force only .*

Applying this logic in Principle of Stability then ,
 \rightarrow as in geometry the same in Physics , $PAB = -PBA$ or $PAB + PBA = 0$, or as , *The Infinite points in [PNS] form infinite Units , monads $A_i B_i = d\bar{s}$, which equilibrium by the Primary Anti-Space by an Inner Impulse (P) at edges A ,B where $P_i A + P_i B = 0$, and $ds = 0 \rightarrow N \rightarrow \infty$ and where Monad $\bar{A}\bar{B}$ is the ENTITY and Elements = Breakages $[|A,B| - \bar{P}\bar{A} , \bar{P}\bar{B}]$ is the LAW of monad AB ,and also in E- geometry [37-40] \rightarrow*

The {Space , Anti-Space equilibrium , $\pm \Lambda^-$, Absolute System [S] } is at Rest , as Angular momentum $\Lambda^- = \Omega = mvr$, and is Crushed out into Fragments , becoming the three Breakages $[s^2=(wr)^2]$, $[-s^2=- (wr)^2]$, $[\nabla i=2(wr)^2]$ and after clashed with the velocity vector \bar{v} of [S] , (unless succeed escaping unclashed through centre O of [S] into[R]=[STPL] and this because $\bar{v} =0$) , are Thrown OFF this System [S] , (in order to avoid scattering ,in STPL line) conveyed into the Linear momentum ,the Inertial and Energy-Space ,the Relative [STPL] System [R] as the Particles

Fermions $\rightarrow [\pm \bar{v}.s^2]$ and Bosons $\rightarrow [\bar{v}.\nabla i]$ with momentum , mv, which behave ,as Mass and as Force, in Relative System [R] .

The Unclashed through center ,O, Fragments $s^2 = \pm |(\bar{w}.r)^2|$ occupying the minimum quantized space $|s^2|$ are deported and fill all [STPL] cylinder which is the Rest Quantized Field $\pm [(\bar{w}.r)^2]$ or , The material point in mechanics , as the base of all motions and the force $[|(\bar{w}.r)^2|\nabla i]=2. [(\bar{w}.r)^2]$, Vibrating on $[|(\bar{w}.r)^2|] = \lambda$ as an Stationary Wave creates a curl Electromagnetic Field $E \perp P$ which is the Universal Quantized force called Gravity , meaning that Newton`s laws issue in both , Absolute System [S] and Relative System [R] . A wide analysis on Relative-Spaces and the how equations of Relativity are related to Geometry is given in [37] .

2).. *Object in mechanics , may be the Material point (1) at Euclidean point (1) , which is now Breakage $\pm [(\bar{w}.r)^2]$ magnitude in the Rest Homogeneously - Isotropically Quantized massless Field $\pm [(\bar{w}.r)^2]$ and is the required coordinate System and the base for all motions and forces .*

3).. *Object in mechanics may be also the Material wavelength $\lambda = (1)-(2)$ in the {[Medium-Field Material Fragment]} which is $\rightarrow [\pm s^2] = |\bar{w}.\bar{r}|^2 = [MFMF]$ Field \leftarrow } which is a standing wave in cavity (1)-(2) with scalar breakage $|\pm(\bar{w}.r)^2|$ as medium (1)-(2) field , and (J1) as energy at point (1) and carried to point (2) by following the cycloidal motion from (1) to (2) which is isochrones. Velocity , \bar{v} , during shifting is analyzed into two velocity vectors \bar{v}_1 , \bar{v}_2 , which undergo vibrations causing two waves that represent the two Electric and Magnetic perpendicular components following the trajectory , in=(c1) , out=(c2) . On cycloid = (c)=|A1-A2| is needed the isochrones time $T = 2p\sqrt{2}/w$ to reach end A2. < Fermat`s Principle of Least time > is the Extrema in < Isochrones Principle > which is embedded in all wavelength vector monads .*

12.2. Lagrangian mechanics , starts with the Principle of Least Action between two points , deftly avoiding the consideration of constraints

forces by using any set of coordinate systems and by applying Inertia Forces (constraints) [$P = m \cdot d\bar{v}/dt$] on stationary Points , are developed the following General equations of Equilibrium :

$$\sum_{i=1}^n [P_i + H_i] \cdot \delta \bar{r}_i = 0 \quad \text{or} \quad \sum_{i=1}^n [P_i - m_i \cdot d\bar{v}_i / dt] \cdot \delta \bar{r}_i = 0 \quad \dots (1)$$

and in rectangular Cartesian coordinates

$$\sum_{i=1}^n \{ [X_i - m_i \cdot d^2x_i / dt^2] \cdot \delta x_i + Y_i - m_i \cdot d^2y_i / dt^2 \cdot \delta y_i + Z_i - m_i \cdot d^2z_i / dt^2 \cdot \delta z_i \} = 0$$

where :

- $i = 1, 2, \dots, n$: The material points
- x, y, z : The position in Cartesian coordinates (the degrees of freedom)
- $m_i(m_1, m_2, m_i, m_n)$: The mass on every point $i=1, 2, 3, 4, \dots, n, \infty$
- $P_i(X_i, Y_i, Z_i)$: The applied Resultant Forces .

- $\delta \bar{r}_i (\delta x_i, \delta y_i, \delta z_i)$: The Virtual displacement (the possible motion from point A to B),
- $d\bar{v}_i / dt = v$: The time derivatives of velocities
- $d^2\delta \bar{r}_i / dt^2 \rightarrow$: The time derivatives of acceleration.

n, j : An Integer label corresponding to a generalized coordinate .

H_i : Inertia Forces (Newton's second law) equal to $m_r = \sum P_i \cdot \delta \bar{r}_i = V$: Potential Energy
 $\sum [m_i \cdot d\bar{v}_i / dt] \cdot \delta \bar{r}_i = T$: Kinetic Energy , Lagrangian $\rightarrow L = T - V$

For $i = 1$, rewrite equation (1) as [$P_1 + H_1$] $\cdot \delta \bar{r}_1 = 0$

$$\text{or } [P + H] \cdot d\bar{r} = 0 \rightarrow d\bar{r} \cdot [P + H] = 0 \quad \dots (2)$$

Remarks :

The standing state , is that equations can be derived from Newtonian equations with a set of non- rectangular coordinate system . Lagrangian Principle of Least action and Fermat's Principle of Least Time coexist in Cycloidal motion of monads because of Isochrones motion .

Since (for $i = 1$) Primary Point is the only Space, then this point to exist in this Space and somewhere else , must move from the Initial Position , say A , to another position , say B . This Equilibrium for points A and B presupposes in Mechanics the Principle of Virtual Displacements , work done $W = \int P \cdot ds = 0$ or

$$\text{when } ds = \text{distance AB} , [d\mathbf{s} \cdot (P_A + P_B) = 0] \dots (s)$$

i.e. The two equations (2) , (s) are the same and quantities $d\bar{r} \equiv d\bar{s}$, $(P + H) \equiv (P_A + P_B)$, satisfy the two equations when one of them is zero , and so , equation (s) is holding in both [S] , [R] [S] \equiv {DA-O} and [R] \equiv {DA-PA} Systems.

Since forces $P = -H = 0 \rightarrow P_n \rightarrow \infty$, in [PS] and

[PaS] , are equal and opposite , then Resultant force \bar{A} is zero , and according to the three mathematical condition for Field Forces , issues ,

- a). The Curl of \bar{A} is $\nabla \times \bar{A} = 0$
- b). The net work through a closed trajectory , ds, $\bar{A} \cdot d\bar{s} = g \bar{A} d\bar{s} = 0$
- c). Opposite forces $\bar{A}P$, $\bar{A}H$ can be written as the negative gradient of the same potential $\bar{A}PH = -\nabla U$.

so then the nth Space and Anti-Space is a Conservative Force Field \bar{A}_n corresponding to the nth Potential energy function $\bar{U}_n(\bar{a})$ or $\bar{A}_n(\bar{a}) = -\nabla \bar{U}_n(\bar{a}) = -\nabla [\nabla \bar{U}_n] = \nabla^2 \bar{U}_n$, where $\bar{a} = x_0, y_0, z_0$, the coordinates of Initial Space .

12.3. Principles and generalized forces in [PNS]

In Field Theory , the Position vector $d\bar{s} = AB$ of two points A,B in a Standard coordinate System is related to the generalized coordinates by transformation equation $\bar{r}_i = d\bar{s} = d\bar{s}(q_i, \bar{p}_i)$, where

q_i = The ,i, number of degrees of freedom (x ,y, z)

\bar{p}_i = A set of variables or constant magnitudes (time , forces , momentum , etc)

$\mathbf{F}_A = (X_A, Y_A, Z_A) =$ Generalized forces

with the components \mathbf{F}_A X_A, Y_A, Z_A

$\mathbf{F}_B = (X_B, Y_B, Z_B) =$ Generalized forces

with the components \mathbf{F}_B X_B, Y_B, Z_B .

$\bar{r} = d\bar{s}(\bar{r}_1, \bar{r}_2 \dots \bar{r}_n)$, $r_i(dx_i, dy_i, dz_i)$
 = Incremental distance dx , dy , dz

m = (mass) , A constant which is considered as the hypothetical Reaction to the Motion (Inertia) .

$T = \frac{1}{2} \sum_{i=1}^n m_i \cdot \bar{r}_i \cdot \bar{r}_i =$ The Kinetic Energy for

$i = 1, \dots, n$ points in a system .

12.4. Lagrange's equation (2 nd kind) .

For any material System with n degrees of freedom the position vector \bar{r} in a Standard coordinate System , is related to generalized coordinates by *the transformation equation* $\bar{r} = \bar{r}(t, \bar{q}_n)$ and depends on \bar{q}_n .

($x_i, y_i, z_i \dots n =$ number of degrees of freedom in the system) coordinates at Time t , and for n generalized velocities $\rightarrow \dot{\bar{r}} = \dot{\bar{r}}(t, \bar{q}_n, \dot{q}_n)$ The expression for the Virtual displacement $\delta\bar{r}_i$ of the system for , *velocity depended constraints* , is the same form as a total differential .

$$\delta\bar{r}_i = \sum_{n=1}^n [\partial\bar{r}_i / \partial q_n] . \delta q_n = \nabla\bar{r} . \odot = [\nabla_x \bar{r} , \nabla_x \bar{r}]$$

where

$\bar{q}_n \rightarrow n$ Independed generalized coordinates (are

the number of degrees of freedom in the system or the spatial coordinates) and Q_n the Total Work done by the applied forces P_i on one of the Virtual displacement $\delta\bar{q}_n$. The Total Kinetic energy T for the system of Point particles is defined by ,

$$T = (1/2) . \sum_{i=1}^n m_i r_i^2 , Q_n = (d/dt) . (\partial T / \partial \dot{q}_n) - (\partial T / \partial q_n)$$

Q_n , the generalized forces .

Action $S = \int_{t1}^{t2} L dt$ where Lagrangian $L = T - U$ and $U =$ The Total Potential energy of the system and work,

$$Q_n = (d/dt) . (\partial T / \partial \dot{q}_n) - (\partial T / \partial q_n) = (d/dt) . (\nabla . T) - \nabla^2 T . (3)$$

i.e. The dynamics of any system = Work = Total energy and is transferred as generalized force Q_n ,

$$Q_n = \partial W / \partial (\delta\bar{q}_n) , (\delta\bar{q}_n) = \bar{v}_n . \delta t = [\bar{v}_c + \bar{\omega} . \bar{r}_n] . \delta t = (Translational + rotational velocity) . \delta t$$

$$Q_n = \bar{v}_c . (\partial T / \partial t) + \bar{\omega} . \bar{r}_n . (\partial T / \partial t) \rightarrow$$

Translational kinetic energy + Rotational kinetic energy .

Applying the fundamental equations on two points of

stationary [PNS] , $\bar{z}_o = [\lambda , \pm \Lambda \nabla i]$, $\bar{z}'_o = [\lambda^2 - |\Lambda|^2]$, $e_o = [-\lambda \nabla , \nabla_x \Lambda] = 0$ then $\rightarrow e = \nabla_x \Lambda = \nabla \odot \Lambda =$

$$[-\text{div} \Lambda^-, \text{curl} \Lambda^-] = [0 , \pm \Lambda] \text{ i.e.}$$

the points are incorporating the equilibrium vorticity $\pm \Lambda$ either as even or odd functions .

Since $\bar{z}_o = [\lambda , \pm \Lambda \nabla i]$, then positive \bar{z}_o , $\bar{z}'_o = [\lambda , \Lambda \nabla i]$ and $\bar{z}''_o = [\lambda , -\Lambda \nabla i]$ is the conjugate quaternion and because \bar{z}_o is a unit quaternion then Action on point is $\rightarrow A =$ New quaternion $z = \bar{z}_o \odot \bar{o} = \bar{z}_o . \bar{o} . \bar{z}'_o = [\lambda , \Lambda \nabla i] . [0 , \Lambda \nabla i] . [\lambda , -\Lambda \nabla i] = [-\Lambda^2 , \lambda \Lambda + \Lambda x \Lambda] . [\lambda , -\Lambda] = [-\lambda \Lambda^2 - \Lambda^2 \Lambda + \lambda \Lambda^2 + \Lambda^2 \Lambda , -\Lambda^2 \Lambda + \lambda^2 \Lambda - \lambda \Lambda^2 + \Lambda (\Lambda x \Lambda) - \lambda \Lambda \Lambda + \Lambda (\Lambda x \Lambda)] = [0 , (\lambda^2 - \Lambda^2) . \Lambda + 2 \Lambda (\Lambda \Lambda) + 2 \lambda (\Lambda x \Lambda)] \dots (4)$

Since $\text{div} \Lambda = 0 = |\Lambda| . \text{div} \bar{\Lambda} + \bar{\Lambda} . \nabla |\Lambda| = |\Lambda| . \text{div} \bar{\Lambda} + \bar{\Lambda} . d|\Lambda| / ds$ then $\bar{\Lambda} . \nabla = d/ds$, which is the arc-length derivative of Λ direction showing that *on points exists directional vorticity as* ,

$$\begin{aligned} (\lambda^2 - \Lambda^2) . \Lambda &= \text{Euler vorticity } \cup \\ 2 \Lambda (\Lambda \Lambda) &= \text{Coriolis vorticity } \cup \\ 2 \lambda (\Lambda x \Lambda) &= \text{Centripetal vorticity } \cup \cup \end{aligned}$$

and for unit $\bar{v} \perp \Lambda$ then ,choosing $\lambda = \pm \cos(\theta/2)$ and $\Lambda = \bar{v} \sin(\theta/2)$ then $z = [0 , \Lambda . \cos \theta + (\bar{v} x \Lambda) . \sin \theta$ which is the *Euler-Rodrigues* formula for the rotation by an angle θ , of the vector Λ about its unit normal \bar{v} .

Comparing (3) with (4) then

$$\text{Conjugation of } \bar{o} \text{ on point } P \text{ is } \rightarrow [0 , \Lambda] \odot [r + \bar{r} . i] = 0 - \Lambda \bar{r} , 0 + \Lambda r + \Lambda x \bar{r} = - |\bar{\Lambda}| . |\bar{r}| , r \bar{\Lambda} + \bar{\Lambda} x \bar{r} \dots (5)$$

and for $\Lambda \perp \bar{r}$ then $A = 0 , r . \bar{\Lambda} + \bar{\Lambda} x \bar{r}$ i.e.

A Potentially Rotational kinetic energy ($mr^2 . \omega^2 / 2$) as this above .

$$\text{The normalized quaternion is } = (-|\bar{\Lambda}| . |\bar{r}| , r \bar{\Lambda} + \bar{\Lambda} x \bar{r}) / (\sqrt{\Lambda^2 r^2 + \Lambda^2 r^2}) = [-|\bar{\Lambda}| . |\bar{r}| , r \bar{\Lambda} + \bar{\Lambda} x \bar{r}] / (\Lambda r \sqrt{2}) \dots (5a)$$

The Particle's spin $h/2$ is consisted of two parts

- 1). The circular motion of all energy on E plane caused by its translational motion of speed v and
- 2). the extra self rotation (from common circle) v , common = $[1 - v^2/c^2] . f$, which motion is of double helix structure . The equations of motion of particle's inner system (stationary wave) . The square of wave function represents Space- energy distribution of particles mass density .

12.5. Einstein's General Relativity [GR] :

A.. The , Laws of Physics , are the same for all Inertial reference frames

B..Light always propagates through a Vacuum at a definite velocity c , which is independent of the state of motion of the emitting body.

a.. Maxwell`s Displacement current $\rightarrow D_c$:

D_c is a quantity appearing in Maxwell`s equations of Electromagnetism and is defined in terms of the rate of change of , *electric displacement fields* D , in a dielectric medium and is defined as

$$D = \epsilon .E + P \text{ where ,}$$

ϵ = The permittivity of the free space

E = The electric field intensity

P = The polarization of the medium .

By differentiating equation

$$dD/dt = JD = \epsilon . (\partial E/\partial t) + (\partial P/\partial z) \text{ where ,}$$

$(\partial E/\partial t)$ = The Magnetic field $\rightarrow B \leftarrow$

$(\partial P/\partial z)$ = The Electric field $\rightarrow E \leftarrow$

and in Isotropic dielectric case ($P=0$) then

$$D = \epsilon .E \text{ and Maxwell`s equations :}$$

$$\nabla .D = \rho \rightarrow \text{Gauss`s law for Electrostatic}$$

$$\nabla .B = 0 \rightarrow \text{Gauss`s law for Magnetostatic}$$

$$\nabla .B = \rho / \epsilon_0 \rightarrow \text{Gauss`s law for Magnetism .}$$

$$\nabla \times D = J \rightarrow \text{Ampers`s law}$$

$$\nabla \times E + (\partial B/\partial t) = 0 \rightarrow \text{Faradays`s law where}$$

$$D = \epsilon .E , H = B/\mu \text{ in SI units,}$$

ρ = The free charge density

ϵ_0 = Electric constant

For the origin of Maxwell`s equations [41].

Relativity considers such a current could be very directly connected to empirical phenomena ,< *Speculation had proved itself superior to empiricism* >

Remarks (a) :

Since wavelength , λ , as distance is equal to product velocity (v).period (T) then $\rightarrow \lambda = \bar{v} T$.

Displacement current is a current like the conduction

current and produces a magnetic field . It is a stationary wave in individual charges in motion as this is velocity vector $\bar{v} = \bar{\omega}r$ being wavelength which is connected to angular momentum $\bar{L} = r.m\bar{v} = m.\bar{\omega}r^2$ in Planck`s or in beyond Planck`s length which is ,

$$L_p = 1,616.10^{-35} \times \pi.\sqrt{3} = 8,906.10^{-35} \text{ m} = e^{\wedge}i.(-5\pi/2).b \text{ then } e^{\wedge}(-78,5398) = \mathbf{8,906.10^{-35} \text{ m}}$$

decomposed into the two perpendicular velocity vectors \bar{v}_1, \bar{v}_2 which create the Electric (E) and the Magnetic field (P) . The same also for the macroscopic bound current circulation around a material`s (monad) surface.

Velocity describes the origin of magnetic in the law field as variation of Electric Flux . Since D_c had never been directly detected , *the proof is the following and reasonable logic.*

Displacement current density , D , is the Energy in cavity (1)-(2) = λ which is a standing wave following cycloid trajectories in cavity to reach edge (2). Medium of cavity is breakage $|\pm(\bar{\omega}.r)|$ of Gravity Field and Energy on (1) is the density velocity vector $\bar{v} = |(D1)|$.

In stationary wave conservation of energy (charge) is assembled .

Velocity vector , \bar{v} , which is the cross product of two velocity vectors \bar{v}_1, \bar{v}_2 or $\rightarrow \bar{v} = \bar{v}_1 \times \bar{v}_2$,with head at point (1) and analyzed , in a perpendicular to $\lambda=(1)-(2)$ directional plane into the two orthogonal velocity vectors \bar{v}_1, \bar{v}_2 which heads are at point (1) , is carried to point (2) by following the cycloidal motion (1)-(2) . During shifting , velocity vectors \bar{v}_1 , \bar{v}_2 ,being vectors, undergo vibrations which causes the two waves that represent the Electric [E] and the Magnetic [P] perpendicular components until reaching point (2) which is the Reemission of the wave and it is the new head of velocity , \bar{v} , where then mechanism is recycled . Figure. 32

Source is Rotation dipoles $\bar{v} = \bar{\omega}r$, because of angular velocity vector $\bar{\omega}$, in Stationary wave decomposed into the two velocity vectors $v_1 \perp v_2$, forming the Electrical and Magnetic field , E, P , as sink following cycloidal Isochrones motion.

i.e. Electric Displacement density (field) , $D = \epsilon.E+P$, in an dielectric medium , of any moving charge of wavelength , λ , in the rate of change , is alternately in terms of The Electric field ($\partial P/\partial t$) and of The

*Magnetic field ($\partial E/\partial t$) in phase with each other in the wavelength , λ , \rightarrow and generally meaning that , velocity vector $\bar{v} = \lambda/T = \lambda f$, of **Photon** (or any other moving charges) is a **Stationary Electromagnetic wave in Photon`s wavelength , λ** , and a self propagating transverse oscillating wave producing **a changing Magnetic field ($\partial E/\partial t$)***

around itself and this , according to the second of Maxwell's equations (Ampere-Maxwell law) .

The resulting Magnetic field creates an Electric field ($\partial P/\partial t$) around itself according to the first of Maxwell's equations (Faraday's law of the Electromagnetism Induction) .

This alternative Electromagnetic wave travels as velocity vector \bar{v} , (charge = momentum , or the assembled conserved unaltered energy , and interlay interchanged) .

The Duality Principle of Photon is the Intensity of light vector $|\bar{v}| = \text{real part}$, which is Particle and since light is quaternion $\rightarrow [q = s + \nabla i]$ then photon represents the intensity of light and is $|s| = \text{Particle}$, and $\nabla i \times Di = \text{Wave forming the Electromagnetic fields } E, P$, where $\nabla i = \bar{v} = |\lambda|f = |\lambda|/T$, and this for all moving monads .

The fact that speed of light is constant and travels at the same speed regardless of any direction is because rotational energy $\bar{\Lambda} = r.m\bar{v}$,the centrifugal velocities $\bar{v} = \bar{\omega}.r$ are constant , so acceleration $[d\bar{v}/dt=d(\bar{\omega}r/dt)=0]$ is zero and the opposite , even if when particles are exported to STPL . [40-41]

Michelson's-Morley experiments cannot prove this reality because Gravity is the force (energy) , which is connecting Material points of the Medium .

Numerical value ,s, and Imaginary $\nabla i = ExP$ are Variant in Invariant rotational energy $\bar{\Lambda} = r.m.\bar{v} = m.\omega r^2$ as velocity $\bar{v} = \bar{\omega}r$, meaning that quaternion = energy ,travels by changing velocity \bar{v} and angular velocity $\bar{\omega} = 2\pi/T$, and Period T of vibration and because of Isochrones motion of Fields on cycloidal trajectories , automatically distribute themselves uniformly and of Homogeneity (The Electromagnetic wave) across the whole wavelength , λ , of monad .

Relativity being confined in Planck's length [Maxwell's Displacement current is equivalent to an electric current producing a magnetic field into wavelengths] , could not perceive this Unique and Intrinsic property of all monads , and being quaternion ,

(eg. The Velocity vector \bar{v} is Quantized) to be Wave as the Intrinsic Electromagnetic field of

the two perpendicular velocity components forming the two Fields , and as Particle , the real part of velocity \bar{v} as ,

$$\text{Energy } I_d = \frac{\rho\pi^2c^3}{2\lambda^2}[\epsilon E^2 + \mu H^2] \text{ in volume } V = \left[\frac{4(\omega^2 r^2)^3}{3\pi}\right] \rightarrow \text{then Appearance is as Particle}$$

$$\text{Energy } I_d = \left(\frac{\rho.c}{2}\right).(\omega A_0)^2 \text{ in Interference pattern} \rightarrow \text{then Appearance is as Wave}$$

The field Intensity estimation $S = h.f$ is ,

$$S = [\bar{E} \times \bar{H}] = \left[\frac{\epsilon.E^2}{2} + \frac{\mu.H^2}{2}\right].\left[\frac{4}{3}\pi\lambda.\left(\frac{\lambda}{\pi}\right)^2\right] = h.f \text{ and}$$

$E = H$ or

$$E = H = \sqrt{\frac{3h}{\pi.c(\epsilon+\mu)}} \cdot \left[\frac{\omega^2}{2\pi c}\right]$$

The Monads in monads is a characteristic expression of above energy monads .

Einstein failed to see this reality (the zero acceleration of the rotational velocity $\bar{\omega}$) and to explain the WHY speed of light is constant , considering constancy of light as an axiom from which derived the rest of his theory of General Relativity .

Galileo Galilei arguing that the mechanical laws of physics are the same for every inertial observer (those moving uniformly with constant speed in a straight line) , and so one cannot distinguish , a state of rest , from , a state of constant velocity, was in reality .

Increasing-Decreasing of a Removal Source

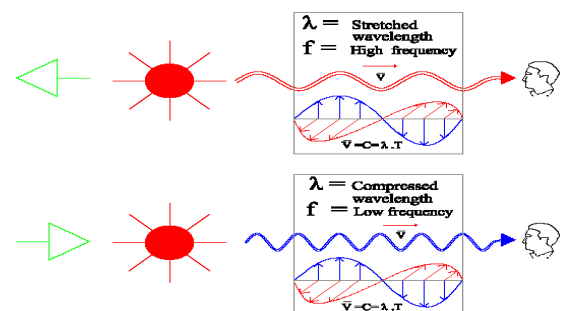


Figure .34. \rightarrow The Increasing-Decreasing λ , of a Removal Source $V(f)$

b.. Equivalence Principle :

In a uniformly and non-uniformly accelerated reference frame with acceleration \mathbf{a} , situated in a Gravitational field of gravity \mathbf{g} , then $\mathbf{g} = -\mathbf{a} =$ **Intensity of gravity field**, i.e. All particles have the same acceleration in a gravitational fields and is not possible with experiment to distinguish the effect of gravity from that of an accelerated reference frame using local observations.

This is a fundamental principle of GR and gravitational mass is identical to inertial mass. This implication of the principle is that, since photons have momentum and therefore must be attributed an inertial mass, they must also have a gravitational mass and thus photons should be deflected by gravity and also be impeded in their escape from a gravity field, leading to the gravitational red shift, the concept of a black hole, and to the gravitational lens effect. Above is, the Why charge of gravity is the Inertia of a body, or equivalency between Inertial mass and Gravitational mass.

Remarks (b) :

Galileo's Principle of Equivalence states that Inertial mass is equal to the gravitational mass and acceleration

$a = d\bar{v}/dt$ equal to acceleration due to gravity g , Gravity is the Stationary force $\rightarrow [\nabla_i = 2(wr)^2] \leftarrow$ on the base for all motions \rightarrow Medium-Field-Material-Fragment, $|\pm s^2| = (wr)^2 = [\text{MFMF}] \leftarrow$ in all universe and so Newtonian theory of gravity, is acting at the same time between two separated masses is correct.

Maxwell's equations predict Electromagnetic waves in and out of monads, while Einstein's equations of GR predict Gravitational waves that travel at the speed of light in order to explain Simultaneity. GR failed to conceive Gravity force as a Stationary force restraining breakages for monads beyond the Planck's length as following,

$$L_v = e^{i(\frac{N\pi}{2})} b=10^{-N} = -\infty \quad m = [0 - 10^{-\infty} - 10^{-62} - 10^{35} - 10^{+\infty} - \rightarrow \infty]$$

Breakages acquire different velocities and different energy and because follow cycloid trajectories, thus need the same time (isochrones) to reach [STPL] line.

Fermat's Principle of Least time in Isochrones Principle is embedded in all wavelength λ , as vector monads.

During Intrinsic Diffraction, $d\bar{s} = \lambda$, of the isochrones motion of vectors, frequency f , doesn't change and only the velocity \bar{v} , and wavelength λ , changes so from equation,

$$\lambda = \bar{v}T = \bar{v}/f, \quad \bar{v} = \lambda f \quad \text{and} \quad a = d\bar{v}/dt = (d\lambda/dt).f + \lambda(df/dt)$$

then $\rightarrow \mathbf{a} = \mathbf{g} = d\bar{v}/dt = (d\lambda/dt).f$ since $f =$ constant, or,

Let $\lambda \rightarrow$ be the wavelength of a moving monad, $t = \lambda/c \rightarrow$ is the needed time to cross length λ , $s = at^2/2 \rightarrow$ Deflection due to acceleration a , $H = gt^2/2 \rightarrow$ Deflection due to acceleration of g , for $s = \lambda$ then $s = at^2/2 = c.T$ where T is the period of Isochrones displacement and

$$t^2 = 2. cT / a \quad \dots(1)$$

$$\text{from equation - H -} \quad t^2 = 2. H / g \quad \dots(2)$$

equating (1), (2) then $cT/a = H/g$ and since in gravity field cycloidal motion (**Simultaneity**) defines the same displacement cT, H then $ct = H$ and also $\mathbf{a} = \mathbf{g}$

Therefore all particles have the same acceleration g , in our gravitational field with frequency unchanged, and \rightarrow velocity \bar{v} , only with wavelength λ , to be changed \leftarrow so light being a particle also, is deviated in gravity field. 10/10/2015

c.. Mercury's Perihelion advance :

The perihelion of the orbit of the planet advances is, 2 degrees per century, 80s have been accounted by the perturbations from the other planets and 43s by Einstein's GR theory.

Remarks (c) :

The \rightarrow [Space, Anti-Space equilibrium, $\pm \bar{\Lambda}$, Absolute System [S] \leftarrow], as Angular momentum $\bar{\Lambda} = \Omega = mvr$, is Crushed out into Fragments and, becoming the three Breakages [$s^2 = (wr)^2$], [$-s^2 = -(wr)^2$], [$\nabla_i = 2(wr)^2$], and after clashed with the velocity vector \bar{v} of [S], (unless succeed to escape unclashed through centre O in STPL cylinder and this because of $\bar{v} = 0$), are Thrown OFF this System [S], conveyed into the, Relative [STPL] System [R], with Linear momentum and Inertial Energy-Space, as the Particles Fermions $\rightarrow [\pm \bar{v}.s^2]$ and Bosons $\rightarrow [\bar{v}.\nabla_i]$.

The unclashed through centre ,O, Fragments $s^2 = \pm |(\bar{w}.r)^2|$ occupy the minimum quantized space $|s^2|$ and consist the Medium-Field Material-Fragment $\rightarrow [\pm s^2] = [MFMF]$ as base for all motions and fill all [STPL] cylinder and thus consist the Rest , Homogenous , Isotropic Base of all motions .On this Base, force $[\nabla i] = [2. |(\bar{w}.r)^2 | \nabla i]$ called Gravity is connecting material points of Medium , while all the other clashed or unclashed fragments of the cylinder move , consisting the Relative System [R] to Absolute , Space , Anti-Space, $\pm \bar{\Lambda}$, System [S] .

Unclashed Fragments through centre O , clashed with the constant velocity \bar{c} , consist the **Dark matter** $[\pm \bar{c}.s^2]$ and the **Dark energy** $[\bar{c}.\nabla i]$. or in summary ,

- A.. $[\pm \bar{v}.s^2] \rightarrow$ Fermions ,and $[\bar{v}.\nabla i] \rightarrow$ Bosons
- B.. $[\pm s^2] \rightarrow [MFMF]$ Field , $[\nabla i] \rightarrow$ Gravity force
- C.. $[\pm \bar{c}.s^2] \rightarrow$ Dark matter ,and $[\bar{c}.\nabla i] \rightarrow$ Dark energy

Since $[MFMF] = [\pm s^2 = (wr)^2]$ is the *base* for all motions and Gravity *force* $[\nabla i] = [2. |(\bar{w}.r)^2 | \nabla i] = 2.(\pm s^2) = 2(wr)^2$, then forces (from any where) is twice the Base ,

i.e. Base is half (1/2) of Gravity force , (or since all perturbations from other planets are 80s) , so the Base is $\rightarrow 80 / 2 = 40s$, which are the Unaccounted last 40 seconds of arc .

d.. Gravitational deflection of light by the Sun :

In GR is indicated that light from a star , *which just grazed the sun* , should be deflected by 1,75 seconds of arc.

Remarks (d) :

Monads ,as an Electromagnetic Standing wave move in Field $[MFMF] = s^2 = \pm |(\bar{w}.r)^2|$ as the smallest quantized space of this level. Let ,L, be the length of an undergoing constant acceleration monad in gravity field ,
 $t = L / c \rightarrow$ is the needed time to cross length L ,
 $s = at^2 / 2 = aL^2 / 2c^2$ is Deflection due to acceleration ,a,

- a.. For a monad in Planck`s length 10^{-35} m then $T = 8,906.10^{-35} / 3. 10^8 = 2,968. 10^{-35}$ s and

$$s = aT^2 / 2 = 9,81.8,809.10^{-70} \text{ m} = 4,32.10^{-69} \text{ m}$$

b.. For Photon wavelength $\lambda = 6,21.10^{-7}$ m as Monad in monad Photon $s = 9,81(\lambda/c)^2 / 2 = 2,101. 10^{-14}$ m corresponding to an angle $\theta = s/3600 = 5,386. 10^{-18}$ degrees of second .

c.. For an arc on earth surface $\pi.(Km)^2 = 3142.10^3$ m then \rightarrow

$$s = 9,81(9,872/9(10^{12}/10^{16})) = 5,38.10^{-4} = 0,538.10^{-3} \text{ mm}$$

which corresponds to an angle

$$\theta_{\text{arc-sec}} \rightarrow 3600.s = 1,883\text{-arcsec} .$$

e.. Gravitational redshift and Time Dilation :

Gravitational redshift is the Phenomenon where low frequencies of light [long T=620-750 nm] shifted to red [redshift $\rightarrow f = 400 - 484$ THz] and higher frequencies of light [short T=450-495 nm] are shifted to blue (blue-shifted $\rightarrow f = 606 - 668$ THz) and Time Dilation the opposite Phenomenon for time .

Remarks (e) :

The answer is as below using the intrinsic property of constant light velocity vector $|\bar{v}|$, *which is a Stationary wave in Photon`s wavelength λ , as $\rightarrow \bar{v} = \lambda / T = \lambda f$. Figure.33*

In a **Stress-Strain System** , the State of Principle Stresses , $\pm \sigma$ at each point, is the double refraction in **Photo-Elasticity** and expressed as the Isochromatic lines $[(\sigma_1 - \sigma_2) = J.k/d]$ or as Isochromatic surfaces , depending on the direction of force (pressure) which is the same in gravity field as length-contracted and length-expanded in a given piece of quantized space .Stretching Removal of λ creates , **$-\sigma_1$** , while , Compressed Removal of λ creates , **$+\sigma_1$** , and since velocity ,**c**, is constant , long and short period T , or low and high ,f, varies and a vector with Low energy $E = h.f$ at Red is as ,

(Redshift) \rightarrow low $f = 400-484$ THz , and long $\lambda = 620-750$ nm

(Blueshift) \rightarrow high $f = 606-668$ THz ,and short $\lambda = 450-495$ nm

and High energy and since $E = h.f$, at Blue .

In this way Light is **s = Particle as Photon** , $s = \lambda = 380-780 \text{ nm} = (3,8-7,8).10^{-7}$ m and **as Wave** , the Stationary Electromagnetic fields **E , P = $\nabla i \times Di$**

= is of an Wave nature force where $\nabla i = \bar{v} = \lambda f$
 $= \lambda/T$, since Light also = quaternion \rightarrow

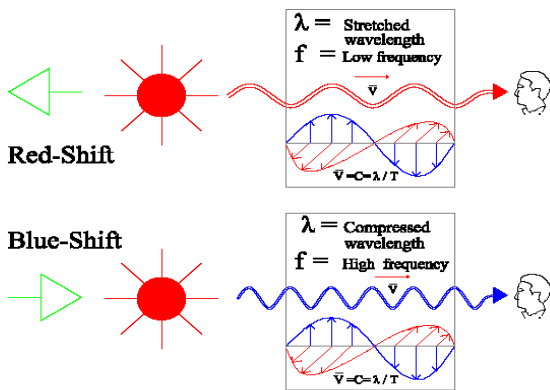
$[q = s + \nabla i]$.

The Stationary Wave in $s = \lambda$ means that, since Photon is the only Electric Displacement field , $D = \epsilon.E + P$, then in the rate of change is alternately in terms of The Electric field $(\partial P/\partial t)$ and The Magnetic field $(\partial E/\partial t)$ i.e. for Low energy Redshift and for High energy Blue-shift is then

$|s| = \text{as Particle}$.

Since also frequency $f = 1/T$ and energy $\bar{v} = E = h.f$ then Cycloidal motion Controls constancy of Energy by changing velocity , $\bar{v} = \bar{\omega} r$, and period , T , of monads.

Einstein failed to see this reality and to explain the WHY IS THE DUAL nature \rightarrow Wave nature , is the Intrinsic Electromagnetic Wave of Particles and speed of light is constant in a Stress-Strain System with (Redshift , as low , f , and Blue-shift , as high , f ,) Photon to be as Particle and Wave , but considering constancy of light as an axiom from which he derived the rest of his theory of General Relativity .



Intrinsic Stationary Wave of a Removal Source

Figure . 35. \rightarrow The Intrinsic Stationary Wave of a Removal Source $V(f)$.

f.. Gravity as Curvature :

GR of Einstein assimilates gravity as the curvature in space-time and not as Force and this based on Elliptic geometry, by contrast, stating that , all lines through a point M and parallel to a line AB intersect line .

In Elliptic geometry the two lines “curve toward” each other and eventually intersect . The simplest

model for Elliptic geometry is a sphere, where lines are “great circles”. For any great circle (which is not a straight line) and a point M which is not on the circle all circles through point M will intersect the circle . In elliptic geometry the three angles of a triangle add greater than 180°, without referring that triangle is not in Plane, but in the Sphere (spherical triangle) . *This deliberate omission created the wrong elliptic geometry and all others following .*

Assuming the postulate of Relativity , $c = \text{constant}$, was valid without restrictions , this would imply that all forces of nature must be invariant under Lorentz transformations in order that principle be rigorously and universally true .

Also say that an object flying pass a massive object , the space time is curved by the massive object . F-33

Remarks (f) :

It is proved in [32-39] and now in [44] that from any point ,M, not on line AB can be drawn one and only one parallel to AB ,which parallel doesn't intersect line , so the Elliptic Geometry must be revised and also in [36-37] Gravity is force $[\nabla i = 2(wr)^2]$ in the Medium-Field-Material-Fragment , [MFMF] as , $|\pm s^2| = (wr)^2 = [MFMF]$ which is the base for all motions.

This force is acting on Medium Field by having as wavelength the Stationary Breakage (1-2) = $\pm |[(\bar{w}.r)^2]|$ which consist the Material points , and on all moving Material wavelength $\lambda = (1)-(2)$ massive or not Particles.

1).. Object in mechanics , may be the **Material point** (1) at Euclidean point (1) , which is now Breakage $\pm |[(\bar{w}.r)^2]$ magnitude **in the Rest Homogeneously - Isotropically Quantized massless Field** $\pm |[(\bar{w}.r)^2]|$ and is the required coordinate System and base for all motions and forces . The material points as Figure 1 .

2).. Object in mechanics may be also the **Material wavelength** $\lambda = (1)-(2)$ in the **{[Medium-Field Material Fragment] $\rightarrow [\pm s^2] = |\bar{w}.r|^2 = [MFMF]$ Field \leftarrow }** which is a **standing wave in cavity** (1)-(2) with **Scalar breakage** $|\pm(\bar{w}.r)^2|$ as medium (1)-(2) field , and (J1) as **Energy at point (1) and carried to point (2) by following the cycloidal motion from (1) to (2) which is isochrones . Velocity , \bar{v} , during shifting is analyzed into two**

velocity vectors \bar{v}_1, \bar{v}_2 , which undergo vibrations causing two waves that represent the two Electric and Magnetic perpendicular components following the trajectory,

$in=(c1)$, $out=(c2)$. On cycloid $= (c)=|A1-A2|$ is needed the isochrones time $T = \pi \cdot \sqrt{Rc / g}$ to reach end A2.

So, Gravity is the minimum attractive and biding Force $\nabla_i = 2(wr)^2$ on [MFMF]= $|(wr)^2|$ Base, which interact with all other particles, and also since acceleration $a = d\bar{v} / dt = (d\lambda/dt) \cdot f$ then for, $\lambda = \text{any constant (or zero)}$ and $\bar{v} \rightarrow 0$, then $f \rightarrow \infty$.

This is the why the very strong gravitational fields are present and close to black holes where there velocity $\bar{v} = c = 0$.

Appealing spacetime a Priori accepts the two elements, **Space and Time**, as the fundamental elements of universe without any proof for it, so anybody can say that **this stay on air**. 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 $PA = -PB$ following

Principle of Virtual Displacement :

Time is the conversion factor (meter) between the conventional units (second) and length units (meter).

Vision theories are all those considering the Time something else of what it is. By considering the moving monads (particles etc. in space) at the speed of light, pass also through Time or Spacetime which is not existing, this is an widely agreeable illusion of General Relativity.

g.. Tidal Forces :

Falling between small particles with very small mass and a rigid body with a large mass, change its shape with time, by stretching in the direction of the fall and press in the direction perpendicular to it are, what is called Tidal forces.

Remarks (g) :

According to Bernoulli equation of energy conservation in, non-viscous, incompressible fluid in steady flow, Potential and Kinetic Energy per unit volume is constant at any point as, $p + \rho v^2/2 + \rho gh = \text{constant}$, where $p = \text{pressure}$, $\rho = \text{the density}$, $v = \text{the velocity}$, $h = \text{the elevation}$ and

$g = \text{the gravitational acceleration}$, and (1)-(2) points lie on a stream line. The one-dimensional continuity equation gives,

$$p_1 - p_2 = (\rho/2) \cdot (v_2^2 - v_1^2) \quad \text{and} \quad A_1 v_1 = A_2 v_2, \quad \text{therefore}$$

$$A_2 < A_1, v_2 > v_1 \quad \text{and} \quad v_2 > v_1, p_2 < p_1$$

or, decreasing area = increasing velocity and increasing

velocity = decreasing pressure (Force).

Spinning ball in an airflow is a characteristic example, where velocity stretches in the velocity direction, and pressures are shrinking in perpendicular to velocity direction. It was shown in [25-30] that,

The mechanism of Energy Transport as (\bar{v}) through its quantized wavelength $|\lambda = \bar{v} \cdot T|$, is a property of any standing wave, into the Medium $|\lambda| = (1)-(2)$, and involves the Absorption and Reemission of the wave quantized energy $J = (J_1) = (J_2)$ by the two neighbor edges (1) and (2) of the medium. The Absorption of

energy causes J_1 , within edge (1) to undergo vibrations as $[ds^2/dt^2] = -(g/4r) \cdot s$ which causes a new wave with the same frequency (because $f = E/h$) as the first wave but delaying the motion through the medium until Reemission by travelling, J_1 to J_2 , through this small region of space between edges (1) and (2) and once the energy of wave is reemitted by its neighbor edge (2) then mechanism is recycled. This mechanism is succeeded by the intrinsic property of waves \rightarrow quaternions, monads, vectors, Tensors, which is, **the Stationary wave nature of Spaces forming external Spin as Torque** and working as follows,

It was shown in [27] that on dipole $AB = [\lambda m, \Lambda]$ under the influence of Space Anti-Space forces $dP = PB - PA$ are created from forces $dP //$ Space lines the Static Force Field E , from forces $dP \perp$ Space lines the Static Force Field P , where $P \perp E$, which then experience on any moving dipole AB with velocity \bar{v} , a total force $F = F E + F P = (\lambda m) \cdot E + (\lambda m) \cdot \bar{v} \times P$ which combination of the two types result in a helical motion, with stability demand $\rightarrow E = -(\bar{v} \times P) = -(\bar{v} \cdot P) \perp$ which is the alternative conservation of momentum $\Lambda^2/2\lambda m$, in the two perpendicular fields E, P .

In case $(\lambda m) = q$ then total force $F = F_E + F_P = q \cdot E + q \bar{v} \times P = q \cdot [E + \bar{v} \times P] \rightarrow$ which is Lorentz force in the Electromagnetic crossed fields E and P with electric charge $q = \lambda m$ and both are the two beyond Gravity Fields interpreting the fundamental cause (effect) of motion, in small and large scales.

The method of velocity constancy, and c :

Since velocity $\bar{v} = \bar{\omega} \cdot \mathbf{r}$ and acceleration for a quaternion $\mathbf{z} = (s + \bar{v} \cdot \nabla i)$ is $\mathbf{a} = [d^2z/dt^2] = (d/dt, w) \cdot (-wz, dz/dt + wxz) = 0$ and, and this because \mathbf{r} and $\bar{\omega}$ are constant, therefore velocity $\bar{v} = \text{constant}$.

When element $d\bar{s} = AD_A = \bar{v} \cdot t = \lambda T = \text{constant} = \bar{c} \cdot T$ then $ds^2 = dx^2 + dy^2 + dz^2 = (cT)^2$ which is the spatial equation of Space $\{d\bar{s}\}$ and Energy $\{\bar{v} \cdot t = \lambda T = d\bar{s}\}$.

Since quaternion $= [\text{Energy}]^2 = - [\text{Space}] = \text{Anti-space} = [-(\Lambda x \Lambda)/m \pm \Lambda x \nabla i] = [\lambda, \pm \Lambda x \nabla i] \rightarrow$ is meaning that the massive mechanism Diffraction, λ , and the Energy mechanism Diffraction, $\pm \Lambda x \nabla i$, are Interchangeable.

A Particle with wavelength $\lambda = (1)-(2)$ and spin say, $h/2$, is consisted of two parts, The one because of the translational motion of speed \bar{v} , and the second of the, common circle, self-rotation velocity $V_c = \lambda^2/T = \lambda^2 \cdot f = [\sqrt{1-(v/c)^2}] \cdot f = [1-(v/c)^2] \cdot f$ and Energy $[\Lambda x \nabla i] = (J1)$ as velocity vector, \bar{v} , is the cross product of two velocity vectors $\bar{v}1, \bar{v}2$ or $\rightarrow \bar{v} = \bar{v}1 \times \bar{v}2$, with head at point (1) and analyzed, in a perpendicular to (1)-(2) directional, plane, into the two orthogonal velocity vectors $\bar{v}1, \bar{v}2$ which heads are at point

(1). Energy $J1$ is carried to point (2) by following the cycloid motion in $\lambda = (1)-(2)$ as follows.

Following the above logic, the vector-quaternion Norm is kept constant by an intrinsic (in wavelength norm) isochrone (harmonic oscillation) because of the cycloidal motion, and independently of amplitudes (displacements, or strengths).

i.e. Quaternion $q = [\lambda, \pm \Lambda \nabla i]$ with norm, wavelength $|\lambda|$ is a Standing wave (a plane Stationary wave) which preserve the constant position of magnitude $|\lambda|$ with the two edges as nodes independently of amplitude, with a period $T = [\gamma \lambda / 2c]$, and energy $\Lambda = r \cdot m \cdot \bar{v} = r \cdot \bar{p} = r \cdot m (\bar{\omega} \cdot \mathbf{r})^2 =$

$m r^2 \cdot \bar{\omega}^2$ depending on, $\bar{\omega}$, only (it is spin) and thus forming the spherical standing waves. [49].

13. Epilogue .

The Content of This Article is Binding Euclidean Geometry, Mechanics and Philosophy, Without any Assumptions and Definitions and Clearly Shows that,

- 1) The origin of Space [S] becomes, through the Principle of Virtual Displacements $W = \int_A^B P \cdot ds = 0$, from Primary Point A which is the Space, to B which is the Anti-space as the Inner distance of Space and Anti-Space in all Layers.
- 2) The origin of Energy becomes, through the Principle of Virtual Displacements, as the Work of the Inner Impulse distance of Space and Anti-Space embedded in all points of universe.
- 3) The *minimum Quantized Space, Quanta, s^2* , are in all quantized Spaces, i.e. Particles, [MFMF] Field, moving vectors, free velocity monads, Material Points and lines \rightarrow Surfaces and bodies.
- 4) The *minimum Quantized Energy, Quanta, $2s^2$* , is diffused as energy, SPIN, in all quantized spaces as material volumes.
- 5) The definition of Material Point as (\pm) Dipole Breakage in [MFMF] medium.
- 6) The definition of Material Object as the Wavelength, λ , of the (\pm) Dipole of [MFMF] Field which is a Standing Electromagnetic wave in tiny energy volumes and exists in beyond Planck's cavity.
- 7) The Time in Euclidean geometry is not distinguished, because time is a conversion factor, *a relative measure of changes*, existing only in its confined-Planck's length level because there exists motion - and is neither Space from Energy - because Energy exists as quanta on any first dimensional Unit AB with infinite or zero time - which connects the only two fundamental elements of Universe, that of Points and that of Energy. Time is designated as the meter of changes, or as the conversion factor, between time (second) and space (mass) units and not essence of Space-energy Configuration. This age-old question, *of what is time*, was standing for many centuries in Philosophy, and was recently adapted by GR, by considering Time, as an essence of Space-time and accepting as base the wrong Non-Euclidean geometries.

- 8) The [STPL] line-cylinder as the passage of energy particles from Absolute [S] Frame to all Relative [R] Frames without any diffusion which consists the Navel cord , *the string* , of galaxies.
- 9) The geometrical Reasoning of Planck Length , Gravity's length , and all Spaces length caves .
- 10) Work as Energy is Quantized, converted, in Space monads , caves, $\bar{x} = d \bar{s} = \lambda m$, as pressure σ, τ , the pressure is converted in caves as a Standing Electromagnetic Wave [E,P] which consists the Standing monad (Maxwell's Displacement current) and the moving Energy monad (by altering the inner wavelength λ or Period T of monad) in Gravity's field medium [MFMF] and is dissipated as *Quaternion monads* (Particles or Waves , matter or vectors) as *Forces* (displacements , masses , pressure etc.) using modulus , coefficients , reactions to the motion and all other geometrical indices as prior referred.
- 11) The Geometries related to the Euclidean by Lorentz factor γ , consist, *The Geometrical expression of Spaces and Anti-Spaces in Relative systems* and is represented by STPL cylinder lines .
- 12) The Cause and Events as it is the Energy quantization in caves λ and the velocity Breakages as , masses , and velocity \bar{v} , only is the Thrust of masses.
- 13) The Origin and the base of Gravity from [S] to [R] frame, and the Equations of the inner standing Electromagnetic wave.
- 14) The Structure of the Energy - Space Universe and the boundaries of the Space-time of General Relativity.
- 15) The Origin of Particles from velocity – The Thrust - on Breakages and the Breakages as the Fragments of the Space , Anti-Space collision , of a cave.
- 16) The Origin of Color - forces from the Retardation and the Birefringence of Spaces .
- 17) The Dual nature of Monads , of wavelength $|\lambda|$ as Particle , and Wave as the Stationary Electromagnetic Wave in $|\lambda|$, which is an intrinsic property of the Cycloid motion of velocity \bar{c} , and Spin , forming the plane and spherical standing waves which are < The Inner structure of Particles >.
- 18) The Cycloidal motion as the intrinsic property of vectors which is a Stationary wave on wavelength of vector , where < Poinot's ellipsoid > becomes \rightarrow cycloid Ellipsoid and spin to be $\frac{1}{2}$ and 1 ,
- 19) The mechanical relation between the speed of light and principal stresses , guided to, Permittivity , Permeability , in free space medium.
- 20) Michelson's-Morley experiments cannot prove reality because in Planck's cave occurs isochrones motions ,and Gravity is the force (*energy*) which is connecting the Material points of the Medium with the constant light velocity \bar{c} .
- 21) The Relative motion of moving systems through Stationary system can be detected only by the Tangential velocities $\bar{v} = \bar{\omega}.r$ on circumference of a cave ,r, with radius $R > r$.
- 22) The equations of inner Structure of Gravity field and the stability of the whirling Space , Anti-space , the Spin and Momentum ,are extended to moving monads.
- 23) The immense confusion in the basic ideas regarding the Quantized Energy-Space , what are *The Quanta* , \rightarrow vanishes.
- 24) The Manifold of mathematics from Astrophysics to Quantum mechanics have been progressively developed on Non-Euclid Geometries , resulting to Relativity's Space-time confinement, unable to conceive the under Planck's cavity energy existence . The only two fundamental elements of Universe, is that of Space (*points*) and that of Work = Energy (*motion*) and is the only way to explain outside Reality .
- 25) In articles was presented the Creation Hypothesis without Big-Bang and without any other coherent Energy-level . An extend elucidation has been previously done for some very important definitions as that of Quanta of Space and the Quanta of Energy. The expansion of the universe occurs by THE rolling , of the light velocity Moving Dark-Matter - Energy Heap mixture , on the Rest Gravity-Field-Energy Base , which consists a parallel motion and not parallel universes as said . It has been elucidated the Origin and the Nature of Particles Fermions and Bosons, what is Gravity – field , Gravity – force , Dark – matter and Dark-energy . It was analyzed that Gravity–field is a Rest of two opposite signed elements which consist the minimum energy quanta Spinning space and this because of dipole nature , and jointed by the Gravity-force which is the Maxwell's-Gravity's Displacement current, and which acts on any other moving or not particle . Because

Dark-matter moves with the constant velocity ,c, and is composed of the two opposite signed elements also, and Dark-energy moves also with velocity of light , so is continually effecting on the two fragments separately and are slinging them further , formulating the Infinite and attracting Geometrical Universe , i.e. Thrust [$\bar{c} \cdot \nabla i$] with light velocity, \bar{c} , acting on the Five Energy and Space Fragments \rightarrow

{ (∇i) , $(+s^2)$, $(-s^2)$, $(+cs^2)$, $(-cs^2)$ } and on \rightarrow [$(\nabla i) \rightarrow (+s^2) \leftrightarrow (-s^2)$] = The Energy-dipole Gravity-field] and also on \rightarrow

[$(\nabla i) \rightarrow (+cs^2) \leftrightarrow (-cs^2)$ = The Energy-dipole Gravity-Dark-matter - field] carrying them in the three dimensional parallel space with the light velocity , \bar{c} , as the Rest Gravity – field – Energy , and the rolling Movable Heap on it, the Dark–matter–energy , or the mixture of the spherical and opposite signed elements and which highlight , and the dipole from them jointed both by the Gravity force , which form the heavy and massive invisible Dark matter , the dipole energy blobby volumes which are the massive Dark Fringes which repel . This is the Expanding universe without Big-Bang , based on Euclidean Geometrical logic only , which is the outer reality of it , and not on Axioms and Postulates which do not agree with this Physical reality.

- 26) In article is shown the How Positive (+) and Negative (-) are joint to create material point which is Zero and by adding it to monads , to create all Primary Particles , following Extrema Geometry-Spaces-Moulds , which are the in Periodic Table elements in each Space-Level . It was shown also the How Rest-Gravity constituent MFMF field is joint and creates the Electromagnetic Waves E,P and Gravity-Spin , which External Spin , is continually converted to the Inner Electromagnetic Waves E,P and which continue this eternal cycle.
- 27) In summary, my personal confidence is that nature is produced from Euclidean Geometry only .{ i.e . \rightarrow from Primary Point A which is nothing (the non-existence) by becoming Anti-point B (the opposite to non-existence also) as Segment AB , (discrete = existence = monad) ,which Equilibrium by opposite forces following Virtual work and thus being the Quaternion (the monad AB as Space AB and as energy equal to Virtual work) and consisting the Primary Neutral Space .

The accumulation of disarrangement of Sub –Spaces leads to a powerful vortex from the infinite

small vortices , which by entering in Geometry Caves ,and through the most important Geometrical mould [the STPL cylinder] on cave , where there \rightarrow Spaces (A), Anti-spaces (B) and Sub-spaces (AB) co-exist on a common circle of diameter AB , and by the composition of opposites (it is the dipole \rightarrow [+ \leftrightarrow -]) , produce through the quantization of energy to quantization of Spaces , to Particles , to Gravity–field-forces , to Dark-matter-gravity forces , following Geometry principles ,which become thus Physical , and not from any other tile-guided center or logical starting point .

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