The Material Geometry, The Origin of Energy Particles 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, e^((2π/7)b=10^−N)=m→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 → Monad, through mould of Space –Anti-space in itself, which is the material dipole in inner monad Structure as 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 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-meteritode twice each other.

The Unification of Space and Energy becomes through [STPL] Geometrical Mould Mechanism of Elements, the minimum Energy-Quanta to Monads → 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 → Discrete → 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(2πt/T) = A.sin.wt = A.cos(kq-wt) because is sinusoidal, where

As the amplitude of oscillation measured from equilibrium position and for repeated motion t=T. Quantity (2π/T) = w = 2.π.f is circular frequency, or f = 1/T = w/2π, is the frequency and ,k, is the wave number k = 2π/λ and the speed of a wave is v = λ.f or w = vk and because of relation of angular velocity ω = w.r = w(1/k) → w = vk then r.k = 1.

Velocity υ≡ x = wA.coswt = wA.sin(wt+π/2)

\[ a ≡ \ddot{x} = w^2A(-\sinwt) = w^2A\sin(wt+\pi) \]

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 π/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 $\mathbf{v}_r$, on radius $r$).

In Free vibration of monads $AB=q=S+\mathbf{v}_i\mathbf{v}_i$ and because velocity vector is composed of the centrifugal velocity vector $\mathbf{v}_r$, and the rotational velocity $\mathbf{v}_q$, perpendicular to displacement $\mathbf{x}$, and because viscous damping represented by a dashpot, is described by a force proportional to the velocity as holds $\mathbf{F}=c\mathbf{v}$ where $c$, is the damping coefficient, it is a constant of transverse proportionality and this because $\mathbf{x}\perp\mathbf{dx}$, then it is directional to transverse velocity $\mathbf{v}_y=x/t$ and is holding the homogenous differential equation $m\ddot{x}+c\dot{x}+kx=0$.

For a flexible string of mass $\rho$, per unit $dx$ is stretched under tension $T$ and analyzing Newton Laws for tiny length $dx$, then Net Force $Tdx=\rho a$ and the equation of motion is $x=\left[\frac{1}{v^2}a\right]$ or

$$\frac{\partial^2 y}{\partial x^2} - \frac{1}{a^2} \frac{\partial^2 y}{\partial t^2} = \left[\frac{1}{v^2}\right] \frac{\partial^2 y}{\partial t^2}$$

...(1), where $v=T\rho$. The general solution of (1) is $y=A\sin(wv\cdot x) + B\cos(wv\cdot x)$ and because of independent variables $x, t$ are both constant the general solutions are,

$$Y = A\sin \frac{\pi}{l} x + B\cos \frac{\pi}{l} x
$$

and $fn = n/\lambda$ is frequency and $Y = \sin n\pi x/l$.

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

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

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

$$\dot{y}(x,0) = \sum_{n=1}^{\infty} \omega n \cdot W_n \sin(n\pi x / l) = 0
$$

and both multiplying by $\sin(k\pi x)$ and integrating from $x=0$ to $x=1$, all terms become zero except $n=k$ and

$$D_k = \frac{2}{l} \int_0^l y(x,0) \sin \left(\frac{k\pi x}{l}\right) dx
$$

For standing waves equation of motion is the sum of a right moving and a left moving wave, or

$$Y_{sta} = A\sin(kx + wt) + B\sin(kx - wt)
$$

$$\left[2A\sin(kx)\cos(wt)\right] \text{ where } k n = 2\pi/n \text{ and },
$$

$$\sin(kx) \rightarrow \text{is the Spatial dependence at locations}
$$

$x = 0, \lambda/2, \lambda, 3\lambda/2, n\lambda/2$ called the nodes.
At nodes amplitude $A_n$ is always zero and at locations $x = n \lambda / 4$, $3n \lambda / 4$, $5n \lambda / 4$ called the Anti-nodes where the amplitude becomes maximum.

$\cos(\omega t)$ $\rightarrow$ is the Time Oscillation dependence where corresponding frequency $f_1 = v / 2\lambda = v / n\lambda$ and $f_n = n f_1$.

i.e. $n$, more times Energy is stored in the frequency, showing the way of Energy quantization in constant caves

Since energy $E = h f$ then frequency $f = E / h$. Angular velocity $\omega = 2\pi / T = 2\pi f = 2\pi (E / h)$, i.e.

$\omega = E / (h / 2\pi)$, $E = \omega \cdot (h / 2\pi) \quad \text{i.e.} \quad $Proportional to energy $E$.

Energy in a standing wave :

Kinetic energy is $E_K = \frac{1}{2} m \frac{\partial^2 y}{\partial t^2}^2$.

Potential energy is $E_U = \frac{1}{2} \frac{F}{\partial x} \frac{\partial^2 y}{\partial x^2}^2$.

Power transmitted $P(x,t) = -\frac{F}{\partial x} \frac{\partial y}{\partial x} \frac{\partial^2 y}{\partial t^2}$

Total Energy $E_T = E_K + E_U = \frac{1}{2} \frac{m}{\rho I_p} \frac{\partial^2 y}{\partial t^2}$

In Sinusoidal waves $dK/dx = dU/dx = \frac{1}{2} \frac{m}{\rho I_p} \frac{\partial^2 y}{\partial t^2} = \frac{m}{\rho I_p} A^2 \omega^2 \ldots (1)$

$\text{Torsional Vibrationsof Rods}$ is similar to that of longitudinal vibration of rods and for the angle of twist in any length $dx$, due to Torque $T$, $\theta = T dx / Ip. G$, where $Ip. G$ 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 $\frac{\partial T}{\partial x} dx = Ip. G \frac{\partial^2 \theta}{\partial x^2} dx$.

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,

$\rho I_p \frac{\partial^2 \theta}{\partial t^2} = Ip. G \frac{\partial^2 \theta}{\partial x^2}$

with the general solution given for $\theta$ is $\ldots (3)$

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

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 $\cos \omega l / \sqrt{l} = 0$ and which is satisfied with the following angles,

$\omega_n = \pi / 2, 3\pi / 2, 5\pi / 2 \ldots (n + 1 / 2) \pi$ and the natural frequency of the rod of length $l$, is

$\omega_n = (n + 1 / 2) \pi / \sqrt{l}$

where $n = 0, 1, 2, 3, \ldots$

where $m = \rightarrow$ is the mass of the rod

$\rho = \rightarrow$ is the density per unit length $dx$,

$G = \text{The shear modulus of the rodand for Electromagnetism}$

$\varepsilon = \text{The permittivity of the free space, Dielectric constant multiplier}$.

$\mu = \text{The Permeability of transverse space, Dielectric constant multiplier.}$
The Total $E_r$, Kinetic $E_K$, and Potential $E_U$, energy per length is their sum as follows, Total Energy $E_T = E_K + E_U = \left[ \frac{\mu_0}{2} \right] \frac{\partial^2 x^2}{\partial t^2} + \left[ \frac{T}{2} \right] \frac{\partial^2 r^2}{\partial t^2}$

The work done per cycle is $W = \pi r^2 \sin \theta \, w \, t$ where $\theta = \pi / 2$ 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 noSpace, 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=B.

Point B is the Primary Anti-Space which Equilibrium point A, It is [PNS] = [A=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, $W = \int_A^B P \, ds = 0$ or $[ds \, (P_A + P_B) = 0]$, i.e. for any $ds = \text{vector} > 0$, Impulse $P = (P_A + P_B) = 0$ and $[ds \, (P_A + P_B) = 0]$. Therefore, Each Unit AB = ds > 0, exists by this Inner Impulse (P) where $(P_A + P_B) = 0$ i.e.

The Position and Dimension of all Points which are connected across the Universe and that of Spaces exist 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 as $\leftrightarrow$ dipole $\rightarrow \left[ (A P_A) \leftarrow 0 \rightarrow (P_B) B \right]$. $\left[17, 23\right]$.

All points may exist with $P = 0 \rightarrow \text{(PNS)}$ 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 ± Charge with $P = 0 \rightarrow P = \Lambda \rightarrow \infty$ and work (W) is quantized on material points as EM wave and as spin $\pm (\Lambda)$ and from this equilibrium quantized angular momentum $\Lambda$, independently of time, is capable of forming the Wave nature of Spaces motion, following the Boolean logic and distorting momentum $\beta = \Lambda$, 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 $\vec{w}$, and momentum $\vec{\Lambda}$, 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,

$$(\partial t, \vec{w}) \odot (0, \Lambda) = (-\Lambda, w \times \Lambda) = (-\vec{H}_{\vec{P}}, \Lambda \times \vec{\Lambda}) = [0, \Lambda \times \vec{\Lambda}] \left[13-15\right].$$

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=B). The Infinite points in [PNS] form infinite Units (monads) A|B = d$\vec{s}$, which equilibrium by the Primary Anti-Space by an Inner Impulse (P) at edges A, B where $P \equiv A + P B \neq 0$, and $ds = 0 \rightarrow N \rightarrow \infty$.

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

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

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 $W = P \, ds = \frac{\text{Work in cave } r}{\text{Work in cave ds}} = W = W_r \frac{r^2}{ds^2} = Q \frac{r^2}{ds^2}$

and force $P$ is equal to the Electric field intensity,

$E_r = \frac{Q \cdot r}{4 \pi \varepsilon_0} = P$ $\left[1 \right]$.

Remarks:

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

For $ds = 0$ and $W = Q = 0$ then $P = 0 \rightarrow P \, ds = 0$ is also anyconstant or infinite, $\infty$ 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 $W = \int_A^B P \, ds \, \int_A^B E_r \, ds$ then work is equal to the Electric-Flux, and since Electric-Flux is the rate of flow of electric field through area of such space 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 ⊕ to ⊗ ⊕ B meaning that Work as Energy (i.e. the spherical displacement ds), is stored in this huge cave AB → ∞.

It was shown [49] that The Infinite Electric dipole NN ≡ [B→←B] 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 and 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 → [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 → (Segments, Anti-segments = Monads = Anti-monads), (Segments, Parallel-segments = Equal monads), (Equal Segments and Perpendicular-segments = Plane Vectors), (Un-equal Segments twice – Perpendicular -segments = The Space Vectors = Quaternion) [46]

In Philosophy [PQ] are the concepts of Matter and of Spirit or 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 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 retuned 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 As sociated 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 andBare, TheEquilibrium 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 egative breakages $\pm s^2=(wr)^2$ and the Vector breakage $[V]=2s^2=2.(wr)^2$. [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 isthe Dipole $[s^2 \rightarrow -s^2]$.

Infinite Series of $[s^2 \rightarrow s^2 \rightarrow s^2 \ldots]$, $[s^2 \rightarrow -s^2 \rightarrow -s^2 \ldots]$, consist the Material points in Lines.

Three Units of $[s^2 \rightarrow s^2 \rightarrow s^2]$ not coinciding consist the Material Plane of the Infinite Lines.

Four Units of $[s^2 \rightarrow s^2 \rightarrow s^2 \leftrightarrow s^2]$ not coinciding consist the Material Volume of Infinite Lines.

Five Units of $[s^2 \rightarrow s^2 \rightarrow s^2 \rightarrow s^2 \rightarrow s^2]$ not coinciding consist the Material Fifth-Space-Volume of Infinite Lines.

N Units of $[s^2 \rightarrow s^2 \rightarrow \ldots N]$, $[s^2 \rightarrow s^2 \rightarrow \ldots N]\ldots N$ not coinciding consist the Material N-Space-Volume of Infinite Lines.

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 $10^{-42}m$ which is Gravity level in which Gravity-Field exists) and also allmodels of the atom as follows.

1. Moulds → 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 → The maximum number of Units in a Point is 2 [1 Positive and 1 Negative].

The possible Repetitive Permutations for moulds and Units are $Mould_{\text{infinite}}=m^2$, for every mould so the Available Extrema Positions for each Point, Line-sector, Plane, Volume, m Space are as,

m=1 → $1^2=1 \times 2$ times = 2 → for Point
m=2 → $2^2=4 \times 2$ times = 8 → Line-sector
m=3 → $3^2=9 \times 2$ times = 18 → Plane
m=4 → $4^2=16 \times 2$ times = 32 → Volume
m=5 → $5^2=25 \times 2$ times = 50 → Volume
m=n → $m^2=m.m \times 2$ times $=2.m^3\rightarrow m$ Space

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

A Comparison Chart between Euclidean Geometry and Material Geometry:

E-Geometry  Material Geometry

A-Point → Is nothing Are energy Breakages, cells $\oplus=+(wr)^2$, $\ominus=-(wr)^2$

Position of Point → Every where Within the objective reality is the quantized energy

A Line → Is of Infinite $\infty$-points Is of Discrete points $\oplus\oplus\oplus$, $\ominus\ominus\ominus$, $\oplus\oplus\ominus$

Direction → Are all directions x,y,z forward and backward.

Is in one direction in each axis as, $\ominus\rightarrow\oplus$. 
A Plane → **Is** of three non-coinciding Points

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.

**Exist**s 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 tiny caves, or Work included in them

Amount of Extension → **Is** from zero to ±Infinite or symbolism 0→±∞ = -∞ ← 0 → +∞

It depends on the Potential difference, the Voltage, 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

It is the alternative uniqueness of mutual traction creating Work on constant magnitude ⊕ to ⊝, the cells = breakages, in one direction or and forward

The result is → **A** sector **ds** can be repositioned infinite times on a straight or curved line.

**The** motion of monad, the material sector, through these discontinuously created from inner, ⊕ ↔ ⊝, monad, and Externally acting on monad.

The Correlation between, Euclidean and Material-Geometry on - Points, Lines, Planes, Volumes -

![Figure 1](image-url)

**Figure 1** The Stationary Material Point [⊕ ⊝]= 0, The two Units on → Euclidean Points (2U) ≡ 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 = Mould.

[1] The **One** Point is Zero=0, while Material-Point is the sequence of Breakage’s length ⊕ ⊝

The **Two** points, Sector, is the length ds = PP, while Vector PP= Material length = Monad = Quaternion = The sequence Breakage’s length r = PP = ⊕ ↔ ⊝ ⏞ ⊕ ↔ ⊝ 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 (⊕ and ⊙)

[3] The three points, sequence the stable shape of equilateral triangle with the Zero Breakage’s length {⊕ ↔ ⊝ = Zero} on the three vertices of the triangle. For monads ds = r = ↔

[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 ⊕ to the three drain ⊝ units.
The three Units of One point and a unit, or a Positive Breakage between two Negative units \(\oplus \rightarrow \oplus \rightarrow \oplus\) causes the Inner Electromagnetic Wave, which creates on axis Spin as a Torque causing motion of monads.

**Remarks:**

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

- Breakage \(s^2 = +(wr)^2\) = The Positive \(\oplus\) Unit
- Breakage \(-s^2 = -(wr)^2\) = The Negative \(\ominus\) Unit \(\oplus \rightarrow \ominus = \oplus\) = The Rest Energy Quanta
- Breakage \(2s^2 = 2(wr)^2\) = The Energy \(\odot\) Unit

Mutual traction of Breakages \[+(wr)^2\] → \[-(wr)^2\] = \(\oplus \odot \ominus\) = \(\oplus \ominus \oplus\) → The Neutral Unit

**Collision** of Breakages \[+(wr)^2\] → \[-(wr)^2\] = \(\oplus \odot \ominus\) = \(\oplus \ominus \oplus\) The Neutral Energy Quanta

**Collision** of Breakages \[-(wr)^2\] → \[+(wr)^2\] = \(\odot \ominus \oplus\) = \(\ominus \oplus \odot\) Two Units + Energy

**Collision** of Breakages \[+(wr)^2\] → \[-(wr)^2\] = \(\oplus \ominus \odot\) = \(\oplus \ominus \oplus\) Two Units + Energy

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

**Addition** of two Rest Breakages \(\equiv\) Units \(\oplus \rightarrow \ominus \rightarrow \oplus\) = \(\oplus \ominus \oplus\), and causes Neutral or Zero Unit.

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

**Addition** of three Rest Breakages \(\equiv\) Units \(\ominus \rightarrow \oplus \rightarrow \ominus \rightarrow \ominus \rightarrow \ominus\) = \(\oplus \ominus \ominus\), 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 Elementthen is found** → 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 [kanarevm@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-Nodethat 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.
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 [3] The minimum number for Vertices/Sub-levels/Level, needed in each Level = Mould.


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 whichis, 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.

In [39-41] was shown the geometrical Mechanism \([\text{STPL}]= [\text{Six-Triple-Points-Line}]\) where energy Massive and Vector Breakages, \([s^2 = \pm (wr)^2]\), and \([\text{vi} = 2(wr)^2]\), become the Materials. Action (©) of a quaternion \(z = s + vi = s + v_i\) on itself is the Binomial type as,

\[
(s + v_i)(s + v_i)^2 = [s + v_i, v_i] = s^2 + |v_i|^2, v_i^2 + 2|s|, i(v_i, v_i) = s^2 - s^2 + 2s^2, \quad \text{where,}
\]

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

- \(s^2 = -i|w|^2 \rightarrow \) the always Negative-Anti-space which is always a Negative Scalar magnitude.

\(2s^2 = [2w_i, s_i, |v_i, v_i|, v_i \rightarrow \) 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 \(\text{ABC of Space and ABC}\) with and because velocity vector \(\vec{w}\) The inversely directionally rotated Energy \(\pm \Lambda\) 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 \(\text{ABC}\) of Anti-space \(\Lambda\) ) meet Anti-Spaces (the Extreme triangles of \(\text{ABC}\) of Extreme \(\Lambda\), through the only Gateway which is the Plane Geometrical Formulation Mechanism (mould) of the \([\text{STPL}]= [\text{Six-Triple-Points-Line}]\) line, or as a cylinder.[17]

The \(-[\text{Space, Anti- Space equilibrium}, \pm \Lambda, \text{Absolute System} [S] \rightarrow \), as Angular momentum \(\Lambda = \Omega = m, vr\) is Crushed out into Fragments and , becoming the three Breakages \([s^2 = (wr)^2] , [s^2 = - (wr)^2] , [v_i = 2(wr)^2] \) and after clashed with the velocity vector \(\vec{v}\) of [S] system , (unless succeed to escape un-clashed through center \(O\) in [STPL] line and thisbecause \(v = 0\), 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 \(\rightarrow [z\vec{v}, s_i]\) and Bosons \(\rightarrow [v_i, \vec{v}]\). Un-clashed Fragments through center \(O\), consist the (Medium-Field Material-Fragment)

\(-[\pm s^2] = [\text{MFM}F] \) as base for all motions , and Gravity as force \([v_i]\), while the clashed with the constant velocity , \(\vec{v}\), consist the Dark matter

\([\pm \vec{c}, s]\) and the Dark energy \([\vec{c}, \vec{v}]\), or from Breakages \([\pm s^2 = \pm (wr)^2]\), \([\vec{v}i = 2(wr)^2]\) become

A. \([+ v.s^2]\) \rightarrow Fermions , through [STPL]
B. \([- v.s^2]\) \rightarrow Anti-Fermions ,through [STPL]
C. \([± v.s^2] \rightarrow Bosons\), through [STPL]
D. \([ v.v_i] \rightarrow Anti-Bosons\), through [STPL]
E. \([± s^2] \rightarrow [\text{MFM}F] \) Field, through O
F. \([ v_i] \rightarrow Gravity Field\), through O
G. \([v.(\pm v_i)] \rightarrow Gravity Force\), through O
H. \([±\vec{c}, s^2]\) \rightarrow Dark matter \), through O
I. \([\vec{c}, (\pm v_i)] \rightarrow Dark energy\), through O

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

1. Positive breakage Quantity \([\vec{v}^2 = \vec{w}x\vec{v}^2 = |\vec{w}, r|^2 \rightarrow \) 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 \([\vec{v}^2 = \vec{w}x\vec{v}^2 = |\vec{w}, r|^2 \rightarrow \) 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.

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2. Negative breakage Quantity \(-|\vec{v}|^2 = -|\vec{w} \times r|^2\) → 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 \(2|\vec{V}|, |\vec{S}|, |\vec{V}| = 2w.(sr), \vec{V} = 2w.(r^2.w), \vec{V} = 2w.r^2.w, \vec{V} →\) 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 \(O\), common’s circle center and shackled OFF into [STPL], and this because of \(v=0\), formulate the [MFMF] Field, which consist the base of all motions.

5. Breakage Quantities \(\vec{V} = 2(wr)^2\) being at \(O\), common’s circle center and shackled OFF into [STPL], and this because of \(v=0\), formulate the Gravity Field and Force in [MFMF] Field.

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

It was above referred that Thrust \([\vec{c}, \vec{V}i]\) moves with light velocity and is continually acting on the five Energy-Space Fragments as →

\([\vec{c}, \vec{V}i]\) \(\times\) \((|+s^2| \leftrightarrow |−s^2|)\) \(\times\) \((|+s^2| \leftrightarrow |−s^2|)\)

And on the two Dipole-Couples, where for the Rest – Couple \([|\vec{V}| \rightarrow (+s^2) \leftrightarrow (−s^2)\) → It is the Gravity Thrust acting on the Stationary dipole creating the Rest Gravity-Field and Force], and for Moving-Couple \([|\vec{V}| \rightarrow (+cs^2) \leftrightarrow (−cs^2)\)

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 \(\vec{v} = \vec{c} = \vec{w} \times r\) 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 \(s^2 = \pm |(\vec{w} \times r)|\) consist the under Gravity primary Dipole, \([|+s^2| \leftrightarrow |−s^2|]\) = |\(\vec{V}\)| \(\leftrightarrow\) \(|\vec{V}i|, |(+s^2)|, |−s^2|, |(±s^2)| = |\(\vec{V}\)| \((|+s^2| \leftrightarrow |−s^2|)\)

|\(\vec{V}\)| \((|+s^2| \leftrightarrow |−s^2|)\), while Thrust \((\vec{V})\) acting on \((±cs^2)\) dipole \([|\vec{V}| \rightarrow (+cs^2) \leftrightarrow (−cs^2)]\) creates the Gravity → Dark-matter Energy-field. [40-43]

The massive particles Femions and Bosons :Velocity vector \(\vec{V}\) acting on breakages \(±s^2 = (wr)^2\) is creating Femions and Anti-fermions, while vector \(\vec{V}\) acting on vector \(\vec{V} = 2(wr)^2\) creates Boson, Anti-bosons. In Figure 3, Breakages \(±s^2 = (wr)^2\).
(wr)² occupying the minimum distance space \( \frac{p(wr)²}{6} \) is \textit{the Volume of the tiny cave of radius}, \( [\varepsilon E²+\mu H²] \) is \textit{the Density of the tiny cave}. And mass \(-\mathbf{m}_p = \mathbf{V}_p = \frac{p(wr)²}{6} [\varepsilon E²+\mu H²] \)

\textbf{In Common-circle Cylinder} \( NN = N_1N_2 = [\pm \varepsilon \varepsilon |\mathbf{v}wx|²] \) the tiny Energy-Spacefiles following the trajectory, in-=(N1), or, out-=(N2), Cycloid=(c)- \([N_1N_2] = [(\varepsilon N_1)| \rightarrow (\varepsilon N_2)\]]\] and needs more or less time \( T(2) < T = 4\pi \sqrt{(r/g)} < T(1) \) to reach the other end point \( N_2 \). [33-36]

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

Breakage quantity \( 2.(wr)² \) under the tangential action \( \mathbf{v} = \mathbf{w} r \) becomes \( 2.(wr)² \) acting on point \( A \rightarrow 2wr.m \) of common circle. The same also for points 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 \( D_x, D_y, D_z \) in time \( t \), isochrones, then material points follow a cycloid with period the norm of wavelength of velocities \( |A|, |B|, |C| \).

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 universal Universe follows i.e.

\textbf{Through} \([\text{STPL}]\) \textit{line}, the mould, which is the Primary Particle Mould, \textit{Energy as velocity vector is quantized to} \( \rightarrow \text{Particles} - \text{Anti-particles}, \text{Gravity-Field and Gravity-Force}, \text{Dark matter and dark energy}, \text{and all material world}, \text{following Cycloidal simultaneity}. \) [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 \( \pm (|\mathbf{w}r|²) \) dipole volume which becomes from that cave where quantized Point length \( = Lv = r = e^{1(N_1)}h = 10^{-N} \), and for \( N = \infty \rightarrow Lv = 0 \).

It is one of the \textbf{two equal and opposite equilibrium basic elements} (\( |(\mathbf{w}r)|² + |(\mathbf{w}r)|² \)) in this Rest Homogeneously and Isotropically Quantized, mass-less Field \([\text{PNS}]\) in the spherical volume \( V = \frac{2}{3} \{ |\varepsilon (\mathbf{w}r)|² \}³ \), 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 \([\text{PNS}]\) (is the Base) into the Medium-Field Material Fragment \( \rightarrow \text{MFMF} \) Field with the less space distance of diameter, \( ds = |\varepsilon (\mathbf{w}r)|² \), which consists the minimum Space material point and Energy Quanta.

It was referred that Fragments \( s² = \pm (|\mathbf{w}r|²) \) occupying the minimum quantized space \( s² \) are deported and fill all \([\text{STPL}]\) cylinder which is the Rest Quantized Field \( \pm (|\mathbf{w}r|²) \) or it is, the material point in mechanics, and the base of all motions where Force \( |(\mathbf{w}r)|² \mathbf{V}² = 2.|(\mathbf{w}r)|² = 2.s² \) is vibrating on length \( 2.|(\mathbf{w}r)|² = \lambda \) as a Stationary Wave, and creates the curl Electromagnetic Field, \( E \perp P \), on which is the \textbf{Universal Quantized force called Gravity}. The Gravity - Force is equal to \( F_g = |\mathbf{q}|.|E| \times |\mathbf{P}| \) and is exerted on any movable particle with charge \( \mathbf{q} \). \textit{Gravity – Field} \( G_f = [\mathbf{E} + \mathbf{\times} |\mathbf{P}|] \), is the un-movable, forced welded spinning dipole, \( \rightarrow |(\mathbf{w}r)|² + |(\mathbf{w}r)|²|\mathbf{A}|\equiv|0-A _2B| \)

and because above is movable then with three Unis becomes the un-movable Torsion \( \pm \mathbf{A} \), \( \rightarrow |(\mathbf{w}r)|² + |(\mathbf{w}r)|²|\mathbf{A}|\equiv|\mathbf{A} _1 A _2 B| \)

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 \( \rightarrow ([\text{Medium-Field Material Fragment}] \rightarrow |s²| = \pm |\varepsilon (\mathbf{w}r)|² \) = \([\text{MFMF}]\) Field \( \rightarrow \) the Electromagnetic Field \( \mathbf{E}x\mathbf{H} \) or the field \( \rightarrow |(\mathbf{w}r)|² + |(\mathbf{w}r)|²|\mathbf{A}|\equiv|\{(1)(J=\mathbf{P}1)\rightarrow 0-(J=\mathbf{P}2)(2)\}| \) which is the Standing wave in cavity \((1)-(2)\), of the two scalar breakage \( |\varepsilon (\mathbf{w}r)|² \) as medium \((1)-(2) \) field, and \( \{J=\mathbf{P}1\}_\text{rest} \) as energy at point (1) and carried to point (2) by following the cycloid motion from \((1)\) to \((2)\) with an isolochrones Velocity \( \mathbf{v} \), and during shifting is analyzed into two velocity vectors \( \mathbf{v} \), \( \mathbf{v}² \), and which undergo vibrations causing two waves that represent the two, Electric E and Magnetic H, perpendicular components following the trajectory, in-=(J=1), out-=(J=2). On cycloid \( (c) = (1)-(2) \) is needed the isochrones time \( T = 2\pi \sqrt{r/g} \) to reach end \((2) < \text{Fermat’s Principle of Least time} > \) 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 \( \mathbf{E}x\mathbf{H} \) or the Rest field as, \( \rightarrow |(\mathbf{w}r)|² + |(\mathbf{w}r)|² + |(\mathbf{w}r)|²|\mathbf{A}|\equiv|\mathbf{A} \rightarrow 0| \)

which is the Reciprocating-motion \( \mathbf{Vibration} \) of a Standing wave in cavity \((2)-(1)-(2)\) \( \equiv \mathbf{A} \rightarrow 0 \) or the Standing wave in cavity \((2)-(1)-(2)\) \( \equiv \mathbf{A} \rightarrow 0 \)
For Dark-matter, the Material point (1) at Euclidean point (1), is now the moving Breakage \([±c.s²]\) volume which becomes from that cave where quantized Point = \(Lv = r = e^{i(N/2)b} = 10^{−N} N = ∞\), infinite , and it is the movable element in the Rest Homogenous and Isotropically Quantized, mass-less Field \([PNS]\) in the same spherical volume \(V = \frac{π}{6}[±c.s²]³\).

For Dark-matter wavelength of two points (1),(2), or the sector \(λ = (1)-(2)\) or the minimum energy Space of two Dark-matter material points is energy field \([±c.s²]\) = \([c.(w.r)]² = \{c.(w.r)]² + c.(w.r)]² = [c.(λ)]²\) ← or the DM massive energy field . Force \([\{w.(r)]²\} \cdot \{v.(r)]²\} = 2|\{w.(r)]²\} = λ as the Stationary Wave of gravity , and creates the curl Dark-Matter Electromagnetic Field \([Ex]\) = \(E₀ \perp P₀\) on which is exerted also the Universal Quantized force , Gravity. This heavier Gravity-Force in DM is equal to \(F₀ = |\{E₀+P₀\} and is exerted on any movable particle with charge \(q\) as in gravity field is .

Since for three Units is applicable the same and

in Material Geometry then ,

\[\rightarrow[[c.(w.r)]² \leftarrow + c.(w.r)]² \leftarrow - c.(w.r)]² \leftarrow ] = |c.(w.r)]² \leftarrow + (w.r)]² \leftarrow - (w.r)]² \leftarrow ] = c .\{0 \leftarrow 0\} \leftarrow i.e. Gravity travelling at light speed=c[A\leftarrow c .Spin\]

So, Gravity force is the minimum attractive and biding Force \(\nabla = 2(wr)²\) on dispersion \([MFMF]\) → \([\{w.(r)]² \leftarrow - (w.(r)]² = |λ]\) ← and is the material energy length consisted of material points \(|wr\²|\) which are the \(±(wr)²\) dipole and restrained by the above Electromagnetic field \(E,P\) becoming from the binding force \(2(wr)²\) and having the equations ,

\[E = 2A sin ξ cos wt = \sqrt{2} |\{w]²| sin ξ cos wt ,\]

\[P = 2A sin ξ cos wt = \sqrt{2} |\{w]²| sin ξ cos wt ,\]

in our Planck’s confinement cave , and which interact with all other particles . Since acceleration ,

\[a = d^2 vt = (d^2 vt )f,\]

is analogues to wavelength \(λ\) and to frequency \(f\), then for , \(λ = any constant (or zero)\) then \(v = 0\) and \(f \rightarrow ∞\).

This is why the very strong gravitational fields are present and close to black holes where there \(v = c = 0\) 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 , \(c\), is rolling , expanding , with the maximum constant \(c\), and continually formulating the ,

**Zero→ Discrete → Infinite Geometrical Universe.**

In \([22-23] \leftarrow Monad AB is the dipole , (PA \leftarrow PB) , or \([A(P_A) \leftarrow 0 \rightarrow (P_B)]\) and it is the symbolism of the two opposite forces \((P_A) , (P_B)\) at points AB 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 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 \([S]→[AS]=\{\text{Space}\}→[\text{Anti-space}]\) 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 \([Gravity\ Length\ 3,969.10^{-62\ m}\) , reaching the Point = \(L_v = e^{(\frac{3}{2})b} = 10^{−N} m = ∞ m = 0 m\) , which is nothing and zero space .\([43-46]\). The very clear conclusion is that ,

**Breakages located IN Cylinder → AcquireOscillation from their inherent Vibration derived from velocity vector \(v = ∞\), while Breakages located OUT OF Cylinder → AcquireOscillation from their interreletion , bonding .**

5. **The Spin and Torque .**

In \([49]\) was shawn that equation of angular velocity \(w = E / [h/2π]\) 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 , \(w = E / [h/2π]\) = \(E[2πh] = E / SPIN\)

*When the applied force \(E =hv\) = \(w.(h/2π)\) = \(w.\text{Spin}\) then \(\text{Spin} = E / w = [±v.s²]\) on cave and are created Fermions with Spin \(= \frac{E}{w} = \frac{v.(r.s²)}{r} = \frac{1}{2}\)
When the applied force $E = h.f = w.(h/2\pi) = [\nu^2 = 2(\nu r)^2 = 2Ds^2]$ on cave then $\text{Spin} = \frac{E}{w} = [2.\nu s^2]/w = 2.(r.s^2)$ and are created $\text{Bosons}$ with $\text{Spin} = \left[\frac{E}{w}\right]2.(r.s^2) \rightarrow 2(\frac{1}{2}) = 1$ which is double the before, i.e. $\text{Energy}$ as velocity vector $\nu$ or $E = [\pm \nu]$, applied on the material energy dipole points $[\pm s^2]$ as the Dipole Quantity $[\nu^2] = [\nu w]^2 = [\nu r]^2 = s^2$, separately creates the massive Particles, $\text{Fermions}$, while the velocity vector $\nu$, applied on the $\text{Double Quantity Energy}$ vector breakages $\nu^2 = (2\nu r)^2 = 2.s^2 = 2[\nu^2] = 2E$ and since $\nu = (w.r)$, $2\nu s^2 = 2[\nu s^2] = 2[\nu w]^2 = 2\nu [\nu r]^2 = 2s^2$ creates the Energy Particles, the $\text{Bosons}$, by doubling its frequency $[f_2 = 2.f_1]$ in the same cave.

Figure. 5 The Mechanism of Angular Momentum – Spin – in Particles and their Curl-motion. The Collision between velocity vector $\nu$ and a Unit NN, 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 turn 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 *ds*, and it is the velocity vector, that of change of velocity vector and it is acceleration *d²v*, that of change of the Reaction to the Velocity and Direction of the motion and it is mass.

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,

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

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

$$x = A \cdot e^{zt} + B \cdot e^{zt} + X \sin(\omega t - \phi) \ldots \ldots \ldots (1)$$

**In Electromagnetism**, *Change*, say a Space- monad is → a Resonance which can occur in the RLC circuit, where Resistance, is the change in current amount it is the converter of current, Inductance, is like mass or Inertia in Mechanical systems which store the Magnetic–energy and, Capacitance, 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,

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

It corresponds physically to the free damped vibration, where Charge $q = \text{is the physical property of matter that causes it to experience a force which can be positive or negative, } dq/\text{dt = the least quantized amount of charge and } d^2q/\text{dt}^2 = \text{the space distribution of charge}, \text{ and } L, R, C \text{ Inductance, Resistance, Elastance constants, with general solution given by the equation}

$$q = A \cdot e^{zt} + B \cdot e^{zt} + X \sin(\omega t - \phi) \ldots \ldots \ldots (2)$$

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 a cycloidal Resonance NN = $n/2 = 2\pi = s^2 = [2\pi/\omega]^2 = 4\pi^2rc$, clashed with velocity vector $\nu = \xi$, 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 $|\nu x|, |\nu y| \text{ where } |\nu|^2 = |\nu x| |\nu y| \text{ 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 $\rho = 4r \cos\phi$ 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 $S_x$, $S_y$, vectors into $V_y$, $V_x$ axis which follows the Cross-product, and is composed to vector $S$ 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 = $n/2$ is Push forward as velocity vector following the same In-cycle by forming the Outward Electromagnetic field.

In Figure 4-5, Space $s^2 = [w(r)]^2 = ds$ 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 $\rho = 4. r \cos \phi$ which depends on angle $\phi$, is following a cosine’s curve, and it is at N.N points where for $\phi = 90^o$, then $\rho = 0$ and for the extremae case at $\phi = 270^\circ$, then $\rho = 2\pi r$, and simultaneously $\rho = 0$. This changeable, Radius of Curvature, creates the varying cycloidal Electromagnetic wave of monads which is Regenerated between N.N nodes, as a kind of geometrical variation position.
In figure 5-2, the Changeable Tangential Velocity \( \dot{V}_x(\tau) = c \sin \phi \) depends on angle \( \phi \). Following a sinus curve, it is at \( N \) N points, where \( \phi = 90^\circ \) and \( \phi = 270^\circ \), \( \dot{V}_x(\tau) = c \) and at middle points \( O', O'' \), where \( \phi = 0^\circ \), \( \dot{V}_x(\tau) = 0 \). It is continually equilibrium with the opposite velocity \( \dot{V}_y(\tau) \).

In figure 5-3, the Changeable Tangential Velocity \( \dot{V}_x(\tau) \) creates Spin vector \( \dot{S} = 2 r c \sin 2 \phi = 4 r c \sin \phi \cos \phi \), depending on angle \( \phi \). Following the sinus curve 2q, and instantly at N, N points, where \( \phi = 90^\circ \) and \( \phi = 270^\circ \), which is the extreme case \( -\dot{S} = 2 \tau r c \), and after this immediately becomes zero until angle \( \phi = 2 \pi / 5 \) accepts the maximum value \( -\dot{S} = 2 r c \). At middle points \( O', O'' \), where \( \phi = 0^\circ \), then spin \( \dot{S} = 0 \) even if \( p = 4 r \).

Since Spin = Torque = \[ \{S\} \times \{x(S)\} = \{V_x(\tau), p, \sin \phi \} \] = 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 \( S \), 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.P by the centrifugal velocity vectors \( \dot{V}_x(\tau), \dot{V}_y(\tau) \).

Meanwhile Total Torque \( |\dot{S}| = 2 \tau r c \), 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 \( \dot{V}_x(\tau), \dot{V}_y(\tau) \), \( \dot{V}_x(\tau) \), \( \dot{V}_y(\tau) \) is a centripetal force making monad to move in a circle or a helix as equation \( C \cdot F = m \cdot v \cdot x \cdot (\eta) \).

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 \( W = \pi r^2 \) and the analogous Energy in monads \( W = \frac{1}{2} n E H^2 \) spread as the First Harmonic and equal to Spin\( ^2 = 2 \pi r c \), Planck’s Energy \( E = h \cdot f = (h/\lambda) c \) is equal to the Isochromatic pattern fringe order in monad as \( c = (a/d) N = (a/d) n f_1 = (8 \pi r^2/3) n f_1 \), and the Summation of their Isochromatic Quantized fringe order is \( E = S = 2 \tau r c = \frac{8 \pi r^2 f_1}{3} [\frac{n(n+1)}{2}] n(n+1) \) of the same curve \( (wr)^2 \).

When stress (c-1-2) 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, \( E = 2 \tau r c = \frac{1}{3} f_1 \cdot f_1 \cdot (n=1) \), and for \( n = 2 \) the Second Isochromatic fringe Quantized order, \( n = \) threes and, \( E = \frac{1}{3} f_1 \cdot f_1 \rightarrow \phi = \pi \) trisection with Energy-Bunched variation \( f_2 = 2 f_1 \).

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 \( [ \forall i = (wr)^2 ] \) breakages all quantized through [STPL] E-geometry [SS] Moule.

Thrust is, Energy applied on breakages as velocity vector \( \vec{v} \). Wave-Structures, are the clashed homogeneously breakages, with the velocity vector \( \vec{v} = \vec{c} \). Spin is fixed and independent of particle’s mass because Spin = \((h/2 \pi)w\), or its external angular velocity. \( \omega \), is monad’s quantum wave function.

The Inner Angular Momentum of Particles (L) as Spin (S) becomes of two Equal and perpendicular velocity Vectors \( \dot{V}_x \), \( \dot{V}_y \), which travel Isochronal between nodes in the Tiny Quantum volume ds = \( N^2 = (wr)^2 \). The centrifugal velocity vectors \( \dot{V}_x(\tau), \dot{V}_y(\tau) \) as forces and the equal opposite on Evolute \( \dot{V}_x(\tau), \dot{V}_y(\tau) \) 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 \( \lambda = 2.0 \) NN of the two perpendicular Inward waves contain NN axis.

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

\( \dot{S} = [g \cdot \sin \phi], \rho = [g \cdot \sin \phi] [2c \cdot \sqrt{\rho} = 2c \cdot \sqrt{\rho} \cdot \sin \phi \cdots (s) \)

i.e. Spin, as Energy \( \vec{c} \), is dependent on velocity Position only, since \( \vec{v} = \vec{c} \). 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 = \( N^2 \), and at nodes evolve 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 \( E = P = \sqrt{2} \cdot [(wr)^2] \cdot \sin(\pi / 2 + \pi) \cdot \cos \omega t \) at middles 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 \( S = \frac{E}{w} = \pm \sqrt{\varepsilon E^2 + \mu H^2} \), then has only One value for scalar breakages \( (h = 1/2) \), and since also \( S = \frac{E}{w} = \pm \sqrt{\varepsilon E^2 + \mu H^2} \), then has only One Double-value for vector breakages \( (h = 1) \).

Since Energy caves are versors then energy \( E = \sqrt{3} \pi \frac{h}{2 \pi} \frac{w}{r} \) and the difference in distance \( |\epsilon E^2 + \mu H^2| \) and the difference in distance \( w = \frac{E}{\sqrt{2} c} \), so the same quantity of energy behaves as ,

\[
\rho = \sqrt{\varepsilon E^2 + \mu H^2}
\]

and thus is shown the unified understanding between the classical Electromagnetic field and and the quantum particle of light. 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 ,

\[
\text{Energy} = \frac{\varepsilon c^2 \pi^2}{24 \lambda} [\varepsilon E^2 + \mu H^2] \text{ in volume} = \frac{4}{3} \pi \left(\frac{\sqrt{\varepsilon E^2 + \mu H^2}}{2 \pi}\right)^3 \text{ having mass} \rightarrow \text{Particle Energy}
\]

\[
I_d = \frac{(\varepsilon c^2 \pi^2)}{24 \lambda} \text{ in interference pattern} \rightarrow \text{Wave}
\]

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

Spin \( \frac{h}{\pi} = 2[wr]^3 \), 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 `s-cave Space quantity as ,

\[
(h/m) = \pi \pi = 2[wr]^3 \text{ in } r = 10^{-35} \text{ m i.e.}
\]

Energy Space quantity \( [wr] \), is Quantized , and becomes the New Space quantity, \( h/\pi = 2[wr]^3 \), doubled, following the Euclidean Space-mould of Duplication of the cube, in tiny Sphere volume \( V = (4\pi/3)[wr]^3 \), as well as that of **Squaring of circle \( \pi \), and in Sub-Space-Sphere volume** \( \pi^2/2 \)

Since \( w = E/[h/2\pi] = m.c^2/[h/2\pi] = 2\pi mc^2/h \), then mass \( m = \frac{\sqrt{2}}{\pi} \), and is what is called conversion factor mass \( m \), as an index of energy changes.

6. **Particles and Momentum[41]**

In general, momentum \( p = m \cdot \vec{v} \), therefore the amount of momentum per unit volume \( dV \), is \( \rho \cdot \vec{v} \), (since \( m = \text{volume} \cdot \rho \) ) and for surface, the normal stress \( \sigma = F/dS \), and then becomes \( -\partial p/\partial t + \nabla \cdot (\rho \cdot \vec{v}) \), \( \nabla \cdot \sigma = \rho \cdot g \), i.e. **momentum is converted into a normal stress** \( \sigma \), **in tiny volume plus momentum of the whole volume as mass**, body force, where \( \nabla \) is nabla symbol for, divergency, \( g \), is gravity`s net acceleration, \( \rho \), the inner volume density. This interpretation applied to Young`s interference and Polarizer experiments for dark fringes then \( p = \varepsilon E^2 + \mu H^2 \), 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, \(\vec{v}, \vec{v}'\) are perpendicular between them, from where then dispersion follows Pythagoras theorem and the resultant Quantized linear Space length, \(r\), becomes,

\[
r = |(\vec{v}, \vec{v}')| = \sqrt{v^2 + v'^2}.
\]

---

**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, creating Magnetic fields \(B\), exerting force on moving charges. And this because exist only thrust vectors \(\nabla \times \vec{E} \neq 0\) creating the Electromagnetic Waves.

**The Inverse Circle-Cycloidal, on the Relief, of 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 consist 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 is required so that the Negative breakage 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 (-∞..-N, 0) are into Zero, i.e. The Space, ⊖, the Anti-Space, ⊖, are in Sub-space, , which is the Neutral space.

Figure 7. The Uniform Circular motion is the First Possible Position of Monads. 1... [P..⊖]⊖ = 0 ⊖ = The Set of Negative-Numbers, Point → O, The Positive-Numbers, while [⊖ ↔ ⊖] = Material Point of ds = r = Monad = The two Inverse Perpendicular Units, creating Zero Work and this because (of Interaction ↔ in Bonding, ∫r, from the Centripetal Force), and for Planck’s Length scale 10⁻³⁵ m, is The Hydrogen Bohr’s Model – Structure.

2... [P..⊖]⊖⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕.. = 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... [P..⊖]⊖⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕.. = 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... [P..⊖]⊖⊕⊕⊕⊕⊕⊕⊕⊕⊕⊕.. = The Number of Positive and Negative Units interacting on The Zero Material point (∫r), is The Proton and Electronon Material Point, and for Planck’s scale 10⁻³⁵ m, The Periodic-Table of Elements.

The combination of → 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 Vi ⊖ creating the Electromagnetic Waves.

Following above logic, it is easy on 4... to define particles beginning from Zero which is Point → 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 Radonion, P = 118, E = 118 for Ununoctium.
7. The periodic Table of Elements.

Since Material geometry follows Euclidean 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 $2N^2-2(N-1)^2 = 2(N^2-(N-1)^2)$, and for $N = 6$ then $N^2 = 22$ as in F-8.

<table>
<thead>
<tr>
<th>Number of Points or Vertices $N$</th>
<th>Euclidean Geometry</th>
<th>Material Geometry - SLU</th>
<th>Points In Between</th>
<th>Available Units</th>
<th>The Periodic Table of Quantized Units and Elements [E]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Point</td>
<td></td>
<td></td>
<td>2</td>
<td>$\infty$</td>
<td>$u = 6$</td>
</tr>
<tr>
<td>2 Line Segment</td>
<td>A</td>
<td>B</td>
<td>8</td>
<td>$\infty$</td>
<td>$u = 10$</td>
</tr>
<tr>
<td>3 Regular Triangle</td>
<td>A</td>
<td>B</td>
<td>18</td>
<td>$\infty$</td>
<td>$u = 14$</td>
</tr>
<tr>
<td>4 Regular Tetrahedron</td>
<td>A</td>
<td>B</td>
<td>32</td>
<td>$\infty$</td>
<td>$u = 18$</td>
</tr>
<tr>
<td>5 Reg. 5gon</td>
<td>N-5</td>
<td></td>
<td>50</td>
<td>$\infty$</td>
<td>$u = 22$</td>
</tr>
<tr>
<td>6 Reg. 6gon</td>
<td>N-6</td>
<td></td>
<td>72</td>
<td>$\infty$</td>
<td>$u = 26$</td>
</tr>
<tr>
<td>7 Reg. 7gon</td>
<td>N-7</td>
<td></td>
<td>98</td>
<td>$\infty$</td>
<td>$u = 30$</td>
</tr>
<tr>
<td>8 Reg. 8gon</td>
<td>N-8</td>
<td></td>
<td>128</td>
<td>$\infty$</td>
<td>$u = 34$</td>
</tr>
<tr>
<td>9 Reg. 9gon</td>
<td>N-9</td>
<td></td>
<td>162</td>
<td>$\infty$</td>
<td>$u = 38$</td>
</tr>
<tr>
<td>10 Reg.10gon</td>
<td>N-10</td>
<td></td>
<td>200</td>
<td>$\infty$</td>
<td>$2N^2-2(N-1)^2 = 2(N^2-(N-1)^2)$</td>
</tr>
<tr>
<td>N Reg.Ngon</td>
<td>N</td>
<td></td>
<td>$2N^2$</td>
<td></td>
<td>$[E] = E-1 +$ SLU</td>
</tr>
</tbody>
</table>

**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.*

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

$$\Delta \rightarrow O A D_A \rightarrow O A D_A - 1, \ AD_A = \mathbf{V}, \ OD_A = C$$

$$\sec \varphi = 1 / \sqrt{1 - (\sin \varphi)^2} = 1 / \sqrt{1 - (\nu/c)^2}$$

Lorentz factor $\gamma = \sec \varphi = 1 / \sqrt{1 - (\nu/c)^2}$

Figure 9. The Geometrical expression of Lorentz factor $\gamma$, where $\sec \varphi = \gamma = O D_A A D_A = \pm 1 / \sqrt{1 - (\nu/c)^2}$. 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-dashed Fragments through center $O$, the Modify-Field Material-Fragment $\rightarrow (\pm s^2) = [MFMF]$ as base for all motions, and Gravity as force $[\mathbf{V} \mathbf{V}]$, while the crashed with the constant velocity $c$, consist the Dark matter $[\pm \epsilon s]$ and the Dark energy $[\mathit{c} \mathbf{V} \mathbf{V}]$, or from $\rightarrow$ Breakages $[\pm s^2 = (\omega r)^2]$ and $[\mathbf{V} \mathbf{V} = (2\omega r)^2]$ where then become,

A $\rightarrow$ Particles, with Inherent Vibration, $\mathbf{A}$

B $\rightarrow$ Gravity-field-energy, without Vibration and

C $\rightarrow$ Dark-matter-energy constituents as,

A $[\pm \epsilon s^2] \rightarrow$ Fermions and $[\mathit{c} \mathbf{V} \mathbf{V}]$ $\rightarrow$ Bosons,

B $[\pm s^2] \rightarrow [MFMF]$ Field, and the binder, Field $[\mathbf{V} \mathbf{V}] \rightarrow$ Gravity force,

C $[\pm \epsilon s^2]$ $\rightarrow$ Dark and the Matter Gravity force $[\mathbf{V} \mathbf{V}, \mathit{c} \mathbf{V} \mathbf{V}] \rightarrow$ The Expanding Dark energy. [39,40,42].

Inner Thrust ($\mathbf{V} = \mathbf{w} r$) is continually acting on the Breakages $[s^2, [\mathbf{V} \mathbf{V}], [\mathbf{V} \mathbf{V}], [s \mathbf{r}] = (2\mathbf{w} r)^2]$ producing the $[1 + 2|\mathbf{w}^2, \mathbf{r}^2|]$ magnitudes $(\omega r)^2$, which is a Positive Scalar magnitude, with Positive or zero Electric charge and with $\pm 1/2$, spin. [30] $\rightarrow$ and the double constant term which as a Vector magnitude $[\mathbf{V} \mathbf{V}, \mathit{c} \mathbf{V} \mathbf{V}]$, and then when, Fig. 9,

1. Positive breakage Quantity $[|\mathbf{V} \mathbf{V}| = |\mathbf{w} \mathbf{r}|^2 = |\mathbf{w} \mathbf{r}|^2 \rightarrow$ 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 $|\mathbf{V} \mathbf{V}| = -|\mathbf{w} \mathbf{r}|^2 = \mathbf{w} \mathbf{r}^2 \rightarrow$ 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 $[2|\mathbf{w} \mathbf{r}|, s |\mathbf{r}|, \mathit{c} \mathbf{V} \mathbf{V} = 2w (s r), \mathit{c} \mathbf{V} \mathbf{V} = 2\mathbf{w} r^2, \mathit{c} \mathbf{V} \mathbf{V} = \mathbf{w} \mathbf{r}^2, \mathbf{w} \mathbf{r}^2 \rightarrow$ 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 $[\pm s^2 = (\omega r)^2]$, being at, O, common circle center and thrown OFF and into [STPL], and this because of $\nu = 0$, formulate the [MFMF] homogeneous, rest Gravity Field, which consist the base of all motions.

2. Breakage Energy Quantities $[\mathit{c} \mathbf{V} \mathbf{V} = 2(\omega r)^2]$ being at, O, common circle center and thrown OFF into [STPL], and this because of $\nu = 0$, and acting on dipole breakages of [MFMF] Field $[\pm s^2 = (\omega r)^2] \rightarrow |\mathbf{w} \mathbf{r}|^2 \rightarrow -|\mathbf{w} \mathbf{r}|^2 \rightarrow |\mathbf{A} \mathbf{A}|$, 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 $[\pm \epsilon s^2]$ and $[\mathit{c} \mathbf{V} \mathbf{V}]$, the clashed with the constant velocity $c$, formulate in [STPL] cylinder,
Dark matter and Dark Energy DE respectively. Energy Quantities\( \mathcal{V}_i = 2(wr)² \) acting on dipole breakages \( [\pm \text{c}.s^2] \) or on DM field \( \mathcal{E}_{\text{m}+} \mathcal{E}_{\text{p}} \) where \( [\pm \text{c}.S^2] \rightarrow \{c\pm w, r, \text{c}± w, r\} \rightarrow [\pm \text{c}(w, r)] \rightarrow [\pm \text{c}(r, w)] \rightarrow [\pm \text{c}(\text{A1}-\text{O})] \), produces DM, while Dark-energy DE \( = [\pm \text{c}.V] \) is acting on all Five Fragments with light velocity\( c \), as \( [\pm \text{c}.V] \rightarrow \{ \mp \text{c}(w, r), \mp \text{c}(r, w), \mp \text{c}(\text{A1}-O) \} \) which is the rolling Heap.[33-36] All the Energy Quantities \( \mathcal{V}_i = 2(wr)² \) are acting on dipole breakages \( [\pm \text{c}.s^2] \) 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 insist 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 \( \pm \Lambda = r.m^2 = r.m.\bar{w}, r = m^2.\bar{w} \), so exists that what is called Relativity. As Absolute System let it be \( [\text{S}] \equiv [\text{D}_\Lambda-\text{O}] \) and as the Relative (Reference, Affine) System, \([\mathcal{R}] \equiv ([\text{D}_\Lambda-\text{P}_2]) . \) Fig -8

The Relative motion \([\mathcal{S}] \equiv ([\text{D}_\Lambda-\text{O}]), [\mathcal{R}] \equiv ([\text{D}_\Lambda-\text{P}_2]) \) of the two above Systems:

It was shown in (F-4), that in \([\text{D}_\Lambda-\text{O}] (x, y, z, t) \), System \( c, \bar{v} \), vectors are isochrones i.e. period \( T = L/V = 2\pi r/V = 2\pi/c(r) = 2\pi/c[r_r] \rightarrow c/r_r = v_r/v_r \rightarrow c/v_r = v_r/c_r \), where \( r_r, c_r \) are the radius of their intrinsic rolling circles. In F-8, this relation is

Geometrically expressed as →

\[
\text{sec} \cdot \varphi = O \cdot D_A : A \cdot D_A = \mathbf{y} = \pm \sqrt{1 - (\mathbf{v}/c)^2} = \frac{c}{\sqrt{\mathbf{v}^2 - c^2}}, \text{ and it is a geometrical Cycloid property equal to Lorentz’s } \mathbf{y}, \text{ factor.}
\]

Newton’s laws are true into Reference System \([\mathcal{R}] \equiv ([\text{D}_\Lambda-\text{P}_2]) \) by,

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

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

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

so, automatically is defined the conversion factor \( t = \text{time} \), between the conventional time units (second) and length units (meter = A.D.) or as \( \bar{c}, r_r \rightarrow \bar{r}_r, \rightarrow \bar{c} (\psi)(T/2\pi) = \bar{v}(c)(T/2\pi) \rightarrow \bar{c}(c)|w = \bar{v}(c)|w \) which is happening with the same \( , w \), without any restrictions, in contradiction to General Relativity when it is an axiom apriori.

This is the why conversion factor, \( t = \text{time} \), with 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 \([\mathcal{S}] \), then this relative frame \([\mathcal{R}] \) is common to the fixed one (common \( D_A \)) and let it be \([\mathcal{R}] [x', y', z', t'] \).

From figure Fig-[8-9], \( \text{sin} \varphi = (\bar{v}/c) \) meaning that the Relative system \([\mathcal{R}] [x', y', z', t'] \), (the Affine Frame) is the projection of Absolute Frame \([\mathcal{S}] \equiv ([\text{D}_\Lambda-\text{O}]) \text{ (x,y,z,t) where exists as Simultaneity for all motions } \), i.e. \([\mathcal{R}] \equiv ([\text{D}_\Lambda-\text{A}) \equiv ([x, y, z', t']) \) \([\mathcal{S}] \equiv ([\text{D}_\Lambda-\text{O}]) \equiv ([x, y, z, t]) \) respectively.

Considering point \( D_A \) as the common center and [STPL] as the x-x axis of the two systems, then becomes \( \text{D}_A( x, y, z', t) \) and for all linear systems \( \text{D}_A( x', y, y, z', t) \) respectively.

This specific state of constancy, i.e., the Centrifugal velocity of Absolute system \([\mathcal{S}] \) 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 → their wavelengths are a Stationary wave in cycloid ← following Lorentz’s factor, \( \gamma \), then this following, happens also to all frames which make this motion, and so issues

\[
[D_A - O] = \gamma [D_A - A] \quad \cdots (2-0)
\]

On this Relative system \( D_A( x, y', z' = z, t') \) are conveyed, the Breakages \( \pm (\omega r)^2, 2(\omega r)^2 \) of \( (O, OA) \) circle after the colliding with the rotating velocity \( \vec{\nu} = \vec{w} r \) of the \( [S] \) system, and are the fundamental particles, Femions 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 \( A \equiv \pm |(\omega r)| \) of the Fixed System \( \{ D_A - O \} \) travels with velocity \( \vec{\nu} \) at point \( D_A \), so geometrical distance \( A \cdot D_A \) in the Relative System \( [R] \equiv \{ D_A - P_A \} \) is \( A \cdot D_A = x + \vec{\nu} t \), and because of the isochrones motion in the Fixed System \( [S] \equiv \{ D_A - O \} \), it is holding,

\[
x = (x' + \vec{\nu} t') y \quad \text{or} \quad x = (x' + \vec{\nu} t') y = [x' + \vec{\nu} t'] / \sqrt{1 - (\nu/c)^2} \quad \cdots (2a)
\]

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 \( \vec{\nu} \) at point \( D_A \), the geometrical distance \( A \cdot D_A \) in the Fixed System \( [S] \equiv \{ D_A - O \} \) is → \( A \cdot D_A = x - \vec{\nu} t \) and in the Relative System \( [R] \equiv \{ D_A - P_A \} \) it is →

\[
x'(x - vt), y = [x - vt] : [\sqrt{1 - (\nu/c)^2}] \quad \cdots (2b)
\]

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 \( \vec{c} = O, D_A \) and \( \vec{v} = A, D_A \), then vectors \( O, D_A = \vec{c} t \) and \( A, D_A = \vec{v} t' \) reach point \( D_A \) simultaneously. This Geometrically means that convention factor \( t \), on \( \vec{c} \), is projected on \( \vec{v} \), and so,

\[
t = t - t\sin\theta = t - (v/c)^2 t = (c - v) t / c .
\]

From above Question, and because \( \vec{w} = \text{constant} \), then Centrifugal velocity \( \vec{v} = \vec{c} \) is also constant and such that velocity \( \vec{c} \), is kept the same in the two reference frames, valid →

\[
c = x t = x' / t' \quad \text{and time} \quad t = x / c \quad , \quad t' = x' / c
\]

or \( t = (x + vt') / c, (\sqrt{1 - (\nu/c)^2}) = (x/c) + (v/c)^2 t' \): \( N = [t' + (v/c)^2 x'] : N = [t + (v/c)^2 x] : [\sqrt{1 - (\nu/c)^2}] \quad \cdots (2c)
\]

From relation \( t' = x / c = (x - vt), y = [x - vt] : [\sqrt{1 - (\nu/c)^2}] \quad \cdots (2d)
\]
i.e. equations,

\[
x = (x' + vt'), y = [x' + vt'] : [\sqrt{1 - (\nu/c)^2}] \quad \cdots (2a)
\]

\[
t = (x' + vt'), y = [t' + (v/c)^2 x'] : [\sqrt{1 - (\nu/c)^2}] \quad \cdots (2c)
\]

\[
y = y', z = z' \quad x' = (x - vt), y = [x - vt] : [\sqrt{1 - (\nu/c)^2}] \quad \cdots (2b)
\]

\[
t' = (x - vt), y = [t - (v/c)^2 x] : [\sqrt{1 - (\nu/c)^2}] \quad \cdots (2d)
\]

\[
y = y', z = z
\]

which are the known equations of Relativity.

c. For constant velocity \( c = \infty \) equations become

\[
x = x' + \nu t', \quad y = y', \quad z = z', \quad t = t', \quad \text{and inversely}
\]

\[
x' = x - \nu t, \quad y' = y, \quad z' = z, \quad t' = t.
\]

issuing in [PNS] Spaces.

*In this way velocity ,* \( \vec{v} \), may have any constant value and also greater than \( c \), which agree with Galilean mechanics.*
Breakages \[(wr)^2, - |wr|, 2(wr)r^2\], being masses off the system \(S\), under the Action of the constant velocity \(\vec{c}\), which is not changed, are multiplied by Lorentz factor \(\gamma\), where then the new masses are \(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 as \(E = m v^2/2 = {2m / [\sqrt{1-(v/c)^2}]} \cdot c^2/2 = mc^2/\sqrt{1-(v/c)^2}\) which is the known formula of Lorentz-Einstein in General Relativity.

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

\[S\] \(\rightarrow x = x' + v \cdot t', y = y', z = z', t = t'\),

\[R\] \(\rightarrow x' = x - vt, y' = y, z' = z, t' = t\)

\[m' = m \cdot \gamma = 2m/\sqrt{1-(v/c)^2}\] and

\[E = mc^2/\sqrt{1-(v/c)^2}\]

i.e. \([PNS]\) Space is such that velocities \(\vec{v}, \vec{c}\), exist independently of this Zero conversion factor \(t\), 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 \(\sin \varphi = vt/c = 1\) and \(\sec \varphi = \pm 1 / \sqrt{1-1^2} = \pm \infty\), and the Systems

\[S\] \(\rightarrow x = x' + vt, y = y', z = z', t = t'\),

\[R\] \(\rightarrow x' = x - vt, y' = y, z' = z, t' = t\)

\[m' = m \cdot \gamma = \infty\] and \(E = \infty\), independently 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 \(\gamma\) factor.

c3... For \(t = 1\) then \(\sin \varphi = vt/c = v/c\) and

\(\sec \varphi = \pm 1 / \sqrt{1-(v/c)^2}\) and the Systems become

\[S\] \(\rightarrow x = x' + vt, y = y', z = z', t = t'\),

\[R\] \(\rightarrow x' = x - vt, y' = y, z' = z, t' = t\)

\[m' = m \cdot \gamma = 2m/\sqrt{1-(v/c)^2}\] and

\[E = mc^2/\sqrt{1-(v/c)^2}\]

i.e. it is a Space where velocities \(\vec{v}, \vec{c}\), exist and dependent on the conversion factor \(t\), and the constant velocity \(c\), 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 \(\sin \varphi = vt/c\) and \(\sec \varphi = \pm 1 / \sqrt{1-(vt/c)^2}\) and the Systems are

\[S\] \(\rightarrow x = x' + vt, y = y', z = z', t = t'\),

\[R\] \(\rightarrow x' = x - vt, y' = y, z' = z, t' = t\)

\[m' = m \cdot \gamma = 2m/\sqrt{1-(v/c)^2}\] and

\[E = mc^2/\sqrt{1-(v/c)^2}\]
i.e. it is a Space where velocities $v, c$, exist and dependent on the conversion factor $\alpha$, and the constant velocity $c$, and mass $m' = \frac{2m}{\sqrt{1-(v/c)^2}}$ and energy $E = mc^2 \sqrt{1-(v/c)^2}$.

Momentum $\vec{p} = m\vec{v} = \vec{h}$ and Energy $E = mc^2 \sqrt{1-(v/c)^2}$ 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 $\leftrightarrow$ 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 (supported) 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.

Gravity force is exerted on breakages $[\pm (\vec{w}, r)^2] =$ Material points = Dipole of the two $\pm$ quantized energy-spaces $[\vec{w}, r]^2$ as velocity vector $\vec{c}$, 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 $[\pm \vec{A}]^2 = [p.c]^2 + [m_0.c]^2$, which is the known relativistic energy-momentum equation of Lorentz transformation equations.

**Conclusions.**

Any moving monad $[z = s + i.v]$ is 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 $[\nabla \varepsilon (\vec{u}, \vec{v}, \vec{w})]$ 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 $G.\nabla^2 \varepsilon = [m.G/(m-2)].\nabla[V\varepsilon] = F$, or in isotropic material $[\mu \nabla^2 \varepsilon + (\lambda + \mu).\nabla (V\varepsilon)] + F = 0]$
The intrinsic Stationary Electromagnetic Wave of gravity, is binding as an dipole the two edge material points of this Homogenous Isotropic, Rest massless, and also of Elastic nature material Configuration Field. [22-23].

2. In Solid material Configuration, is as Kinetic (Energy of motion $\mathbf{v}$) 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 ($\delta \mathbf{r}, \mathbf{c}$) = [$\mathbf{v}, \mathbf{c} + \mathbf{w}, \mathbf{r}$] $\delta t$, as the Inertia ellipsoid [Poisson's ellipsoid construction] in $[S]$ frame which instantaneously rotates around vector axis $\mathbf{w}, \mathbf{c}$ with the constant polar distance $\mathbf{w}, \mathbf{Fe} / \mathbf{Fe}$ and the constant angles $\theta$, $\phi$, traced on, Reference $[R]$ cone and on $[S]$ cone, which are rolling around the common axis of $\mathbf{w}$ vector without slipping, and if, $\mathbf{Fe}$, 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 $\mathbf{w}$ 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 $[\text{PNS}]$ carry A-priori the work $W = [A, B]$ [Pds] = 0, where magnitudes $P, d^3$ can be varied leaving work unaltered. The Diffusion (decomposition) of Energy is as the mechanism of Energy Transport as velocity $(\mathbf{v})$, 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 perpendicularly 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, $\mathbf{v}$, (and this because extreme case happens for zero application area) is decomposed into two velocity vectors $\mathbf{v} 1, \mathbf{v} 2$, 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, $\mathbf{v}$, where then mechanism is recycled. [39-40]

5. The dynamics of any System = Work = Total Energy, is transferred as generalized force $Q$ as, $Q_n = \partial W / \partial (\mathbf{v})$, and involves the Absorption and Reemission of the wave quantized energy $J = (J1) = (J2)$ Electric and Magnetic field of Electric Displacement of the two neighbor edges $(1)$ and $(2)$ of the medium, following the isochrones Cycloidal motion. [40]

6. The ultimate Constituents of Monads (s, $\mathbf{v}, \mathbf{v}i$) is the real part $, |s|$, and the Magnitude of Imaginary part as Vector $\mathbf{v}i = \mathbf{vi}$, decomposed into velocity vectors $\mathbf{v}1, \mathbf{v}2$. [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,

$$L_g = 2r = e^{-\gamma (\pi r / 2)} \approx 3.969 \times 10^{-62} m$$

is inversely balancing the Common circle, of Space, Anti-Space.

For the Rotational Spaces, with velocities

$$[\mathbf{v} \mathbf{g} = \mathbf{v} \mathbf{r} \mathbf{e} = \mathbf{e}]$$

that of light, $\mathbf{r}$, tending to zero in cave $L_c > L_g$ then exist velocities $[\mathbf{v} \mathbf{c} > \mathbf{e}]$ 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, $\mathbf{v} = \mathbf{w} \mathbf{r}$ 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, $\delta$, and determining Color Bands or Fringes) is Produced a color Spectrum which is, the $<\text{Color Forces}> \rightarrow$ Gluon Red, Gluon Green, Gluon Blue.[36,41].

When tangential velocity $\mathbf{v} = \mathbf{w} \mathbf{r}$ on the circumference of a cave, $r$, is in another of radius $R > r$, then the new tangential velocity $\mathbf{v} = \mathbf{w} \mathbf{R}$ is greater than $\mathbf{v}$ and when $\mathbf{v}$, the speed of light, then the new$^2$, are velocities greater than that of light, and this is a way of succeeding these velocities.

7. In Black holes Energy scale $[|\Lambda| \cdot \Lambda = k]$ there are infinite high frequency small amplitude vacuum fluctuations at Planck energy density of $10^{113}/m^3$ 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 $L = r \mathbf{v} = \mathbf{r}, \mathbf{j} = r \mathbf{\Lambda}$, as the Stationary Electromagnetic wave $[E \perp H]$ in constant mass $m = [r, \mathbf{v}]^2$, is the reaction to this motion $\mathbf{v}^2 = (w, r)^2$. Different
versions with different Energy (scalar) possess the same angular momentum. A Composition of Scalar Fields \( s \) and Vector Fields \( \mathbf{V} \) 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, \( \mathbf{F} \), is said to do work, \( W \), if when acting on a body (something which has mass and has a resistance to any change of motion) there is a displacement, \( ds \), of the point of application in the Direction of the force, i.e. \( W = \mathbf{F} \cdot ds \). For any direction with an angle, \( \varphi \), between \( \mathbf{F} \), \( ds \) then \( W = \mathbf{F} \cdot ds \cdot \cos \varphi \). And for \( \varphi = 0^\circ \) then it is \( W = \mathbf{F} \cdot ds \), \( W = 0 \).

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

Work is conserved as, as the Universal Principle of Virtual work on Geometry Primary dipole, \( ds \), law \( W = \partial \mathbf{F} \), and as Energy is then Quantized,

converted in Space monads, caves, cells, \( \bar{x} = ds = \lambda \cdot m \), as pressure \( \sigma, \tau \), the pressure is converted in caves as a 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. 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 \( E, P \) 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 (Coriolis force curl helix Displacement current in monads). [39–40–41]

Remark:

Work as Energy is Quantized, converted in Space monads, caves, cells, \( \bar{x} = ds = \lambda \cdot m \), as pressure \( \sigma, \tau \), the pressure is converted in caves as a 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 (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 \( W = F \cdot ds \) → Stationary Force on zero Displacement → and is transformed as,

2. Work \( W = (\sigma, dF) \cdot ds \) → Stress on any Area, and if area is zero then is transformed as,

3. Work \( W = (c[sF]) \cdot ds \) → Electromagnetic field and is transformed as,

4. Work \( W = (E \cdot H) \cdot ds \) → Inner Electromagnetic Wave of monad and is transformed as,

5. Work \( W = (\lambda, m) \cdot ds \) → Moving Field Vector and for \( dF = 0 \), \( ds \neq 0 \) is transformed as,

6. Work \( W = (p) \cdot ds \) → Angular Momentum of the moving field, and is transformed as, Space, and their combination as.

7. Work \( W = (v) \cdot ds \) → Cycloidal Spin, in wavelength \( \lambda \),

Work as Energy \( h.f \) which is the known Planck’s formula for frequency and energy, \( W = (\sigma, dF) \cdot ds = \sigma, (v) = (h) (m), (v) = \lambda \cdot c^2 \) → Work as Kinematic Vector which is the known Einstein’s formula for mass and energy and is transformed as,

8. Work \( W = (\lambda, m) \cdot (v) \) → Kinematic Vector with mass and velocity, and is transformed as,

9. Work \( W = (M, v) \cdot dt \) → General mass-Velocity moving vectors, and is transformed as,

10. Work \( W = (p) \cdot dt \) → Linear Momentum as Extrema for Angular. The Work Quantization
process → i.e. WorkEnergy 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 \[ W = P.dS = (F.dF).dt = (p)dt \]

b.. The Work Quantization process as Space is \[ W = (c[\varepsilon H]).dS = (E.\perp H).ds = (dt,(E.\perp H)).ds/dt = m.v \]
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 exists also in out Solar system where , earth motion follows elliptic traces .

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

\[ \text{Figure. 12. The Quantization of Work as discrete Force (Energy) = Electromagnetic field } [E,P] \]
Figure 7-A. The Periodic Table of Particles Dependent on Material-Geometry Properties.

A. The Series of Positive Breakages ★is the Nucleus Cluster Structure, Zero = Neutral = ★is the Rest-Monad Dipole, The series of Negative breakages ★is the Orbital Cluster Structure.

B. The Monad of Positive ★and Negative ★breakages with \( r = \text{Distance} \), which is thus resulting to the Circular-Motion, because of the CentriPedal .CP. and of CentriFugal .CF. equal Forces.

C. The Positive ★and Negative ★Breakages, and the Zero = Neutral = ★with \( r=0 \).

1. One Positive ★Breakages, Attached to Nucleus of Monad \([★→★]\) is Produced \( ^1\text{H} \) =Hydrogen.

2. One Positive ★Breakages and one Neutral, Attached to Nucleus of Monad \([★→★]\) is Produced \( ^2\text{H} \) =Deuterium which is Isotopes of Hydrogen.

3. Two Positive ★Breakages, Attached to Nucleus of Monad \([★→★]\) is Produced \( ^3\text{He} \) =Helium.

4. Two Positive ★Breakages and Two Neutral, Attached to Nucleus of Monad \([★→★]\) is Produced \( ^4\text{He} \) =Helium-4 which is Isotopes of Helium.

5. Three Positive ★Breakages and Four Neutral, Attached to Nucleus of Monad \([★→★]\) and using SLU= Shell-Least-Units Principle to Orbital Cluster, is Produced \( ^3\text{Li} \) =Lithium.

6. Eleven Positive ★Breakages and Twelve Neutral, Attached to Nucleus of Monad \([★→★]\) and by using SLU= Shell-Least-Units Principle to Orbital Cluster, is Produced \( ^3\text{Na} \) =Sodium, and so on.
The Energy monads

Pressure variations within liquid, vibration in liquid matter

due to the

λr

c.²

embrane

c.²

Ossicles

c.²

w

is the Stationary wave of the


Electromagnetic wave constituent [E

h.w/2πc²]

from

transmission


2.


3.


4.


5.

Energy for


6.


7.


8.


9.


The Stationary wave of the


E

E = (∂P/∂t) and The Magnetic field P = (∂E/∂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 ± ([(w.r)²]) magnitude, in the Rest. Homogenously, Quantized mass-less Field ± ([(w.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 = [w.r]² extended beyond Planck’s length, the Space Quanta.

Object in mechanics may be also the Quantized Energy as wavelength λ=(1)-2 in [Medium-Field Material Fragment →[± s²] = [w.r]² = [MFMF] Field →] which is a standing wave in cavity

(1)-(2) with scalar breakage {i+(w.r)²→-(w.r)²} as medium (1)-2 field, and (J1=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 V, during shifting, and because A=0, is analyzed into two transverse velocity vectors V₁,V₂, 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 c, V are perpendicular between them, where then dispersion follows Pythagoras theorem and the consultant Quantized Space r, becomes


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

The total Rotating energy is → ±Λ = ⃗.r = (M.c).r = (M.c).\sqrt{v^2 + c^2} and |± Λ|^2 = p²,r² = M²c²(v²+c²) = (M²v²)c² + M²c⁴ = (p²c²) + M²c⁴ = [p.c]² + [m_o.c²]² .

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 into 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 whic... 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 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= 4π²/2πr² = 4(w².r²)²/2π] composed of an inner Electromagnetic wave constituent [E.L.H], and h=2π/λ, is the reaction to these velocity motions [it is the mass m = (pr).w/c² = h.w/2mc²], the external energy momentum is
p = h/2πλ 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.π.a.b² = 4λ³/3π, \( \text{[because a, b = λ/π]} \) of the Electromagnetic stationary field \( \varepsilon \partial^2/\varepsilon_0 + \mu H^2 \) where IntensitySc = \( \varepsilon_0 E^2/2 + μH^2/2 \) and \( μ, \varepsilon \) the Permittivity, \( (it \ is \ the \ Dielectric \ constant \ multiplier) \), Pemeadiability (the Dielectric constant multiplier).

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

\[ \text{a. Energy } I_d = \frac{\varepsilon^2}{2\pi} (\varepsilon E^2 + μH^2) \text{in volume } V = \frac{(v^2 + w^2)^{3/2}}{3\pi} \rightarrow \text{Energy behaves as Particle like,} \]

\[ \text{b. Energy } I_4 = \left( \frac{\varepsilon^2}{2\pi} \right) (\varepsilon_0 A^2 + μ B^2) \text{in any Interference Pattern} \rightarrow \text{Energy behaves as Wave like, Discrete} \]

This is the Wave-Particle duality unified the classifying 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, \( \pi \) (Archimedes number \( \pi \) ) so quantization of Points (\( \lambda \)) follows geometry constant (\( \pi \)) and for Energy \( W_d \), this is the quantized Energy of the Quantity dissipated per cycle, \( [\text{and because monads follow sinusoidal oscillation on wavelength = monads as the } w, \text{th power and the n,th root of this monad where } w.n = 1 \text{ as above on and in the same monad] and which energy is equal to} \)

\[ W_d = \lambda. dx \cdot d |C^\lambda dt = (\pi Cw) d^2 \lambda = (2\pi C, \lambda^2/4) f = (\pi C, \lambda^2/2) f = C.f \text{ i.e. From above monads } (s + \sqrt{\lambda}) \lambda = |zo| \cdot w, \text{ e}^w - i.f \text{ and for } \text{Rotated Energy case where } s = 0 \text{ and also } \cos \phi = 0 \text{ exists for angle } \phi = \pi/2, \text{ the quaternion, } z, \text{i}z = (s + \sqrt{\lambda}) \lambda w \text{ as dimension power w-b and it is } as e^{-i\left(\frac{\pi}{2} + 2k\pi\right)}/w = e^{i\left(\frac{\pi}{2} - 2k\pi\right)}/w, \text{where } Lp = e^{i\left(\frac{\pi}{2} - 2k\pi\right)}/w, \text{ and it is the basic Geometrical Interpretation of < Planck scale meter > based on the two Geometry constants } e, \pi, \text{ where k = 1}, \text{ and base b = 10, and this from logarithm properties with different bases on the same base e [when e}^w = x \text{ then base e logarithm of x is } \ln(x) = \log_e(x) = y \text{ as it is } e^w = (b \log_e(b^c) w = b \log_e(b^c)w \text{ and } \sqrt{\lambda} = e^{1/2} = e = e^w = e^{-w} = e^{x \log_e(b^c)}w \text{ which are monads in monads and is of Wave motion with angular velocity } w = 4Wd/(\pi C, \lambda^2), \text{ i.e. Space and Energy is quantized and measured on the two Constant and Natural numbers } e, \pi, \text{ where for base the natural logarithm } e, \text{ and exponent the decimal base } b = 10, \text{ where then issues \rightarrow During Diffraction } ds, \text{ frequency } f, \text{ doesn’t change and only the velocity } v, \text{ and wavelength } \lambda, \text{ changes and the Total Energy is } [\lambda^{1/2}w = |zo| \cdot wLp]. \]

Again because for quaternion \( z, \text{ exists as } \rightarrow z^i \wedge w = (s + \sqrt{\lambda}) \lambda w = |zo| \wedge w, \text{cos}(\phi + k\pi)/w + i . \sin.(\phi + k\pi)/w) = |zo| \wedge w + i. (\phi + k\pi)/w, \text{ and so then. For cos.}(\phi + k\pi)/w = 0 \text{ then exists only the Imaginary part of monad, } (\sqrt{\lambda}) \cdot i \neq 0 \text{, where } \phi = \pi/2 \text{ and then } z^i \wedge w = |zo| \wedge w. e i.(\phi + k\pi)/w = \pm i. (\pi/2 + k\pi).10 \text{ 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^i \wedge w = |zo| \wedge w. Lv = \rightarrow \text{Energy Monads.} \]

For \( \sin.(\phi + k\pi)/w = 0 \text{ then exists only the Real part of monad } s \neq 0, \text{ where } \phi = - \pi \pm k\pi \text{ and then spaces}. \text{ Massive particles are then where issues \rightarrow z^i \wedge w = |zo| \wedge w.e i.(\phi + k\pi)/w = \pm i. (\pi/2 + k\pi).10 \text{ 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 \( L v = e^{i\left(\frac{\pi}{2} + 2k\pi\right)}/w = e^{i\left(\frac{\pi}{2} + 2k\pi\right)}/w \)

\[ \text{then for base } e = 2.71828 \text{ and } k = 0 \rightarrow L v = e^{i\left(\frac{\pi}{2} \pm 2\pi\right)}/w \text{ then } e^{\left(15,7079\right)} = 1,78118.10^{-7} \text{ m Energy Balanced.} \]

\[ \text{for base } e = 2.71828 \text{ and } k = 1 \rightarrow L v = e^{i\left(\frac{\pi}{2} \pm 2\pi\right)}/w \text{ then } e^{\left(47,12389\right)} = 5,344.10^{-21} \text{ m Energy Balanced.} \]

\[ \text{for base } e = 2.71828 \text{ and } k = 2 \rightarrow L v = e^{i\left(\frac{\pi}{2} \pm 2\pi\right)}/w \text{ then } e^{\left(78,5398\right)} = 8,906.10^{-35} \text{ m Planck’s Length.} \]

\[ \text{for base } e = 2.71828 \text{ and } k = 3 \rightarrow L v = e^{i\left(\frac{\pi}{2} \pm 2\pi\right)}/w \text{ then } e^{\left(109,9956\right)} = 2,295.10^{-48} \text{ m Layer Length.} \]

\[ \text{for base } e = 2.71828 \text{ and } k = 4 \rightarrow L v = e^{i\left(\frac{\pi}{2} \pm 2\pi\right)}/w \text{ then } e^{\left(141,372\right)} = 3,969.10^{-62} \text{ m Gravity Length.} \]

\[ \text{for base } e = 2.71828 \text{ and } k = 5 \rightarrow L v = e^{i\left(\frac{\pi}{2} \pm 2\pi\right)}/w \text{ then } e^{\left(172,7876\right)} = 9,593.10^{-76} \text{ m Layer Length.} \]

\[ \text{for base } e = 2.71828 \text{ and } k = 6 \rightarrow L v = e^{i\left(\frac{\pi}{2} \pm 2\pi\right)}/w \text{ then } e^{\left(204,2404\right)} = 7,155.10^{-89} \text{ m 1st Layer length.} \]

\[ \text{for base } e = 2.71828 \text{ and base } b = 10, \text{ then } e^{\left(-78,5398\right)} = 8,906.10^{-35} \text{ m and divided by } \sqrt{3} \pi = 1,616199.10^{-35} \text{ m} \]
Since cave is a versor then → Planck’s Length

$L_p = e^{i\left(\frac{-5\pi}{2}\right)} = e^{i(-5\pi/2)}.10 = e^{-(78.5398)} = 8.906.10^{-35} \text{ m} = \{\sqrt{3.\pi}.1,616199.10^{-35} \text{ m}\}.$

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 $L_{Planck} = 1,616.10^{-35} \text{ m} = \sqrt{h.G^3}$ is consisted of the three compromising constants $h,G,c,$ instead of geometry cave mould as above.

$L_p = e^{i}.(-5\pi / 2).10,$ which is based on the two natural constants $e, \pi.$

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 → [(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.

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**Figure 13.** → The Point, Linear, Plane, Space (volume) Mould for E-geometry Quantization, of monad

$\text{EA to Anti-monad EC – of AB line to Parallel line MM’, of CE Radius to the CM Square Segment of KA Segment to KD Cube Segment}.$

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 Spaces the mould of the Duplication of cube. All methods in, F-13.

The METERS of Quantization of monads = AB are as,

In any point A, happens through Mould in itself (The material point as a → ± dipole) in [43]

In monad $\text{ds = AC, happens through Mould in itself for two points}$ (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

$\text{ds = EA the quantized and Anti-monad is dq = EC} \pm \text{EA}$

Remark : The two opposite signs of monads $\text{EA, EC}$ represent the two Symmetrical equilibrium monads of Space-Antispace, the Geometrical dipole $\text{AC on points A,C which consist space AC as in F12 - (1)}$
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 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 propety 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 KD³ = K.A³ .

On monad ds = KA the Volume = KA³ and the quantized Anti-monad, dq = KD³ ≥ ± 2 . KA³ .

Remark: The two opposite signs represent the two Symmetrical Volumes in Geometrical machine of triangles [ Δ ADZ ⊥Δ ADB ] , which are → 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 = KA³ and the quantized Anti-monad dq = KD³ = ± 2. KA³ . (The Space = the cube KA³ , The Anti-space = the Anti-cubeKD³ ) .

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 KD³ in all Spaces, Anti-spaces and Sub-spaces .

This is the Euclidean Geometry Quantization inpoints 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 .

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) \(\text{Segment } KoA \perp KoD\), \(\text{Ratio } KoX / KoA = KoX1 / KoD\), 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) \(\text{Segment } KoA \perp KoX\), \(\text{OKo} = OA = OX\) 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 right-angled triangle and \(KoZ \perp AX\). Radius \(OKo = OA = OX\). Since \(DA , X1X\) are also perpendicular to \(AX\), therefore \(KoZ // X1X // DA\). According to Thales theorem ratio \((ZA/ZX) = (KoD/KoX)\) and since \(X1\) and\(X\) are tangents \(DKo = Dk\) and \(X1Ko = X1A\) then \(AZ / ZX = DA / XX1\). From Pythagorean theorem (Lemma 6) \(\text{Ratio } KoA² / KoX² = AD / XX1 = KoD / KoX1\)

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 \(O, Ko\) exists \(KoA\) such that, \(\text{Ratio } KoA² / KoX² = AD / XX1 = KoD / KoX1\)

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 [KoA³ / [KoD]³ = [KoX / KoX1]³ = ½.

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 → KoX³ / KoX¹ = 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 (the are they 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 Fiel 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 Transcetal 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 answerd 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

CHAOS = Primary Point [ A ] = The non-existence - Time t = 0

EREBUS = Space [S], Anti-space [AS], Sub-space [SS] Time t = 0
The creation of Opposites.

BLACK NIGHT = The Geometrical caves for breaking of Opposites t = 0

BORN = The Six - Triple Points - Line [STPL]
Mechanism of Opposites to co-exist velocities Simultaneously - Time t = 0

AETHER = The Rest dipole Gravity - Field and Gravity -Force [E,H ] in ds
Rest field , Time t = T = Eternal

DARK = Moving or rest Particles , Antiparticles
Dark matter, Dark Energy - Time t = t
Next DAY = Atoms , Molecules and Bodies as the Chemical laws

Figure .15. Diagram of the Hesiod Quantization (creation )Hypothesis. Critique to Ancient and Recent Admissions :

1. Aethergy → 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 [± s²] being dipoles are restrained by the inner Electromagnetic field [E⊥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 ± s² and consisted of dipole breakages [± s²] side by side and are the minimum Quantized Energy, the Quanta magnitude ,2s², 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 consistency 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/2πλ 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 < stability reaction > 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 evolute curve, the Anti-space, on the balancing cycloidal field wavelength). [49]
This because, Space is quaternion composed of Stationary quantities, the position \( \mathbf{r}(t) \) and the kinematic quantities velocity \( \mathbf{v} = d\mathbf{r}/dt \) and acceleration \( \ddot{\mathbf{a}} = d^2\mathbf{r}/dt^2 \). The Kinematical quantities are also tiny energy volume caves. (cycloid in kof vandi consists in gravity’s fields the infinite tanks 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 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.
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 \( L \),

\[
L = e^\left(\frac{\alpha}{2}\right) \times 10^{-3} \text{N}^{-1} \text{m}^{-1} \text{a}^{-1} \to 0 \text{ m}.
\]

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 energy and the other half in the for intermediate, this because of the Continuity of points and the Discrete of \( \pi \), and \( \sigma \) as well.

{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.). 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 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 \( P = 0 \) → \( P = \lambda \to \infty \) 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, \( ds = \text{ discrete } = \text{ Quantization of points, following geometry moulds where, In caves } \to \text{ Opposite velocities are crushed which defines the motion, and are thrown OFF the cave through a Mechanism, The Six-Two Triple Points-Line [STPL] Formulation, [STPL is a Mechanism } \to \text{ Curl-opposites co-existently by Rotational equilibrium } \}. \) 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, \( t, \text{i.e. Eternal, } \), 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 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 Thurst 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 = ∞, i.e. Eternal .

In the MovingDark-matter and in Dark-Energy , Time , t, is of all types, t = T= 0, 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 a priori. The Above analysis defines a Space- Energy universe [39] and not a Space-time universes 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 Time-less space and T = 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 [46-47]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 → , which is a step after Hesiod . The good order to the infinite in Black night (Ω) has to do with, genesis and decay, two steps after chaos.

Aristotle with its temporal nexus is referred to Aether ([+→+[−−]]) 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 .
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<thead>
<tr>
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<tr>
<td>CHAOS</td>
<td>Point (0)</td>
<td>Schwarzschild radius ( r_\bullet = 2GM/c^2 )</td>
<td>Point ( \rightarrow \text{Limit} = e )</td>
</tr>
<tr>
<td>EREBUS</td>
<td>Straight Line ((-\infty,0,\infty))</td>
<td>A Cloud for (-\infty) and for (+\infty) a web extended constituent</td>
<td>PNS ( \rightarrow ) Spaces, Anti-spaces, and Sub-spaces, in Monad [A ( \leftrightarrow ) B]</td>
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<tr>
<td>BLACK – NIGHT</td>
<td>Numbers ( \pm (1,2,3,N) )</td>
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<td>The different Homogeneous Coordinate Systems [A]-[R]</td>
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<td>EATHER</td>
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<td>Quanitized force ( \nabla = 2S^3 )</td>
<td>of Cave radius, ( r ), an d ( w ), vibrating on</td>
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<td>length ([</td>
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<td>DAY</td>
<td>Quaternion</td>
<td>Rest and Moving particles</td>
<td>Moving or Rest Particles and Anti-Particles</td>
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<td></td>
<td></td>
<td>, 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</td>
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### 9.1A 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, \( \rightarrow \text{Chaos} \)

2. Since Primary point \( A_0 \) is the only Space then on this exists the Principle of Virtual Displacements which principle denotes that work \( W = f^B_A P \cdot ds = 0 \) or \( [ds,(P_A + P_B) = 0] \), i.e. for any \( ds \) = vector \( > 0 \), Impulse \( P = (P_A + P_B) = 0 \) and \( [ds,(P_A + P_B) = 0] \).

Therefore, Each Unit \( AB = ds > 0 \), exists by this Inner Impulse \( P \) where \( P_A + P_B = 0 \rightarrow i.e. \)

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 \( \rightarrow [[(P_A) \leftrightarrow 0 \rightarrow (P_B)]] \).

\[
[( (+ P_A) \leftrightarrow 0 \leftrightarrow (P_B))] \text{ i.e. The discrete Energy monad } ds = AB \text{ as, } [ \text{Erebus} \rightarrow (\leftrightarrow) \text{ and } [ \text{Black-Night} \rightarrow (\cup)]
\]

All points may exist with \( P = 0 \rightarrow (\text{PNS}) \) 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 \( (\mathbf{P}) \) and from this equilibrium of the quantized angular momentum \( \Lambda \), independently of time, is capable of forming the wave nature of Spaces, following the Boolean logic and distorting momentum \( \mathbf{P} = \Lambda \), 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, \( w \), and momentum, \( \Lambda \), are constants and thus consist a Purequaternion, so conjugation of the two is as \( (\partial \partial \Lambda) \odot (0 \Lambda) = (\Lambda \cdot w \mathbf{X} \lambda = (\mathbf{R} \mathbf{P} \mathbf{V}_X \mathbf{X} \mathbf{X} \lambda = [\Lambda \cdot \Lambda \times \lambda] \) [13-15]. This is permitted because Space is quaternion and is composed of Stationary quantities, the position
Kinematic quantities are the tiny Energy volume caves (cycloid is the, Energy Spacequantum of velocity \( \vec{v} \), and \( \lambda \) consists in gravity's field the infinite Energy dipole Tanks in where energy is conserved) as volume \( V = 4\lambda^3/3\pi = 4(\vec{w}.\Lambda^3)/3\pi \rightarrow [\text{Erebus} \rightarrow \text{Black-Night}] \).}

\[ [A(P_0) \rightarrow 0 \rightarrow (P_1)B] + ((P_0) \cup 0 \cup (P_1))] \text{i.e. The equilibrium Dipoles and Cavess in Chaos}.

3. The work \( W \), of the two opposite dipole \( \Lambda B \), \( B \Lambda \) in the same plane is equal to \( W = n[P.Ds] = \left[ \Lambda = \Lambda \Lambda, \Lambda \times \Lambda \right] \) where,

\( \Lambda = \text{Displacement of Ato B} \), and it is a scalar magnitude called wavelength of the new dipole \( \Lambda B \).

4. The amount of Rotation on dipole \( \Lambda B \), (this is angular momentum \( I \), and it is a vector parallels to \( \alpha, \) axis).

\[ \text{Momentum} = m.r.v = m.r.w = m.r.\vec{w} \text{, where}, r, \text{is the radius and angular velocity} \vec{\omega} = (\text{spin}) \text{which maps velocity vector} \vec{v}, \text{on the perpendicular to} \alpha, \text{axis plane with the two components} \vec{v} \perp \vec{B} \text{. Tangential velocity} \vec{\omega} = \vec{r}.r = \frac{2\pi}{s} + \vec{v} \vec{w} \vec{r} \text{where} \vec{s} = \vec{r}.\vec{w} \vec{r} \text{and} \vec{v}.\vec{w} = \vec{w} \vec{r} \text{is a quaternion} \vec{E} \text{where} \vec{w} \vec{r} \text{the two opposite biaxial ellipsoid equilibrium and it is the How conservation it happens.} \rightarrow [\text{Erebus}].

5. Momentum \( \vec{p} = \lambda \) on the infinite dipole \( \Lambda B \) of spaces with a momentum lever equal to zero (0) or equal to wavelength \( \lambda \) create linear motion, \( \), while with a momentum lever \( \neq 0 \) creates the rotational motion (Euler, Coriolis, Centrifugal) \( m.[(d^2d/\omega^2r)] + m.[(d^2d/tr)x + 2v0x/d^2r] + 6x/wx) \] where momentum \( \vec{p} = m.\vec{r} \) and mass \( m \), is a constant equal to, the Reaction to this motions which are inertia \( 1 \) which are a natural property of dipole and both are conceived vice versa.

6. Forces \( dP = P_x + P_y \) parallel to the Space Anti-Spacelines \( S \), \( \lambda \\Lambda \), create a Static force field \( E \), and when Forces \( dP \) are perpendicular to the Space Anti-Space lines, create a Static 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 \( \Lambda \), and momentum \( \lambda \), their product \( \Lambda \Lambda = k1,2,3 \) constant for each energy cave level.

The fundamental force in universe is the total kinetic energy \( T = 1/2 \vec{w}L = \Sigma (L^2/2,1) \), 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 \( \vec{w} \), 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 is the diagonal of the cuboids and it is the How this conservation happens \( \rightarrow [\text{Black-Night} + Day] \).

5. Geometrical caves in 8.4. has been shown that 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 \( \pi \) (Archimedes number \( \pi \)) so quantization of Points \( \lambda \) follows geometry constant \( \pi \) and for Energy \( Wd \), which is the quantized Energy of the Quantity dissipated per cycle, \( \text{and this because monads follow sinusoidal oscillation on wavelength} = \text{monads as the} \ w \text{.th power and the} \ n \text{.th root of this monad where} \ n = 1 \).

\[
\begin{align*}
\text{By extending} \ Lv & = e^{i(\frac{2\pi + 2\pi}{l})} \text{then caves are produced as,} \ \text{Planck’s Length} \ \Lambda P = e^{i(\frac{2\pi + 2\pi}{l})} | h = e^{-i(\frac{2\pi}{l})} | h = 8,906,10^{-35} m = \{ \sqrt{3.\pi} 1.616199.10^{-35} m \}, \text{the known Planck’s constant from E-geometry produced .}
\end{align*}
\]

6. Conservative Planck’s constant \( L - \text{Planck} = 1,616.10^{-35} m = \sqrt{h.G}^3 \) is consisted of the three compromising known constants \( h, G, c \), instead of that of geometry cave which is \( Lp = e^{i(-\frac{2\pi}{l})} \), \( l = 287,539,98 \), \( 10^{-35} = m \), and is based on the two natural constants \( e, \pi \). \( \rightarrow [\text{Black-Night + Born}] \).

7. The action on 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 \( d^2/dt^2 \vec{r} = 2\omega^2x/d^2r + 2v0x/d^2r \) where angular velocity \( \vec{w} = \vec{r}/| \vec{r} | = k/\vec{r} \) 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 spaces of 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. \( \rightarrow [\text{Born + Aether}] \).

8. In Black hole Energy scale \( \lambda \Lambda = 1 \) 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 \( [39-40-41] \). \( \rightarrow [\text{Born + Aether + Day}] \).

9. The force between two charges \( (\pm q) = (\pm q) \) of distance \( s \), create an Electric field \( (\pm E) \) 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, \( E = k.(2q^2/s^3) \). For non-uniform fields the force on the two equal but opposite point charges do not cancel field.
The dipole will rotate to align with the field, hence there must be a torque (\( \tau = r \times \vec{E} \)) on the dipole as well. 

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 into angular momentum \( L = \vec{r} \times \vec{v} = r \ell \), 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 \( (\vec{v}) \) 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\( A B \).

In a spherical cave the Biaxial Ellipsoid \((\alpha x = \alpha y)\) exists as momentum \( + \Lambda \) on caves of diameter \( 2r \) with parallel circles \( \rightarrow 0 \). The Biaxial Anti-ellipsoid \((-\alpha x = -\alpha y)\) exists as equal and opposite momentum \(-\Lambda\) 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 quaternions and since this is as, Action of quaternions, \( \rightarrow \{\text{Born + Day}\} \).

Opposite \( (\vec{v} \rightarrow -\vec{v}) \) are \( (s + \bar{\vec{v}}.\vec{v}) (s + \bar{\vec{v}}.\vec{v}) = s^2 + |\vec{v}|^2 \vec{v} = s^2 - 2|\vec{v}|^2 + 2s |\vec{v}| \vec{v} =\)

\[
\begin{align*}
\text{where,} & \\
+s^2 & \rightarrow s^2 = (w.r)^2 \text{is the real part of a new quaternion which is, the positive Scalar product, of Space from the same scalar product,} s.s, \text{with } \frac{1}{2}, 3, 2, \ldots, \text{spin, and represents the, Space, part of quaternion, the minimum Space - Quanta.}
\end{align*}
\]

\[ |s^2| \rightarrow -|\vec{v}|^2 = |\vec{w}|.\vec{v}|^2 = -(|\vec{w}||\vec{v}|)^2 = -(w.r)^2 \rightarrow \text{is the always, the negative Scalar product, of Anti-space from the dot product of, } \vec{w}, \vec{v} \text{ vectors, with } \frac{1}{2}, 3, 2, \ldots, \text{spin, and represents the, Velocity vector product, of quaternion giving}, 1, 3, 5, \text{ spin, the minimum Energy-Quanta. (this is the How Particles are originated). The Geometrical formulation is } \rightarrow \{\text{Born + Day}\} \{35\}
\]

\[
\begin{align*}
|\vec{v}| & \rightarrow 2|\vec{w}||\vec{v}| = 2|\vec{w}|.|\vec{v}| = 2(w.r) \rightarrow \text{is a vector of, the velocity Vector product, from the cross product of, } \vec{w}, \vec{v}, \text{ vectors with the common angular momentum term and represents the, Velocity vector product, of quaternion giving}, 1, 3, 5, \text{ spin, the minimum Energy-Quanta. (this is the How Particles are originated). The Geometrical formulation is } \rightarrow \{\text{Born + Day}\} \{35\}
\end{align*}
\]

\[
\text{Thrust } [\vec{E}, \vec{V}] \text{ acting on the five Energy and Space Fragments, } \rightarrow \{\vec{v}i, (+s^2), (-s^2), (+cs^2), (-cs^2)\} \text{ where } [(vi) \rightarrow (+s^2) \rightarrow (+s^2) \rightarrow (-s^2) \rightarrow (-s^2)] \text{ The dipole Gravity-field-energy and } [(vi) \rightarrow (+cs^2) - (-cs^2) \rightarrow (-s^2) \rightarrow (-s^2)] \text{ The dipole Gravity-Dark-matter-energy carry them in the three dimensional parallel space, with the light velocity, } c, \text{ as the Rest Gravity-field-Energy, and the rollingMoveableHeap on it, the Dark – matter – energy. This is the Expanding universe without Big-Bang. } \rightarrow \{\text{Ether + Day}\} \{35\}
\]

9.2. TheStPL Mechanism Fig:9.10, \{35-36\}.

1. \{STPL\} is a Geometrical Mechanism that produces and composite, by quantization, all opposite space Points from Spaces \((A-C)\), 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 \(A, B, C\) or \(A\), \(B\), \(C\) or \(A-B-C\), \(A-C-B\), \(ABC\) or \(ABC\), \(BCA\) or \(BCA\) of Anti-Space, communicate with the corresponding \(A_E, B_E, C_E\) and \(A_E, B_E, C_E, B_E, C_E\), of Anti-Space, separately orthogonal with bands of three lines at points within 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 \((\text{quaternion})\), \(s, \bar{s}, \vec{v}\), \(s, or \bar{s}, or \vec{v}\), all or parts off, somewhere exists at points \(A, B, C\), or any segments \(A-B-C\) of \(ABC\) or \(ABC\), \(BCA\) or \(BCA\) of STPL line or lines is the Geometrical expression of the Action of External triangle \(K_A K_B K_C\), the tangents as extremas are the Sub-Space, on the two extremities \(A-B-C\) and \(A_E, B_E, C_E\) of the 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 \(\text{a surface of a cylinder with } 2r \text{ diameter} \), 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 \( \vec{w} \). The inversely directionally rotated Energy \( \pm \vec{A} \) 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\(_B\)B\(_C\)C\(_B\)\), 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, \( \pm \vec{A} \), Absolute System [S] \( \rightarrow \)], as Angular momentum \( \vec{A} = \Omega = m.v.r \) is Crushed out into Fragments and, becoming the three Breakages \( [ s^2 = (wr)^2], [\pm s^2 = \pm (wr)^2], [\vec{v} i = 2(wr)^2], and after clashed with the velocity vector \( \vec{v} \) of [S], (unless succeed to escape un-clashed through center O in STPL line and this because \( \vec{v} = 0 \)), are Thrown OFF this System [S], conveyed into the Linear momentum, the Inertial and Energy-Space, the Relative [STPL] System [ R] as ParticlesÆFemions \( \rightarrow [\pm \vec{s}^2] \) and Bosons \( \rightarrow [\vec{v}, \vec{v} i] \).[27] [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, \( \vec{c} \), 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 \( \varepsilon = d\lambda = m.\sigma.\tau \) as pressure \( \sigma.\tau \) and principle pressure is converted as velocity \( \nu \), in caves and as an 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.

( The Displacement current in monads),[40] \( \rightarrow \) [Aether ] , ( \( [\pm ] \) )

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

Dark matter \( [\pm \vec{c}, \vec{s}] \) and the Dark energy \( [\vec{E}, \vec{v} i] \), or from \( \rightarrow \) Breakages \( [\pm s^2 = \pm (w^2)^2] \) and \( [\vec{v} i = 2(wr)^2] \) then become moving particles,

1. \( [\pm \vec{v}, \vec{s}] \) — Fermions and \( [\vec{v} i, \vec{s}] \) — Bosons

2. \( [\pm s^2] \) — [MFMF] Field, and into their dipole Field, \( [\vec{v} i] \) — Gravity force

3. \( [\pm \vec{c}, \vec{s}] \) — Dark matter, and into their dipole Field Gravity force, \( [\vec{c}, \vec{v} i] \) — Dark energy is Thus Th.

All particles are characterized by their quantized cave the minimum Space \( [V = \frac{4\lambda^3}{3n} = \frac{4(w^2r^2)^3}{3\pi}] \)

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, and

mass \( = \frac{m = (pr)w/c^2}{2\pi r^2} \), the external energy momentum \( [p = \frac{h}{2\pi r^2}] \) 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 \( s^2 = \pm [(w^2)^2] \) occupying the minimum quantized space \( [s^2] \) are deported and fill all [STPL] cylinder which is the Rest Quantized Field \( \pm [(w^2)^2] \) or it is the material point in mechanics as the base of all motions, where force \( [(w^2)^2] \) is vibrating on length 2, \( [(w^2)^2] = \lambda \) as a Stationary Wave, and creates the curl Electromagnetic Field (E.P), on which is the Universal Quantized force called Gravity.

The Gravity – Force is equal to \( \mathbb{F}_g = [q], [E+V\times P] \) and is exerted on any movable particle with charge \( q \). Gravity – Field

\( \mathbb{G}_F = [E+V\times P] \), is the un-movable, Rest forced welded spinning dipole,

\( \rightarrow [[(w^2)^2] \rightarrow [(w^2)^2]] = [\mathbb{A}(P_A) \rightarrow 0 \rightarrow (P_B)B]] \)
and because above is Rest then with three Unis becomes the un-movable Torsion ±Λ as ,

\[ |\Lambda| \equiv \text{Spin} \]

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

\[ |c(\vec{w}r)^2| \rightarrow (\vec{w}r)^2 \]

\[ c \left[ (\vec{w}r)^2 \right] \rightarrow c \left[ (\vec{w}r)^2 \right] \]

i.e. Gravity travelling at light speed = c|Λ|≡ c Spin and also because joined 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 λ = (1)-(2) or the minimum energy Space of the two material Units as above is as →{ [ Medium-Field Material Fragment ] → [ ± s² ] = ±|\vec{w}r|^2 = [MFMF] Field→ } the Electromagnetic Field [ |i±|] or the field →[|(+\vec{w}r)^2|→(−\vec{w}r)^2]|→[±|] ≤ [((1)(J=P1)→0→(J=P2)(2))] ← which is the Standing wave in cavity (1)-(2) , of the two scalar breakage ±|\vec{w}r|^2 as medium (1)-(2) field , and (J1) = 2|\vec{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 , ν, and during shifting is analyzed into two velocity vectors \( \vec{v}_1 \), \( \vec{v}_2 \), and which undergo vibrations causing two waves that represent the two , Electric E and Magnetic H , perpendicular components following the trajectory, in= (cf1), out=(2). Gravity · Force in Rolling Heap is equal to

\[ F_D = |\vec{q}|.E_0 + \vec{P}_D = |\vec{q}|.E + \vec{c}.P_D \].

It was referred that Thrust [ \( \vec{c}.\vec{v}_1 \) ] is acting on the five Energy-Space Fragments ||(\vec{v}_1),(+s²),(−s²),(+c²),(−c²)|| and the two Dipole-Couples,wherefor Couple [(\vec{v}_1)→(+s²)→(−s²)= is the dipole Gravity-field-energy],and for the Couple [(\vec{v}_1)→(+c²)→(−c²)=ls the Gravity dipole Dark-matter-energy], i.e.

**The same force for the two Couples.**

The two, opposite signed, Fragments s²=±|\( \vec{w}r \)|² consist under Gravity primary Dipole, [ |+s²|→|−s²| ] = |Λ| ≡[+(\vec{w}r)^2]−(−\vec{w}r)^2]Where on this, Force \[ (\vec{v}_1) = 2.s²=(2\vec{w}r)^2 \] as velocity \( \vec{v} \), the Thrust, causes the Gravity’s Electromagnetic Field (E, I, P) as \( [\vec{v}_1](+s²) \)

\[ [\vec{v}_1],(−s²),[\vec{v}_1] \cdot (±s²) = [\vec{v}_1],[+s²]→[−s²] ]

\[ [\vec{v}_1],[+s²]→[−s²],[40-41] \]

In Figure 6 [F-G] is shown the How Alternative Current is produced and how Gravity acts on any movable object with velocity \( \vec{v} \).

In F17. Electric Gravity-Field is E1+\( \vec{v} \)1.P and Magnetic Gravity- Field is E2+\( \vec{v} \)2.P and Gravity-Force their sum \( \rightarrow E + .P \)

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**Figure. 17** Fragments[(+|w|²)↔(−|w|²)]as Dipole are joined by Gravity Force that causes the Electromagnetic Gravity-Field→forced welded spinning dipole.

It was referred that Fragments s²±|\( \vec{w}r \)|² occupying the minimum quantized space |s²| are deported and fill all [STPL] cylinder which is the Rest Quantized Field ±|\( \vec{w}r \)|² or it is, the material point in mechanics, as the base of all motions where force \( |\vec{w}r|/\vec{v}_1 \) = 2.|\( \vec{w}r \)|² is vibrating on the rest length 2.|\( \vec{w}r \)|² = λ , as a Stationary Wave, and creates the **Curl - Electromagnetic Field** E ⊥ P, on which is the Universal Quantized force called Gravity, The Gravity · Force is equal to,

\[ F_g = q.E + \vec{v} \times P \]

and is exerted on any movable particle with charge q.

Gravity · Field is Gf = [E+\( \vec{v} \)P]= [E+\( \vec{v} \)xP] , the unmovable, forced welded spinning dipole, and because joined with force,means that Newton’s laws issue in both, Absolute System [S] , and Relative System [R]:

On cycloid, Thrust \( \rightarrow g = Force \_ F = velocity, where Velocity\( \vec{v} = |v/g|4r\),p=|v/g4r|, on |(1)-(2)| length .Acceleration\( \vec{a} = (d²s/dt²) = -
(g/4r)\), Trajectory acceleration \(\vec{a} = g\sin\varphi = [g/4r]s\) Centripetal acceleration \(\vec{a} = (\vec{v}_t)^2/\rho = [g/4r].\rho = [g/4r].AA\)

where point A' is on anti-cycloid. Ratio \(\rho \cos\varphi = \sqrt{4gr} = \text{constant}\) and velocity of center K of rolling circle is, \(\vec{v}_K = \vec{v}_t/\rho A = (1/2).\vec{v}_t\cos\varphi = \sqrt{4gr} \rightarrow \text{i.e.}

**The motion, the velocity** \(\vec{v}_K\), of the rolling circle center is linear.

Force \(2.\left[\vec{v}_t(\rho/2)^2\right]\) as velocity \(\vec{v}\) is acting at point (1) and since \(dF=0\) then is analyzed into the two equal velocity vectors

\[\vec{v}_x = \vec{v}_1 = (\bar{\vec{v}}_t)^2/2, \vec{v}_y = \vec{v}_2 = (\bar{\vec{v}}_t)^2/2\] as the cross-product \(= \vec{v}_1\times \vec{v}_2\). F-2

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

Energy as the horizontal constant velocity \(\vec{v}_1\) (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-trajecotry A' on Evolute, the Anti-Electric field \(-E\), both decomposed in a velocity \(\vec{v}_1\) perpendicular to the trajectory and thus executing zero work, and \(\vec{v}_1\) tangent 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

\[Y = [2A\sin kx].\cos wt, \quad Y = [2A\sin \left(\frac{2\pi}{\lambda}\right)x].\cos 2\pi f \] in volume is

\[\lambda = \frac{\pi}{k}\] and moment of motion is

\[m = (p.r).w/\sqrt{\lambda} = \text{the meter of reaction to the motion} \quad \text{and} \quad \rightarrow\]

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

\[m = (p.r).w/\sqrt{\lambda} = \frac{\hbar}{2\pi c^2} \quad \text{and} \quad \text{momentum} \Rightarrow \frac{\hbar}{2\pi c}\], where

\(w = \text{Particle's oscillation frequency which is that of inner common circle and it is constant,} \quad r, \text{the rolling circle's radius. All waves oscillate with energy} 2E = m\bar{v} = (pr).w, \text{which awareness translational motion} (pr) \text{at light,} c \text{and rotational at spin}(w) \text{motion in helical behavior. The Work Quantization process occurs as this compound helical motion and is conserved in <translational motion} (p.r) \text{and rotational motion at} \sin(w) > \text{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

\[A_{x,t} = A_o \cos(kx - wt + \varphi) \text{where} \Re = 2\pi/\lambda, \quad w = 2\pi T = 2\pi f, \quad \varphi = kx, \quad c = \lambda/\tau = \Lambda f = w/\kappa\]

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

\[S = [E \times H] = [E]x[H] \left\{S_o/\beta \right\} \cos^2(kx - wt)\]

Energy density with translational outer velocity \(v(t) = p/m = \bar{\lambda} /m\).

The Equal Phase, Stationary Wave equations are \(E = 2A \sin kx \cos wt = 2A \sin \left(\frac{2\pi}{\lambda}\right) \cos wt\) in volumes is

\[P = 2A \sin kx \cos wt = 2A \sin \left(\frac{2\pi}{\lambda}\right) \cos wt \quad \text{and} \quad \text{a.} \quad A = v_1 = v_2 = |v|/\sqrt{2}, \quad \pi, 3\pi/2, 2\pi, \quad \text{b.}\]

\[w = 2\pi f = 2\pi/T \text{with inner velocity} \quad v(t) = \lambda/T = \lambda f = w/2\pi, \quad \text{[41]}\]

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\[ P_d = \rho \cdot c \cdot w \cdot A_0 = \rho \cdot c \cdot w \cdot [\varepsilon E^2 + \mu H^2] / 2 \] and
\[ I_d = \frac{\rho \cdot c^3}{2 \lambda^4} \cdot [\varepsilon E^2 + \mu H^2] \]

This tiny Energy Volume for wave's case is the Cycloidal volume \( V = \frac{4}{3} \pi a^2 b^3 \) because \( a = \lambda, b = \lambda / \pi \). The Electromagnetic stationary field \( [E x H] \) where the Intensity Sc = \( \varepsilon E^2 / 2 + \mu H^2 / 2 \) and \( \varepsilon, \mu \) 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 \( J_d = \frac{\rho \cdot c^3}{2 \lambda^4} \cdot [\varepsilon E^2 + \mu H^2] \), tiny volume \( V \), where \( V = \frac{4}{3} (w^2 r^2)^3 \rightarrow \) then appearance is as Particle
- d., Energy \( J_d = \frac{\rho \cdot c^3}{2 \lambda^4} \cdot (wA_0)^2 \), in interference pattern → then appearance is as Wave
- e., The field Intensity estimation \( S = h \cdot f \) becomes,

\[ S = [E x H] = \frac{\varepsilon E^2}{2} \cdot \mu H^2 = \frac{4}{3} \pi \lambda (\frac{\lambda}{\pi})^2 \cdot h \cdot f \]
and so

\[ E = H = \frac{3h}{\pi c (\varepsilon + \mu)} \cdot \left( \frac{w^2}{2 \pi c} \right) \]

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 its \( (\pm c s^2) \) moves with the constant light velocity, c, and is composed of the two opposite signed elements, \( (+cs^2), (-cs^2) \), and Dark-energy \( [\varepsilon, \mu] \) moves also with the same velocity, c, so is continually effecting on the two fragments separately and on their dipole joined by the Gravity Thrust \( (\varepsilon, \mu) \) as \( (\pm cs^2) \) + \( (\pm cs^2) \) and it is the Gravity Dark-matter-energy and by sling 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 parallel universes, is the rolling on Gravity field as the Base of the expanding heap mixture.

The Continuous [The light Moved mixture DM-DE is Geometrically Rolling] Expansion of the Heap with light velocity is the How is, the constructing 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

\[ \text{DE} = [c.n] \text{on all Five Fragments with light velocity, } c, \text{ as } [\text{c.V}i] \rightarrow (i) \{+(s^2),(\pm s^2),(+c.s^2),(\pm s^2)\} \text{ which is the rolling Heap. Energy Quantities } \nabla i = 2(wr)^2 \text{ in the rolling Heap, acting on dipole breakages } [\pm s^2] \text{ formulate the Gravity-Field and Gravity-force while acting on dipole breakages } [\pm c.s^2] \text{ formulate Dark matter and Dark Energy respectively, while DE acting on Leptons and Quarks, Anti-Leptons and Anti-Quarks, Bosons, formulate Material worlds. This is the quantization effect of DE.} \]

Neutral → ⊘ = ⊘ = 2(wr)^2 ≠ ±, i.e. neutral to them, and it is Zero.

The three consistencies of Dark-matter (DM) are, \(-[+(c.s^2),(\pm c.s^2),(\pm c.s^2)]\) and Dark-energy → [DE] = \(-[c.n]i\):

Since [DM] = \((\pm c.s^2)\), is of opposite signed (±), then consists the Dipole, \([+(c.s^2),(\pm c.s^2)]\) = \(c[+(\text{wr}^2),(\pm \text{wr}^2)]\) = Gravity travelling at light speed = \(c[+(\text{wr}^2),(\pm \text{wr}^2)]\).

Dark matter is a more massive base than that of gravity, and this because of c, so for DM field issues, \([E_m + \overline{c.P_m}] = \[c.E_g + \overline{c.P_g}\] \), and as this is also a Stationary field then follows the equation, \(E_m = 2.Ac.sin(\frac{2\pi}{\lambda}).c\ cos\ \omega t\), where \(P_m \perp E_m\).

Gravity Thrust (i) acting on \((\pm s^2)\) dipole, \([\nabla i] \rightarrow (+s^2) \rightarrow (-s^2)\), creates the Rest Gravity – Field – Force, while Thrust (i) acting on \((\pm c.s^2)\) the dipole, \([\nabla i] \rightarrow (+c.s^2) \rightarrow (-c.s^2)\), then creates the Gravity Dark-matter-Energy-field.

Since also the tiny volume of \([\pm s^2] \rightarrow [\pm c.s^2]\) consists a sink, then DM attracts and it is an infinite ocean in all universe.

Since also dark Energy is effecting then, \(\text{DE} = q.[E_m + \overline{c.P_m}]\) align with the field, so on DM dipole \([E_m + \overline{c.P_m}]\) exist also a torque (τ) and in this way DE repels.

Dark-Energy is acting on all, In and Out the cylinder Breakages \((\nabla i)\) with velocity \(\nabla = \overline{\nabla}\) or and \(\overline{c}\) for Expanding, and carry them.
Figure .19. Dark Matter [A]→DM, Dark Energy, Force [B]→DF. And the three DM→c [|±s²|↔|s²|↔|s²|] = c.(Ω↔Ω),
i.e. Gravity travelling at light speed = c/Λ≡ c Spin

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→[±c.s²] and on [±c.s²]→[±c.s²] highlights, and on→[±c.s²]→[±c.s²] the Darkness which is the tiny energy volume consisting the dipole of dark matter, and formulates the massive Dark Fringes jointed by gravity force [±vi] 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.s²],[±c.s²] 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 [±vi] acting on the three constituents of DM = [(+c.s²) , (-c.s²) , (±c.s²) = [±s²|↔|s²|↔|s²|] 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 bends 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

1.. DM→[(+c.s²)↔|s²|↔|s²|] attracts but how and why, and DE → [±vi] =±vi 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→[±c.s²] and on [±c.s²]→[±c.s²] the Darkness which is the tiny energy volume consisting the dipole of dark matter, and formulates the massive Dark Fringes jointed by gravity force [±vi] and this because are not particles . [41]

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3. DE by exerting pull on DM → [\(\mathbb{E} \cdot (\pm c \cdot s^2)\)] and on [\(\mathbb{E} \cdot \mathbb{V} \cdot i\cdot (\pm c \cdot s^2)\)] highlights, and on → \(\mathbb{E} \cdot \mathbb{V} \cdot i\cdot (\pm c \cdot s^2)\) the Darkness which is the tiny energy volume consisting the dipole of dark matter, and formulates the massive Dark Fringes jointed by gravity force [\(\mathbb{V} \cdot \mathbb{I}\)] and this because are not Particles. [41]

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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 [\(\pm c \cdot s^2\)] formulates the massive compact spherical objects and themassive 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 again 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 MF MF field. Energy density of the Rest base MF MF is that of gravity, \(l_0\), while of the Moving DE, DM is that of \(c \cdot l_0\), 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 how the 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 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 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 (\(\mathbb{VI}\)) forming the Electromagnetic Gravity field which is the Rest base of all universe and which doesn’t exist a priori, 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 themaximum 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 and 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 DMs 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 \(v = \pm w \cdot r = 0\), 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 is 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 set of forces.>

In case of two material points the static procedure is, the Virtual work done by two forces is zero for adual, 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, whilst this Velocity \(v > c \rightarrow t = \infty\) 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:
The creation, Quantization, Processes

10. The creation, Quantization, Processes

10.1. The Geometrical, Quantization, of the New Creation Hypothesis 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, 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 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 Tangentson 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 Matterand 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, [43].

The principle of Virtual Work is the motion of a force, P, executed on a point A → P₃, to reach point B, so P₃ force acting on point A (which is Nothing) reaches point B (which is also Nothing) as P₃, 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, ω. 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 (ω→ω), incaves 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 anew 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=ω) 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 all their producing son where laws of Chemistry and Physics are applied.
Thrust \([E,vi]\) with light velocity, \(c\), acting on the five Energy and Space Fragments, i.e. \(\rightarrow [E,vi]0[(vi)],(s^2),(s^2),(-cs^2)\) and on Particles, Antiparticles and Bosons, where it is holding on the, energy cycloidal volumes, \(\{(vi)\rightarrow(s^2)\rightarrow(-s^2)\} = \) The Energy-dipole Gravity-field and on \(\{(vi)\rightarrow(s^2)\rightarrow(s^2)\} = \) The Energy-dipole Gravity-Dark-matter-field \}, and carry them in the three dimensional parallel space with the light velocity, \(c\), 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 \(\{\text{some-physics}\}\)[42-43]

[B] The, Chaos= Point, the It= Anti-point , the discrete \(\rightarrow\)Chaos\(\leftrightarrow\) It isand, What is done = The Energy quanta consistence in Monads , i.e. the Primary Dipole.

Explanatory – Interpretation :

1. CHAOS is that , extremely Big and small magnitude with infinite or infinitesimal directions, and simultaneously to nothing and without Position, \(\text{the Non-existence. This exists only in Euclidean geometry, on Points only, and is the only model for Universe.} \)

2. POSITIVE INFINITE\(+\infty\): It is the experienced Space of the Universe with any Expanding Position (Direction \(\rightarrow\) )and Unlimited dimension, with no Form of Matter inside Chaos.

3. NEGATIVE INFINITE\(-\infty\): It is the experienced Space of the Universe with any Shrinking Position (Direction \(\leftarrow\) ) 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 Anything or any Volume and in handled generality the Substance of Units (its a relative measure for the changes in motion).

6. BODY: It is each one, the Material Object.

7. SUBSTANCE: It is also the main Component of 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: It is Each what it can be Measured (the inner or the outer numerical value).

11. BEBORN: 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 factoring existing only in its confined-Planck'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, \(\text{The Standing Electromagnetic Field}\), units \(AB\).

14. CONVERSION: The Changes, Alters, the mechanism of Change 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 Object and reflected to us reality.

17. EXISTENCE: This which Exists in Universe and can be measured inside Chaos, \(\text{That which it is} = \text{The discrete.}\)

The composition of Existence is the joint of Opposites. Quanta of energy is the first material dipole of existence,i.e. \(\text{The Finite exists because of the opposite Infinite, and this is the Potential of dipoles in tiny volumes.}\)

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 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 Space and also in Time, all changes. Stability of the infinite opposite directional forces presupposes equilibrium of vortices. Points of a Space with the equal and opposite Momentums for equilibrium,i.e. The Opposite Momentum in the Rest = Curl-Energy volume.

[C] Continuous transformations with time-moments \(\rightarrow t-1, t-2, t-3, t-4 \rightarrow\) 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 territorially 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 ineffect the Principle of Equality, i.e.

Action–Reaction, and as generally imposed like $T-1$,

$$\Gamma_\text{correlation} = \text{virtual work principle which issues between Primary Point and Anti-point and Physical laws on monads (discrete space → The Non-existence becomes existence by Becoming).}$$

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

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

$$R(a) = \text{The Place (Position) of the System (a), i.e. the Distance, from a reference point } 0.$$  
$$U(a) = \text{The Total Impetus of System (a).}$$

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

$$L = L_a + L_b = R(a).P(a) + R(b).P(b)$$

$$= R(a).[m(a)γ(a)] + R(b).[m(b).γ(b)] = R(a).F(ab) + R(b).F(ba) = 0 \text{ or } → R(a), F(ab) → R(b), F(ba).$$

$$= R(ab), F(ab) = 0$$

because *equilibrium*, and since $F(ab) = m(a)γ(a), F(ba) = m(b)γ(b)$ hence is $R(a).[m(a)γ(a)] + R(b).[m(b)γ(b)] = 0$

and is in effect $→ R(a).U(a) + R(b).U(b) = \text{Constant} \Leftrightarrow$.

**Work → as Impetus, Momentum and Energy ← produced in all Systems**, is Conserved (Quantized) as $T-2$.
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

\[
\text{Work} = \text{Fab. } \delta \mathbf{r}_a = m_a (dU_a/dt) \cdot dr = \frac{1}{2} d \{ m_a \cdot U_a \} + \text{Fba. } \delta \mathbf{r}_b = \frac{1}{2} d \{ m_b \cdot U_b \} \]

therefore

\[
\text{Dynamic Energy change} \delta \mathbf{V} = \text{Fab. } \delta \mathbf{r}_a - \text{Fba. } \delta \mathbf{r}_b = \frac{1}{2} d \{ m_a \cdot U_a \} \]

\[
\text{and } \delta \mathbf{V} = \frac{1}{2} d \{ m_b \cdot U_b \}, \text{therefore } \delta \mathbf{V} = 0 \text{ or, } \mathbf{V} + \mathbf{T} = \text{Constant.}
\]

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, \(Q_n = \partial W/\partial (\delta q_n)\), \((\delta q_n) = v_n \cdot \delta t = \left[ \nu_c \cdot (\partial T/\delta t) + \omega \cdot r_n \right] \cdot \delta t = \text{Translational + Rotational velocity}\), \(\delta t\) as velocity and \(Q_n = \left[ \nu_c \cdot (\partial T/\delta t) + \omega \cdot r_n \right] \cdot (\partial T/\delta t) \rightarrow \text{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\((t)\), and the kinematic quantities, velocity \(\nu = dr/dt\) and acceleration, \(\ddot{\alpha} = d\nu/dt = d^2 r/dt^2\). Kinematic quantities maybe also the tiny Energy Volume Caves (\(\text{cycloid is the } \lambda, \text{Space of velocity } \nu, \text{and } \ddot{\alpha} \text{consist in gravity’s field the infinite Energy dipole Tanks in where energy is conserved }\)). 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 , →

<table>
<thead>
<tr>
<th>Territorial Reflection</th>
<th>Changes a System to its Idol</th>
<th>Symmetry of System – Idol ra = –ra</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time Reflection</td>
<td>Inversion of Flow – Time is equal to the alternation of past with Future, or, does not exist also Objective Flow-Time</td>
<td></td>
</tr>
<tr>
<td>T-4</td>
<td>In Time (t) of the System and in time (-t) of the Idol is in effect Symmetry (t = -t), concerning any axis</td>
<td></td>
</tr>
</tbody>
</table>

IsotropiaofSprings= equal to The Dynamic Energy of System which obeys → The Total Energy laws , then Empty Time is Independent of Time of Conservation because of, master - meters, as this in table T4.

The Principle of Relativity Excess Homogeneity and the Isotropic of Empty - Space and Time, and also that the Laws of Mechanics remain Inalterable and axion, The Constancy of the light-speed for Transformations without any proof. 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 Idle, or holding r a = - r a) 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). 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-S.)

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, whereby 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 concurrency 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 concurrency 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. (r a = - r a)

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-Euclidean 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 Spacemeter ^V/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.

The Plane Procedure method is consisted of two equal and perpendicular vectors \( CA \), \( CP \), \textit{the Mechanism}, where \( CA \) = \( CP \) and \( CA \perp CP \), such that \textit{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 →

\[ \text{is Converting the Rectilinear motion on the Mechanism, to Four - Polar Expanding motion.} \]

The Plane Procedure method is consisted of two equal and perpendicular vectors \( CA \), \( CP \), \textit{the Mechanism}, where \( CA \) = \( CP \) and \( CA \perp CP \), such that \textit{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 →

\[ \text{is Converting the Rectilinear motion on the Mechanism, to Four - Polar Expanding motion.} \]

The formulated Five Conjugate circles \([F21-1, F22-4]\) with diameters → \( CA = OB, CP = OB', EBe = OB, P'Pe = OB' \), \( PoP1 = PoP2 = CA \) 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

\[ \text{A System of infinite Changable Squares from theInscribed CBAO to any otherin Squareand to that equal to the circle \( \rightarrow CMNH \) and, to the Circumscribed \( \rightarrow CAC \ P \),through the Four - Poles of rotation.} \]

The Geometrical construction: \( F21-2 \) – \( F22 \)

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 \( OC'B' \). 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 \((O, OA), (P', PP')\) 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 \(lb\).

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

\[
CM^2 = CH^2 = \pi . EA^2 = \pi . EO^2
\]

**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 Euclidean logic when transferred 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,Z, 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 diameterCA through Plane Procedure.

Mechanism Inscribed Square CBAO → Circle-SquareCMNH → Circumscribed SquareCAC'P.


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 they are equal (conjugate) and since they are Perpendicular so, No work is executed for any motion ⬔.

In (3) Points A, C, P and O are the constant Poles of Rotation, and OB, OB', OC, CA, 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, PA, PA, 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 \(G, G_1\) and \(G', G'_1\) consist a Fix and Constant system of lines \(GG_1\) and \(G'G'_1\).

When Points \(Z, Z'\) coincide with the Fix points \(B, B'\) and thus forming the inscribed Square CBAO or CZAO , \(\text{(this is because point Z is at pointA)}\).

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 diamusus 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 ≡ Z formulates CBAO Inscribed square , at Edge point Be , Be ≡ 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 .

\[\text{F.23. → Markos theorem on any OB diameter .}\]

**Theorem** \(\{\text{F.22-}(5)\ Garnier}\) , F.23

On each diameter OE of a circle \((E, EB)\) we draw,

1. *the circumscribed circle* \((O, OA = OE/\sqrt{2})\) 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* \((B, BE = BBe)\) = \((E, EO)\) at the edge point B as center ,

Then the three circles pass through the common points \(G, G_1\) , and the symmetrical to OB point \(G_1\) 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 < 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 , *therefore side CH = CM* , and *Because CH = CM , the rectangle CMNH is Square*. The same for Square CM'N'H' . \((o.\varepsilon.\delta),(q.e.d)\) .

This is the General proof of the squares on this Mechanism without any assumptions .

From the equal triangles COH , CBM angle < CHO = CHM = 45° because lie on CO chord and so points H,O,M lie on line HM i.e.
Any segment \( PA \rightarrow PAz \rightarrow PAe \rightarrow PC = CA \), drawn from Pole \( P \), beginning from \( A \) to \( \infty \), intersecting the circumscribed \( (O, OA) \) circle, and the circle \( (P', P'P = P'C = EO = EC) \) at the points \( N, H \), Formulates Squares \( CBAO \), \( CMzNHz \), \( CAC'P \) respectively, which are, The Inscribed, In-between, Circumscribed Squares, of circle \( (O, OB) = (E, EO = EB) = (P, P'P) \).

Since angles \(< CAzP , \) HCP have their sides \( CA , CP = AzP, CH \) perpendicular each other, then are equal so angle \(< PAzC = PCH = OZZm \), and so point \( Az \), is common to circle \( O, OZ \), Pole-line \( CA \), and Pole-axis \( PN \), where \( ZZm \) the perpendicular to \( CM \).

Since PE is diameter on \((P1,P1P) \) circle, therefore triangle \( , E, Ig, P \), is right-angled and segment \( , Elg \), 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 \((P1,P1O) \) 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 \( \infty \), → Creates on the three circles \((O, OA) , (E, EO/\sqrt{2}) , (B, BE) \), the Changeable moving Squares

a). The Inscribed \( CBAO \), at \( Z \equiv Ge \)
b). The In-between \( CMzNHz \), 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 \( A, C, P \), of the Plane Procedure Mechanism, pass (rotate) the Sides and Diameters \( (O, S) \) of Squares, Anti, Changeable moving Squares.

In (3). Point \( Z \) moving from Edge points \( Ge \) and \( Be \), (forming inscribed square \( CBAO \)), in-between points \( Ge-Be \) (forming any square \( CMzNHz \)), at Extrema point \( Be \) (forming that square \( CMNH \) equal to the circle), and between points \( , Be \sim, \) (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 \( Ig, Ib, le \) and to \( \to P \) 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:

\[ BC^2 = BO^2 - OC^2 = (2, EB)^2 - (EB, \sqrt{2})^2 = 2EB^2 - (2EB, EB) = (2, BG) \cdot BG \]

and since \( 2BG = BG1 \) 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 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 diameus 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 \( (\frac{1}{2}) \) of the circumscribed radius then the circle \((E, EB / \sqrt{2} = OA/2) \) passes through point \( G \). Because \( BC \) is perpendicular to the radius \( OC \) of the circumscribed circle, so \( BC \) is tangent and equal to \( BC^2 = 2 \cdot EB^2 \). (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 \( CHNM \) rightangled is completed as Circle without any more assumptions.

Following again prior A-B common proof,

Angle \(< CHP = 90^\circ \) because is inscribed on the diameter \( CP \) of the circle \((P', P'P)\).

The supplementary angle \(< CHN = 180^\circ - 90^\circ = 90^\circ \) because is inscribed on the diameter \( AP \) of the circle \((O, OA)\) and 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 \( 90 + 90 + 90 + 270 = 360^\circ \), and from the total of \( 360^\circ \), the 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 \(< CMA = HCP \).

The rightangled triangles \( CAM \), \( CPH \) are equal because have hypotenousa \( CA = CP \) and also angles \(< CMA = CHP = 90^\circ \), \(< MCA \perp HCP \) and side \( CH = CM \) therefore, rechangle \( CMNH \) is Square on \( CA, CP \) Mechanism, through the three constant Poles \( C, A, P \) of rotation. The same for square \( CMN'H' \). (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 . (ο.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 →
Area of Inscribed = \( \frac{1}{2} \pi OE^2 \)
Area of Circle = \( \pi OE^2 \)
Area of Circumscribed = \( 2 \pi OE^2 \)

and those of corresponding squares , then one square of the Plane Mechanismis 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 le P
↓ ↓ ↓ ↓
Square CBAO , CmiNiHi , CMNH , CAC`P

i.e. Square CMNH of case [3] is equal to the circle , and\( CM^2 = CH^2 = \pi . EA^2 = \pi . EO^2 \)

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 CM2N2Hz 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.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 le on circle with diameter PE, belongs to the Inscribed circle ( E , Elg = EG) while Point H on (P`,P`O) , belongs to the Circle. ie.

It was found a Mechanism where the Linearly Expanding Squares → CBAO – CMNH – CAC`P , and circles → (P1,P1E) – (B, BE) – (O,OA) ,which are between the Inscribed and Circumscribed ones , are Polar– 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 \( \pi = 3.1416048 \) → 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 → CA⊥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 $CM^2 = \pi CE^2$, and System with number $\pi$ 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 CMzHz 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 E.Ig, 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 → ∞ 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 $w = a + b. i$ = discrete and continuous), and which is the Dual Nature of Segments = monads in Plane, to be discrete and continuous). Their monad-meter 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 lengths = CA= OB, the diameter of the circle (E, EA) with CBAO Square, on the Expanding by Transportation and Rotation Mechanism which is → (Circumscribed circle (O,OA) – Inscribed circle (E, EG = E.Ig) – Circle (B, BE)) ← in extended moving System → (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 Extremal 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


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 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 ⊥ KoB and the circle (O, BZ) of diameter BZ. Line-segment ZKo produced to KoAo = KoB (or and KoXo ≠ KoB) is forming the Isosceles right-angled triangle AoKo.

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 diamensu BD and triangle BCD.

Show that this is an Extrema Mechanism on where, The Three dimensional Space KoA, is Quantized to KoD as → KoD³ = 2·KoA³.

Analysis : F-24

In (1) KoZ = 2·KoB and KoAo = KoB, KoB ⊥ 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 < ZCoO = 90▫, then segment OCo // BKo and BKo = 2·OCo.

Since radius OB of circle (O, OB = OZ) is ½ of radius OZ of circle (B, BZ = 2·BO) then, D, is Extrema case where circle (O, OZ) is the 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), F.24-(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 ½ chord KoB. Since angle < Z’DoApP 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 B AoDoCo in angle < PDoZ’ is expanded to Rectangle BADC in 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 DoAp 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 RectanglesBCoDoAo.

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 KoD³ = 2 times the monad KoA³. About Poles in [5].

Proof : F.24. (3)-(4).
1. Since KoZ = 2·KoB then (KoZ / KoB) = 2, and since angle < ZKoB = 90▫ then BZ is the diameter of circle (O, OZ) and angle < ZKoB = 90▫ on diameter ZB
2. Since angle < ZKoA = 180▫ and angle < ZKoB = 90▫ therefore angle < BKoA = 90▫ 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 $<ZDP = 90^\circ$ (because exists on diameter $ZP$) and since also 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 $BD, BD$ diameter, therefore point $D$ is common to $BD$ 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,

$$\Delta ADZ \rightarrow KD^2 = KA \cdot KZ \quad \text{(a)}$$
$$\Delta ADB \rightarrow KA^2 = KD \cdot KB \quad \text{(b)}$$

and by division (a) / (b) then →

$$KD^2 = KA \cdot KZ \hspace{1cm} KD^3 = KA^3 \hspace{1cm} KA^2 = KD \cdot KB$$

(1), (2) \hspace{1cm} $KoD^3 = 2 \cdot KoA^3$, 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 $KD^3 = 2 \cdot KoA^3$. This is one of the basic Geometrical Euclidean Geometry Moulds, which create the METERS of monads → where Linear is the Segment $MA1$, Plane is the square $CMNH$ equal to the circle in Space, is volume $K^4$ in all Spaces, Anti-spaces and Sub-spaces of monads = Segments $\leftrightarrow$ 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 $→ (KoX)^2 = (KoA)^2(XX1/AD)$ such that $XX1 \parallel AD$, as in Fig.26–(4).

All comments are left to the readers, 30/8/2015.

(1) (2) (3)

F.25. $→$ For any point $A$ on, and $P$ Out-On-In circle $[O, OA]$ and $O'P = O'O$, exists $O'M = OA/2$.


Quantization of E-geometry is the Way of Points to become as $→$ (Segments, Anti-segments = Monads = Anti-monds), (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 → 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 circleand , for Spaceis the mould of the Duplication of cube . All methods in, F - 26 .

Monad $ds = EA$
Quantized Monad $ds = MA1 = M`B1$
$dq = EC = - EA$

$ds = KA , Volume = KA ^ 3$
$dq = KD ^ 3 = 2 . KA ^ 3$

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 $dq = EC = ± EA$
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 $ds = ± AB$ , 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 ⊥ 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 $\pi = constant$ , or as $CM^2 = \pi . CE^2$ .

On monad $ds = EA = EC$ , the Area = $\pi . EC^2$ and the quantized Anti-monad $dq = CM^2 = ± \pi . EC^2$. F25-(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` ).

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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 $KD^3 = 2KA^3$.

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 $\rightarrow$ The Anti-cube of a segment $K'D'$ is the double the Anti-volume of $KA$ 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 analogus 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 $MA_1$, 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 $ds = AB = \text{monad} = \text{constant}$, the
3. **METER** of Plane is that of circle on Segment $= \text{monad}$, which is the Square equal to the area of the circle, the
4. **METER** of Volume is that of Cube on any Segment $= \text{monad}$, 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.

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 system $[x, y, z, k, \ldots]$.

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 $= \text{the cube}$ $KA^3$, The Anti-space $= \text{the Anti-cube}KD^3$}.

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 $= \text{Volume of } KA$, Anti-space $= \text{Anti-Volume of } KD$, and this as applied to Dark -matter, Energy in Physics} . [43]
Radiation of Energy is enclosed in a cavity of the tiny energy volume $\lambda$, (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) → 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 KoAlKoX, OKo = OA = OX and since $XX1 // AD$, 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 KoAlKoX because triangle AKoX is rightangled triangle and KoZ⊥AX. Radius OKo = OA = OX.

Since $D,A, X,1$ are also perpendicular to AX, therefore $KoZ // X1 X//DA$. According to Thales theorem ratio $(ZA/ZX) = (KoD/KoX)$ 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.d).

i.e. in Euclid’s Plane mould $[KoAlKoX]$,

**The Plane Ratio square of Segments** $→ KoA, KoX \cdot \text{ is constant and Linear, and for any Segment KoX on circle (O,OKo) exists KoA such that }$

$→ KoA^2 / KoX^2 = AD / XX1 = KoD / KoX1 \rightarrow \text{ i.e. the Square Analogy of the sides in any rectangle triangle AKoX is linear to Extrema Semi-segments AD, XX1 or to KoD, KoX1.}$

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 $[KoA]^3 / [KoD]^3 = [KoX / KoX1]^3 = ½$.

i.e. in Euclid’s Plane mould $[KoA // KoX, KoD // KoX1]$, Volume Ratio of volume Segments $→$ $KoA, KoD \cdot \text{ is constant and Linear, and for any Segment KoX exists KoA such that }$ $→$ $KoA^3 / KoX^3 = 2 \rightarrow$

i.e. the Duplication of the cube.

In F27. 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 $x,y,z-1$, $i,j,k$), 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 Fields 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 Transcendental 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. → (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, νεύζις, is a part of Extrema method. This method
The proposed Contemporary Trisection method.

We extend Archimedes method as follows:

a. F29.(2). Given an angle $\angle AOB = AOC = 90^\circ$:
   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 // 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.
   5. Draw CD perpendicular to AD and complete rectangle A1OCD.
   6. Draw AoE Parallel to A1C at point E (or sliding E on OC).
   7. Draw AoE1 parallel to OB and complete rectangle A0E1E.
   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 $OC = OA \cdot \sqrt{3}$ and $OE = OA \cdot \sqrt{3}$, from vertices O, and also A'C // A'O.

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 = OA) 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 = OA) 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 = OA) 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 G G1 = OA.

Proof:

a). F29.(1 - 2)

Let OA be one-dimensional Unit perpendicular to OB such that angle $\angle AOB = AOC = 90^\circ$.
Draw the equal circles \((O, OA)\), \((A, AO)\) and let points \(A_1, A_2\) be the points of intersection. Produce \(AA_1\) to \(C\).

Since triangle \(AOA_1\) has all sides equal to \(OA\) \((AA_1 = AO = OA_1\) then it is an equilateral triangle and angle \(< A_1AO = 60^\circ\)

Since \(\angle C AO = 60^\circ\) and \(AC = 2\), \(OA\) then triangle \(ACO\) is right-angled and \(\angle AOC = 90^\circ\), and so the angle \(\angle ACO = 30^\circ\).

Complete rectangle \(AOCD\), and angle \(< D CO = 180^\circ - 90^\circ - 60^\circ = 30^\circ\) \(= ACO = 90^\circ / 3 = 30^\circ\)

From Pythagoras theorem \(AC^2 = AO^2 + OC^2\) or \(OC^2 = 4OA^2 - OA^2 = 3OA^2\) and \(OC = OA \cdot \sqrt{3}\).

For \(OA = OA_0\) then \(A_0E = 2OA_0\) and \(OE = OA_0 \cdot \sqrt{3}\).

Since \(OC / OE = OA / OA_0 \rightarrow\) then line \(CA_1\) is parallel to \(EA_0\).

b) \(\ldots\) F.29. (3-4)

Triangle \(OAA_1\) is isosceles, therefore angle \(< A_1AO = 60^\circ\). Since \(A_1D 1 = A_1O\), triangle \(D_1A_1O\) is isosceles and since angle \(< OA_1A = 60^\circ\), therefore angle \(< OD_1A = 30^\circ\) or \(< A_1D_1 = 30^\circ\). Since \(A_1A = A_1D_1\) and angle \(< A_1AO = 60^\circ\) then triangle \(AOD_1\) is also right-angle triangle and angles \(< D_1OA = 90^\circ\), \(< OD_1A = 30^\circ\).

Since the circle of diameter \(D_1A\) passes through point \(O\) and also through the foot of the perpendicular from point \(D_1\) to \(AD\), and since also \(ODA = ODA_1 = 30^\circ\), then this foot point coincides with point \(D\), therefore the locus of point \(C\) is the perpendicular \(CD_1\) on \(OC\). For \(A_1D_1\) then \(D_1\) is on the perpendicular \(D_1E\) on \(OC\).

Since the Parallel from point \(A_1\) to \(OA\) passes through the middle of \(OD_1\), and in case where \(AOB = AOC = 90^\circ\) through the middle of \(AD\), then the circle with diameter \(D_1A\) 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 \(CD\), \(EE_1\) on \(OB\).**

c) \(\ldots\) F.29.(3-4)

Since \(A1A = A1D1\) and angle \(< A1AO = 60^\circ\) then triangle \(AOD1\) is a right-angle triangle and \(\angle AOD1 = 90^\circ\).

Since angle \(< A1-D1-O\) is always equal to \(30^\circ\) and angle \(< D1-O-A\) is always equal to \(90^\circ\), therefore angle \(< AOB\) is created by the rotation of the right-angled triangle \(A-O-D1\) through vertex \(O\).

Since tangent through \(A_0\) to circle \((O, OA')\) lies on the circle of half radius \(OA\) then this is perpendicular to \(OA\) and equal to \(A'A\).

\[\text{F.30.} \rightarrow \text{The three cases of the Sliding segment } \text{OA} = \text{F1F2} = \text{E1E2} \text{ between a line OB and a circle (O,OA)}\]

between the Extrema, Maxima edge cases \(F1F, E1E\) or \(F, E\) points On \(AF, AE\) lines exists:

\[
\begin{align*}
FF1 & > OA, \\
GG1 & = OA, A1E = OAo, EE1 < OA \\
F2F1 & = OA, A1E = OAo, EA1 = OA, E1E2 = OA
\end{align*}
\]

d) \(\ldots\) 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 \(E_1, G_1, F_1\) 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 \(< AOB = 90^\circ \rightarrow A1C = A1A = OA, A1Ao = A1E = OAo\) and for angle \(< AOB = 0^\circ \rightarrow OF = 2\ OA\)). 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 PointG1 of G1G is stretched on circle (O, OA) then G1G ≠ 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 ≠ 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 EAo, this is for all angles equal to 90◦, and from this position to the new position EA by rotating EAo to the new position EA having always the distance E1 E2 = OA.

This motion is taking place on a circle of center E1 and radius E1 E2.

2. From point F, where OF = 2. 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 F1 F2 = 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 E1 E2 = OA and exists E E1 < E2 E1. Length E1 E2 = OA is stretched, moves on EA so that point E2 is on EF. Circle (E, E E1 < E2 E1 = OA) cuts circle (E2, E2E1 = OA) at point P.

2. Point F1 is common of line AF and circle (O, OA) and point F2 is on line AF such that F1 F2 = OA and exists F F1 > F2 F1. Segment F1 F2 = OA is stretched, moves on FA so that point F2 is on FE. Circle (F, F F1 > F2 F1 = 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 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.

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 G1 G be stretched on GA, then also GP = OA.

4. In additional, for point G1:

a. Point G1, from point E1, moving on circle (E2, E2 E1 = OA) formulates AE1E such that E1E = G1G < OA, for G moving on line GA. There is a point on circle (E2, E2 E1 = OA) such that GG1 = OA.

b. Point G1, from point F1, moving on circle (F2, F2 F1 = OA) formulates AF1F such that F1F = GG1 > OA, for G moving on line GA. There is a point on circle (F2, F2 F1 = 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 $GG_1 = OA$ then circle $(G, GG_1 = OA)$ 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 $(E_2, E_2E_1 = OA), (F_2, F_2F_1 = OA)$, 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 3.1** → *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▫ = AOB/3▫.

In F.30- (2) Basic triangle AOD1 defines D1 point such that angle AD1O = 30▫ = AOB/3▫.

In F.30- (3) Basic triangle AOD1 defines E’ point such that angle AE’O = 30▫, and it is the Extrema Case for angles AOB = 0▫, B’OB = 180▫.

In F.30- (4) The two Edge cases (1), (3) issue for any angle AOB = θ▫.

In F.30- (5) The two circles corresponding to Edge cases (1), (3) issuing for any angle AOB = θ▫.

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 = θ▫.
**Figure 3.1** - The extrema Geometrical method of Trisection of any angle $\angle AOB$

Point $G$, of Extrema length $GG_1$, is Sliding on $PE$ line and Rotating through the Instantaneous 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 – constructions.

Initial position of triangle ZOD-E is, when angle < BOA = 90▫ and Segment Z1D-E = OA, and Final position of triangle ZOD-E is, when angle < BO = BOB = 0▫ and BOE = 180▫, and where Extrema position between edge-cases of triangle is when AOB = φ and GG1 = GP = F2F1 = E2E1.

F.31-A. → Presentation of the Trisection Method on Dr. Geo - Machine Macro – construction.

The steps of Trisection of any angle < AOB = 90▫ → 0▫ F.31-[1-6]

2. Draw OA ⊥ 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 → 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 < AOB = 3. AGB.

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
The external angle of triangle $\triangle GGO$ is $\angle AGO = G1OG = 2 \cdot AGO$.

The external angle of triangle $\triangle GOA$ is $\angle AOB = AGO + OAG = 3 \cdot AGO$.

Therefore $\angle AGB = \left( \frac{1}{3} \right) \cdot (AOB) \quad \ldots \quad (\alpha \varepsilon \delta.)$

**Analysis : Figure 30.**

Since $\angle D1OA$ is always equal to $90^\circ$ then angle $AOB$ is created by rotation of the right-angled triangle $\triangle AOD1$ through vertex $O$. The circle $(A, AO = A1O)$ and triangle $AOD1$ consists the geometrical Mechanism which creates the maxima at positions from $AOE$, to $AOE$ and to $BOF$, triangles, on $(O, OE = \sqrt{3} \cdot OA)$, $(O, OF = 2 \cdot OA)$ circles.

In (1) $\angle AOB = 90^\circ$, $AE = 2 \cdot OA = OF$, 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 $AOB = 90^\circ$.

In (2) Angle is, $0 < AOB < 90^\circ$, $AE = 2 \cdot OA$ and point $A1$ common to circles $(O, OA)$, $(A, AO)$ defines point $D1$ on $(O, OE = \sqrt{3} \cdot OA)$ circle such that $A1D1 = OA$ and on $(O, OF = 2 \cdot OA)$ circle at point $D1$.

In (3) $\angle AOB = 0$ or $B'OB = 180^\circ$, $AE = 2 \cdot OA = BB'$ and point $A1$ common to $(O, OA)$, $(A, AO)$ circles define point $E$ on $OAE$ line such that $E \equiv E'$, where then point $D \equiv F'$. This happens for the extrema angle $AOB = 0$ or $90^\circ$.

In (4-5) where angle is, $0 < AOB < 90^\circ$, 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 $90^\circ$, 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 $AOB$ 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 $(G, G1G)$ 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 Euclidean 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 unifying element is the before refereed.

11.1. The First Definitions (D), of Terms in Geometry but the true unifying $D1$: 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: Amidpoint 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.

\[
\begin{array}{c}
| A & B \\
M & M' \\
\end{array}
\]

\[F.32. \rightarrow \text{The three points (a Plane).}\]

In F.32, 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 MA1,

b. The locus of all these points is a straight line.

Construction:

This is done by the three Steps as in Figure 33 using Euclidean logic only for the Definitions, Common Notions and Postulates.

\[F.33. \rightarrow \text{The Parallel Method}\]

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 <MA1A = MA1C (CN1) and since the sum of the two angles <MA1A = MA1C = 180° (CN2, 6D) then angle <MA1A = MA1C = 90° (P4) so, MA1 is the minimum fixed distance h of point M to AC.

Step 2
Let $B_1$ be the midpoint of $CB$, (it is $B_1C+B_1B = CB$ because $B_1$ is on the straight line $CB$) and draw $B_1M' = h$ equal to $A_1M$ on the mid-perpendicular from point $B_1$ 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 $MA_1 \perp AC$ and also $MC' \perp CD$ then angle $< A_1MC' = A_1CC'$. (Cn 2,Cn3,E.I.15) Because $M'B_1 \perp CB$ and also $M'C \perp CD$ then angle $< B_1M'C' = B_1CC'$. (Cn2, Cn3, E.I.15)

b..The sum of angles $A_1CC' + B_1CC' = 180^\circ = A_1MC' + B_1M'C'$. (6.D), and since Point $C'$ lies on straight line $MM'$, therefore the sum of angles in shape $A_1B_1M'$ are $< MA_1B_1 + A_1B_1M' + [ B_1M' + M'MA_1 ] = 90^\circ + 90^\circ + 180^\circ = 360^\circ$ (Cn2), i.e. The sum of angles in a Quadrilateral is $360^\circ$ in Rectangle all equal to $90^\circ$. (m)

c.. The right-angled triangles $A_1B_1M'$, $B_1A_1A$ are equal because $A_1M = B_1M'$ and $A_1B_1$ common, therefore side $A_1M' = B_1M'$ and since their sum is $180^\circ$ as before (6D), so angle $< A_1MM' = B_1MM' = 90^\circ$. (Cn2).

d.. Since angle$< A_1MM' = A_1CC'$ and also angle$< B_1M'M = B_1CC'$ (P4), therefore the three quadrilaterals $A_1CC'M'$, $B_1CC'M'$, $A_1B_1M'M$ 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, $h = MA_1 = M'B_1 = CD / 2 = C'C$ (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 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, $h = C'C = MA_1 = M'B_1$ and also $C'C \perp AB, MA_1 \perp AB, M'B_1 \perp AB$. (o.e.d.) – (q.e.d)

e.. The right-angle triangles $A_1CM$, $MCC'$ are equal because side $MA_1= C'C$ and $MC$ common so angle $< A_1CM = C'MC$, and the Sum of angles $C'C + MCB_1 = A_1CM + MCB_1 = 180^\circ$.

11.4.1 The Succession of Proofs

1.. Draw the circle $(M, MA)$ be joined meeting line $AB$ in $C$ and let $A_1, B_1$ be the midpoint of $CA, CB$.

2.. On mid-perpendicular $B_1M'$ find point $M'$ such that $M'B_1 = MA_1$ 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 $MA_1 = M'B_1 = C'C = h$ , i.e. a constant distance $h$ from line $AB$ or, also The Sum of angles $C'C + MCB_1 = A_1CM + MCB_1 = 180^\circ$.

**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 $AB$ 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 $AB$ 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 ($\infty$) Planes. All for the extrema Geometry cases in [44-46].
11.4.2 Proved Succession

1. The mid-perpendicular of CD passes through points M, M'.

2. Angle $\angle A1MC' = A1 MM' = A1CC'$, Angle $\angle B1M'C' = B1M'M = B1CC'$ because their sides are perpendicular among them i.e. MA1$\perp$CA, MC$\perp$CC'.


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 $\angle A1MM' = B1M'M$ and since their sum is $180°$, therefore angle $\angle A1MM' = MM'B1 = M'B1A1 = B1A1M = 90°$.

5. Since angle $A1CC' = B1CC' = 90°$, 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 $\angle A1CM = C'MC$ and since the sum of angles $\angle A1CM + MCB1 = 180°$ then also $\angle C'MC + MCB1 = 180°$ 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 all 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, Aor B passes the only one line AB. Aline 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 $\angle$ 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.


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. → 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 $(m\cdot v$ Rotational, $m\cdot v Linear)$ per change in time. For a constant mass, force equals $\langle$ mass times acceleration $F = ma \rangle$, or $F = dp/dt = d(mv)/dt = m(dv/dt) = ma$,
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 ≠ B  The Principle of Inequality,

PA+ PB = 0  The Principle of Stability,

A⊂B  Principle of Infinite Superposition (extrema)

A⊂B = C/D  The Principle of Proportionality (analog)

And in Mechanics the one = monad is,

A→B = ∞  The Principle of Virtual Displacements

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 → as in geometry the same in Physics.

PBA = - PBA or PAB + PBA = 0, or as, The Infinite points in [PNS] form infinite Units, monads AiBi = dš, which equilibrium by the Primary Anti-Space by an Inner Impulse (P) at edges A, B where P |A+ P |B = 0, and ds = 0 → N → ∞ and where Monad AB is the ENTITY and Elements = Breakages |[A,B] – P A, PB| is the Law of monad AB, and also in E-geometry [37-40].

The {Space, Anti-Space equilibrium, ± Λ:, Absolute System [S]} is at Rest, as Angular momentum Λ: = Ω = mvr, and is Crushed out into Fragments, becoming the three Breakages |[s²=(wr)²]|, |[s²=-(wr)²]|, |[s²=0]|, and after clashed with the velocity vector v: of [S], (unless succeed escaping unclashed through centre O of [S] into[R]=|STPL| and this because 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 → [±v...±s] and Bosons → [v...v] with momentum, m, v, which behave as Mass and as Force, in Relative System [R].

The Unclashed through center, O, Fragments: s² = ± [(w:±r)²] occupying the minimum quantized space |s²| are deported and fill all [STPL] cylinder which is the Rest Quantized Field ± [(w:±r)²] or, The material point in mechanics, as the base of all motions and the force |[(w:±r)²]|=± |[(w:±r)²]|. Vibrating on |[(w:±r)²]| = λ as a Stationary Wave creates a curl Electromagnetic Field E→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 [STPL] Space by an Inner Impulse is the ENTITY and Element PA+ PB = 0  The Principle of Stability, ± |δs²|=|w²| on stationary Points, are developed the following General equations of Equilibrium: Position r:., Energy v:.,

Σ [ Pi + Hi ] . δr i = 0 or Σ [ Pi – mi.dwi / dt ] . δr i = 0

i=1   i=1    ....(1)

and in rectangular Cartesian coordinates

Σ { [ X i – mi. d²xi / dt² ] . δxi + Yi – mi. d²yi / dt² ] . δyi + Z i – mi. d²zi / dt² ] . δ2 i } = 0

**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.dv/dt| on stationary Points, are developed the following General equations of Equilibrium: Position r:., Energy v:.,
\[ i = 1 \]

**where:**

\[ i = 1, 2, \ldots, n \] : The material points

\[ x, y, z \] : The position in Cartesian coordinates (the degrees of freedom)

\[ m_i(m_1, m_2, m_i, \ldots, m_n) \] : The mass on every point \( i = 1, 2, 3, \ldots, n, \infty \)

\[ P_i(x_i, y_i, z_i) \] : The applied Resultant Forces.

\[ \delta \vec{r}_i(\delta x_i, \delta y_i, \delta z_i) \] : The Virtual displacement (the possible motion from point A to B),

\[ dv_i \iff \frac{dt}{dt} = \mathbf{v} \] : The time derivatives of velocities

\[ \frac{d^2\delta \vec{r}_i}{dt^2} \iff \text{acceleration} \]

\( n, j \) : An Integer label corresponding to a generalized coordinate.

\( \mathbf{H}_i \) : Inertia Forces (Newton's second law) equal to \( mr = \sum P_i \cdot \delta \vec{r}_i \)

For \( i = 1 \), rewrite equation (1) as \([ P_1 + \mathbf{H}_1 ] \cdot \delta \vec{r}_i = 0 \) or \( \mathbf{H}_1 \cdot \mathbf{dr}_i = 0 \rightarrow \mathbf{dr}_i \cdot (\mathbf{P}_1 + \mathbf{H}_1) = 0 \)

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 \( W = \int P_i ds = 0 \) or when \( ds = \text{distance AB} \), \( ds \cdot (P_A + P_B) = 0 \)

i.e. The two equations (2), (s) are the same and quantities \( \mathbf{d}f \equiv ds \), \( (P + H) \equiv (P_A + P_B) \), satisfy the two equations when one of them is zero, and so, equation (s) is holding in both [S], [R]


Since forces \( \mathbf{P} = -\mathbf{H} = 0 \rightarrow \mathbf{P} \rightarrow \infty \), in [PS]and

[PaS], are equal and opposite, then Resultant force \( \mathbf{A} \) is zero, and according to the three mathematical condition for Field Forces, issues,

a). The Curl of \( \mathbf{A} \) is \( \nabla \times \mathbf{A} = 0 \)

b). The net work through a closed trajectory, \( ds \),

\( \mathbf{A} \cdot ds = gc\mathbf{A}ds = 0 \)

c). Opposite forces \( \mathbf{A}P, \mathbf{AH} \) can be written

as the negative gradient of the same potential \( \mathbf{A}P = -\nabla U \).

so then \( n \)th Space and Anti-Space is a Conservative Force Field \( \mathbf{A}n(\mathbf{a}) \) corresponding to the \( n \)th Potential Energy function \( U_n(\mathbf{a}) \) or \( \mathbf{A}n(\mathbf{a}) = -\nabla U_n(\mathbf{a}) = -\nabla [\nabla \mathbf{U}_n] = \nabla^2 \mathbf{U}_n \), where

\( \mathbf{a} = x_0, y_0, z_0 \), the coordinates of Initial Space.

12.3. Principles and generalized forces in [PNS]

In Field Theory, the Position vector \( ds = AB \) of two points \( AB \) in a Standard coordinate System is related to the generalized coordinates by transformation equation \( f = i \cdot ds = d\mathbf{s}(\mathbf{q}_i, \mathbf{p}_i) \), where

\( \mathbf{q}_i = \text{The } i \text{, number of degrees of freedom } (x, y, z) \)

\( \mathbf{p}_i = \text{A set of variables or constant magnitudes (time, forces, momentum, etc)} \)

\( \mathbf{F}_A = (X_A, Y_A, Z_A) = \text{Generalized forces} \mathbf{F}_A \)

with the components \( \mathbf{X}_A, \mathbf{Y}_A, \mathbf{Z}_A \)

\( \mathbf{F}_B = (X_B, Y_B, Z_B) = \text{Generalized forces} \mathbf{F}_B \)

with the components \( \mathbf{X}_B, \mathbf{Y}_B, \mathbf{Z}_B \).
\[ \vec{r} = d\vec{s}(\vec{r}_1, \vec{r}_2, \ldots , \vec{r}_n) , \vec{r} i(\, \text{d}x_i, \text{d}y_i, \text{d}z_i) = \text{Incremental distance} \, \text{d}x, \text{d}y, \text{d}z \]

\[ m = \text{(mass)}, \text{A constant which is considered as the hypothetical Reaction to the Motion (Inertia)} \]

\[ i = n \]

\[ T = \frac{1}{2} \sum \text{m} \, r \cdot r, i \cdot r, i = \text{The Kinetic Energy for i = 1 ,, n points in a system} \]

12.4. Lagrange’s equation (2nd kind).

For any material System with \( n \) degrees of freedom the position vector \( \vec{r} \) in a Standard Coordinate System, is related to generalized coordinates by the transformation equation

\[ \vec{r} = \vec{r}(t, q, n) \]

and depends on \( \vec{q}n \). \( (x_i, y_i, z_i \ldots n = \text{number of degrees of freedom in the system}) \) coordinates at Time \( t \), and for \( n \) generalized velocities \( \vec{q} \rightarrow \vec{r} \rightarrow (t, q, n, \dot{q}, n) \)

The expression for the Virtual displacement \( \delta \vec{r} \) of the system for \( \text{Velocity depended constraints} \), \( \text{is the same form as a total differential} \)

\[ n = n \delta i = \Sigma [\, \angle r_i / \angle q_n ] \delta q_n = \nabla r, \delta \dot{q} = [\, \nabla r, \nabla x, \nabla f \, ] \]

where

\[ \vec{q}n \rightarrow n \text{ Independent generalized coordinates (are the number of degrees of freedom in the system or the spatial coordinates) and } Qn \text{ the Total Work done by the applied forces } \vec{P} \text{ on one of the Virtual displacement } \delta \vec{q}n \]

The Total Kinetic energy \( T \) for the system of Point particles is defined by,

\[ n \]

\[ T = \Sigma m \, i \, r \, i \, \dot{r} \, i, \quad T = (d/dt)(\, \nabla r / \nabla \dot{q}\, ) - (\nabla r / \nabla q\, ) \]

\[ i = 1 \quad t \]

\[ Qn, \text{ the generalized forces} \]

Action \( A = \int L \text{d}t \) where Lagrangian \( L = T - U \) and \( U = \text{The Total Potential energy of the system and work,} \)

\[ Qn= (d/dt)(\nabla r / \nabla \dot{q}\, : n)(\nabla r / \nabla q\, ) = (d/dt)(\nabla r x, \nabla x) \]

i.e. The dynamics of any system = Work = Total energy and is transferred as generalized force \( Qn \),

\[ Qn = \nabla r x, \text{ Translational kinetic energy} + \text{Rotational kinetic energy} \]

Applying the fundamental equations on two points of stationary [PNS], \( \delta \phi = [\, \lambda, \pm \Lambda \, ] \), \( \delta \phi = [\, \lambda, \Lambda, 0 \, ] \), \( \delta = \text{even or odd functions} \)

\[ \text{the points are incorporating the equilibrium vorticity } \pm \Lambda \text{ either as even or odd functions} \]

Since \( \delta \phi = [\, \lambda, \pm \Lambda, 0 \, ] \), then positive \( \delta \phi \), \( \lambda \) and \( 2\delta \phi \) are the conjugate quaternions and because \( 2\phi \) is a unit quaternion then Action on point is \( \rightarrow \Lambda = \text{New quaternion} \)

\[ Z = \delta \phi \Leftrightarrow \delta = \text{Choose a new quaternion.} \]

Since \( \delta \phi = [\, \lambda, \pm \Lambda, 0 \, ] \), \( \lambda, \pm \Lambda \) is the conjugate quaternion and because \( \delta \phi \) is a unit quaternion then Action on point is \( \rightarrow \Lambda = \text{New quaternion} \)

\[ Z = \delta \phi \Leftrightarrow \delta = \text{Choose a new quaternion.} \]

Since \( \delta \phi = [\, \lambda, \pm \Lambda, 0 \, ] \), \( \lambda, \pm \Lambda \) is the conjugate quaternion and because \( \delta \phi \) is a unit quaternion then Action on point is \( \rightarrow \Lambda = \text{New quaternion} \)

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Since \( \delta \phi = [\, \lambda, \pm \Lambda, 0 \, ] \), \( \lambda, \pm \Lambda \) is the conjugate quaternion and because \( \delta \phi \) is a unit quaternion then Action on point is \( \rightarrow \Lambda = \text{New quaternion} \)

\[ Z = \delta \phi \Leftrightarrow \delta = \text{Choose a new quaternion.} \]

Since \( \delta \phi = [\, \lambda, \pm \Lambda, 0 \, ] \), \( \lambda, \pm \Lambda \) is the conjugate quaternion and because \( \delta \phi \) is a unit quaternion then Action on point is \( \rightarrow \Lambda = \text{New quaternion} \)

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Since \( \delta \phi = [\, \lambda, \pm \Lambda, 0 \, ] \), \( \lambda, \pm \Lambda \) is the conjugate quaternion and because \( \delta \phi \) is a unit quaternion then Action on point is \( \rightarrow \Lambda = \text{New quaternion} \)

\[ Z = \delta \phi \Leftrightarrow \delta = \text{Choose a new quaternion.} \]
A Potentially Rotational kinetic energy \(mr^2w^2/2\)as this above.

The normalized quaternion is \(\frac{-|\Lambda|, r_{\Lambda} + \Lambda \bar{x}}{\sqrt{\Lambda^2 r^2 + \Lambda^2 \bar{x}^2}} = \left[-|\Lambda|, r_{\Lambda} + \Lambda \bar{x}\right] / (\Lambda \sqrt{2}) \) ..(5a)

1. The circular motion of all energy on E plane caused by its translational motion of speed \(v\)
2. the extra self rotation (from common circle) \(v_{\text{common}} = [1 - v^2/c^2]/f\), 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 \(\rightarrow Dc\):

\(Dc\) is a quantity appearing in Maxwell’s equations of Electromagnetism and is defined in terms of the rate of change of, \(\text{electric displacement fields}\) \(D\), in a dielectric medium and is defined as

\[D = \varepsilon \cdot E + P\text{ where ,}\]

\(\varepsilon = \text{The permittivity of the free space}\)

\(E = \text{The electric field intensity}\)

\(P = \text{The polarization of the medium}\).

By differentiating equation

\[
\frac{dD}{dt} = JD = \varepsilon \left(\frac{\partial E}{\partial t}\right) + \left(\frac{\partial P}{\partial z}\right)\text{ where ,}
\]

\[
\left(\frac{\partial E}{\partial t}\right) = \text{The Magnetic field} \rightarrow B \leftarrow
\]

\[
\left(\frac{\partial P}{\partial z}\right) = \text{The Electric field} \rightarrow E \leftarrow
\]

and in isotropic dielectric case \((P=0)\) then

\[D = \varepsilon \cdot E \text{ and Maxwell’s equations :}\]

\[\nabla \cdot D = \rho \text{ → Gauss’s law for Electrostatic}\]

\[\nabla \cdot B = 0 \text{ → Gauss’s law for Magnetostatic}\]

\[\nabla \cdot \left(\frac{\partial P}{\partial z}\right) = \text{Faradys’s law } \text{ where}\]

\[D = \varepsilon \cdot E, \ H = B/\mu \text{ in SI units,}\]

\(\rho = \text{The free charge density}\)

\(\varepsilon_0 = \text{Electric constant}\)

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 \(\lambda\) as distance is equal to product velocity (v). period (T) then \(\lambda = v \cdot T\).

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 \(v \cdot r\) being wavelength which is connected to angular momentum \(\Lambda = r.m.v = \text{m.w.} \cdot r^2\) in Planck’s or in beyond Planck’s length which is \(L_p = 1.616.10^{-35} \text{m}\) \(= e^\Lambda (-78.5398) = 8,906.10^{-35} \text{m}\)
decomposed into the two perpendicular velocity vectors \(v_1, v_2\) which create the Electric (E) and the Magneticfield (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 Dr had never been directly detected, the proof is the following and reasonable logic.

Displacement current density, \( D \), is the Energy in cavity \((1)\)\(\rightarrow\) \( \lambda \) which is a standing wave following cycloid trajectories in cavity to reach edge \((2)\). Medium of cavity is breaking \( \mu (w \cdot r)^2 \) of Gravity Field and Energy on \((1)\) is the density velocity vector \( v. = |(D1)| \).

In stationary wave conservation of energy (charge) is assembled.

Velocity vector \( v. \), which is the cross product of two velocity vectors \( v.1, v.2 \rightarrow v. = v.1 \times v.2 \), with head at point \((1)\) and analyzed in a perpendicular to \( \lambda(1)-(2) \) directional plane into the two orthogonal velocity vectors \( v.1, v.2 \) which heads are at point \((1)\), is carried to point \((2)\) by following the cycloidal motion \((1)-(2)\). During shifting, velocity vectors \( v.1, v.2 \), 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, \( v. \), where then mechanism is recycled. Figure 32

Source is Rotation dipoles \( v. = w. \times r \), because of angular velocity vector \( w. \), in stationary wave decomposed into the two velocity vectors \( v1 \perp v2 \), forming the Electrical and Magnetic field \( E, P \), as sink following cycloidal Isochrones motion.

i.e. Electric Displacement density \( \text{(field)} \), \( D = \varepsilon \text{E} + P \), in a dielectric medium, of any moving charge of wavelength \( \lambda \), in the rate of change, is alternately in terms of The Electric field \( \angle E \angle t \) and of The Magnetic field \( \angle E \angle t \) in phase with each other in the wavelength \( \lambda \), and generally meaning that velocity vector \( v. = \lambda T = \lambda \) of Photon (or any moving charges) is a Stationary Electromagnetic wave in Photon’s wavelength \( \lambda \), and a self propagating transverse oscillating wave producing a changing Magnetic field \( \angle E \angle t \) around itself and this, according to the second of Maxwell’s equations (Ampere-Maxwell law).

The resulting Magnetic field creates an Electric field \( \angle E \angle t \) 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 \( v. \), (charge = momentum), or the assembled conserved unaltered energy, and interlay interchanged.

The Duality Principle of Photon is the Intensity of light vector \( |v|=\text{real part} \), which is Particle and since light is a Quaternion \( \{ q = s +vi \} \) then photon represents the intensity of light and \( |v| \) Particle, and \( \forall i \times D = \text{Wave forming the Electromagneticfield}s \ (\text{EP}) \), where \( \forall i = v. = |\lambda f| = |\lambda f|/t \), 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 \( \dot{\lambda} = \mu \times r \), the centrifugal velocities \( v. = w. \times r \) are constant, so acceleration \( \text{d}v/\text{d}t = \text{d}(w. \cdot r)/\text{d}t = 0 \) 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 \( \text{(energy)} \), which is connecting Material points of the Medium.

Numerical value \( s \), and imaginary \( Vi = \text{E} \times \text{P} \) are Variant in Invariant rotational energy \( \ddot{\lambda} = \mu \times r \) as velocity \( v. = \mu \times r \), meaning that quaternion \( \dot{\lambda} = \text{energy} \), travels by changing velocity \( v. \), and angular velocity \( w. = 2\pi/\text{T} \), and Period \( \text{T} \) 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 \( \lambda \), of monad.

Relativity being confined in Planck’s length \( [\text{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,

\[ \text{(eg. The Velocity vector } v. \text{ is Quantized to be Wave as the Intrinsic Electromagnetic field of the two perpendicular velocity components forming the two Fields, and as Particle, the real part of velocity } v. \text{ } \]

Energy \( I_\text{d} = \frac{\mu}{2} \text{E}^2 \text{=} \frac{\mu}{2} \text{P} \) in Volume \( V = \frac{4}{3} \text{E}^2 \text{=} \frac{4}{3} \text{P} \) then Appearance is as Particle

Energy \( I_\text{d} = \frac{\mu}{(\text{T})\text{E}^2 \text{=} \frac{4}{3} \text{P} \) in Interference pattern then Appearance is as Wave

The field Intensity estimation \( S = \text{h.f} \) is,

\[ S = |\text{E} \times \text{P}| = |\text{E} \times \text{P}| |\text{E} \times \text{P}| = \text{h.f} \text{ and } E = H \text{ or } E = H = \frac{3h}{\text{p.c}(\text{c} + \text{i}p)} \text{ w }^2 \text{.}

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 $w$) 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**

**b..Equivalence Principle :**

In a uniformly and non-uniformly accelerated reference frame with acceleration $a$, situated in a Gravitational field of gravity $g$, then $g = -a$ - **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 $a = \frac{dv}{dt}$ equal to acceleration due to gravity $g$.

Gravity is the Stationary force $\vec{F}_{\text{grav}} = \vec{F}_{\text{grav}}$ on the base for all motions $\rightarrow$ Medium-Field-Material-Fragment, $|±\vec{s}^2| = (wr)^2 = [MFMF] \rightarrow$ 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:

$$L_v = e^{(\frac{2k}{c^2})} \rightarrow \left[ \begin{array}{c} 0 \cdot 10^{-35} \cdot 10^{-35} \cdot 10^{-35} \cdot 10^{-35} \rightarrow \infty \end{array} \right]$$

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 $\lambda$, as vector monads.

During Intrinsic Diffraction, $ds = \lambda$ of the isochrones motion of vectors $\lambda$, frequency $f$, doesn’t change and only the velocity $v$, and wavelength $\lambda$ changes so from equation,

$$\lambda = v \cdot T = v \cdot f \rightarrow \lambda = 2 \cdot cT \rightarrow (d\lambda/dT) \cdot f$$

Then $\rightarrow a = g = d\lambda/dt = (d\lambda/dT) \cdot f$ since $f$ is constant, or,

Let $\lambda \rightarrow$ be the wavelength of a moving monad,

$$t = \lambda / c \rightarrow \text{is the needed time to cross length} \lambda,$$

$$s = at^2/2 \rightarrow \text{Deflection due to acceleration} \cdot a,$$

$$H = gt^2/2 \rightarrow \text{Deflection due to acceleration} \cdot g,$$

for $s = \lambda$ then $s = at^2/2 = cT$ where $T$ is the period of Isochrones displacement and $t^2 = 2 \cdot cT / a \ldots(1)$
from equation - H - 
\[ t^2 = 2 \cdot \frac{H}{g} \]  ...(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 \( ca = g \)

Therefore all particles have the same acceleration \( g \), in our gravitational field with frequency unchanged, and → velocity \( v \), only with wavelength \( \lambda \), to be changed—so light being a particle also, is deviated in gravity field.

marks, 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→[Space, Anti-Space equilibrium, \( \pm \tilde{A} \), Absolute System \([S]\) ←], as Angular momentum \( \tilde{A} = \Omega = mvr \), is Crushed out into Fragments and, becoming the three Breakages \( [s^2 = (\omega r)^2] \), \( [\pm s^2 = (\omega r)^2] \), \( [\pm v = 2(\omega r)^2] \), and after clashed with the velocity vector \( v \) of \([S]\), (unless succeed to escape undashed through centre O in STPL cylinder and this because of \( v \), are Throwen OFF this System \([S]\), conveyed into the Relative [STPL] System \([R]\), with Linear momentum and Inertial Energy-Space, as the Particles Fermions → \([ \pm v \cdot : s^2 ]\) and Bosons →\([ v \cdot : s^2 ]\).

The undashed through centre \( O \), Fragments \( s^2 = \pm (w \cdot : .r)^2 \) occupy the minimum quantized space \([s^2]\) and consist the Medium-Field Material-Fragment \([ss^2] = [MFMF]\) 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 \([\mp i] = [2.(w \cdot : r)^2[\mp i]\) called Gravity is connecting material points of Medium, while all the other clashed or undashed fragments of the cylinder move, consisting the Relative System \([R]\) to Absolute, Space, Anti-Space, \( \pm \tilde{A} \), System \([S]\).

Unclashed Fragments through centre \( O \), clashed with the constant velocity, \( c \), consist the Dark matter \([ \pm c \cdot : s^2 ]\) and the Dark energy \([c \cdot : \mp i]\).

A. \([ \pm v \cdot : s^2 ]\) → Fermions, and \([v \cdot : \pm i]\) → Bosons
B. \([ \pm s^2 ]\) → [MFMF] Field, \([ \pm i]\) → Gravity force
C. \([tc \cdot : s^2]\) → Dark matter, and \([tc \cdot : \mp i]\) → Dark energy

Since [MFMF] = \( \pm (s^2) = (\omega r)^2 \) is the base for all motions and Gravity force \([\mp i] = [2.(w \cdot : r)^2[\mp i]\) = \( 2.(s^2) = 2(\omega r)^2 \), then forces (from any where) is twice the Base,

i.e. Basis is half (1/2) of Gravity force, ( or since all perturbations from other planets are 80s) , so the Basis is \( 80 \pm 2 \pm 40s \), 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] = \( s^2 = \pm (\omega r)^2 \) as the smallest quantized space of this level. Let \( L \), be the length of an undergoing constant acceleration monad in gravity field,

\[ t = L/c \rightarrow \text{is the needed time to cross length } L, \]

\[ s = at^2/2 = aL^2/2c^2 \] is Deflection due to acceleration \( a \),

a.. For a monad in Planck’s length 10 \( ^{35} \) m then \( T = 8,906.10 ^{35} \times 3.10 ^{18} = 2,968.10 ^{35} \) s and \( s = aT^2/2 = 9,818,809.10 ^{70} m = 4,320.10 ^{14} m \)
b.. For Photon wavelength \( \lambda = 6,210.10 ^{17} m \) 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 \( \pi.(Km)^2 = 3142.10 ^{10} \) m then \( s = 9,81(9,872.9(10^{15}/10^{16})5,38.10 ^{14} = 0,538.10 ^{13} \) mm, which corresponds to an angle, \( 8arc-sec \rightarrow 3600.s = 1,883-arcsec. \)
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 → f = 400 - 484 THz] and higher frequencies of light [short \( T = 450-495 \) nm] are shifted to blue (blue-shifted → 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 \(|v|\), which is a Stationary wave in Photon’s wavelength \(\lambda\), as \(v \cdot v = \lambda / T = \lambda T\). 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 \(\lambda\) creates, \(-\sigma_1\), while, Compressed Removal of \(\lambda\) 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:

(\textbf{Redshift}) \(\rightarrow\) low \(f = 400-484\text{THz}\), and long \(\lambda = 620-750\text{nm}\)

(\textbf{Blueshift}) \(\rightarrow\) high \(f = 606-668\text{THz}\), and short \(\lambda = 450-495\text{nm}\) and High energy and since \(E = h.f\), at Blue.

In this way Light is \(s = \text{Particle as Photon, } \lambda = 380-780\text{ nm} = (3,8,7,8,10) \cdot 7\text{m} \) and as \textbf{Wave}, the Stationary Electromagnetic fields \(E, P = \vec{V} \times \Delta s\) is of an \textbf{Wave nature force} where \(\vec{V} = V_i = \lambda = \lambda f = \lambda/T\), since Light also = quaternion \(-[q = s + vi]\).

The Stationary Wave in \(s = \lambda\) means that since Photon is the only Electric Displacement field, \(D = \varepsilon E + P\), then in the rate of change is alternately in terms of The Electric field \((\lambda P/\lambda t)\) and The Magnetic field \((\lambda E/\lambda t)\) i.e. for Low energy Redshift and for High energy Blue-shift is then \(|s|\) as \textbf{Particle}.

Since also frequency \(f = 1/T\) and energy \(v_i = E = h.f\) then Cycloidal motion Controls constancy of Energy by changing velocity \(v_i = v = w \cdot r\), and period \(T\), of monads.

\textit{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}

\textbf{Particle and Wave, but considering constancy of light as an axiom from which he derived the rest of his theory of General Relativity.}

\textbf{Figure 35. \(\rightarrow\) The Intrinsic Stationary Wave of a Removal Source \(V(f)\).}

\textbf{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, \(c\) = 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-35

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
In case (1), Object in mechanics, may be the Material point at Euclidean point (1), which is now Breakage at\([w \cdot r]²\) magnitude in the Rest Homogeneously - Isotropically Quantized Field as, \([w \cdot r]² = |\text{[MFMF]}]\) which is the required Coordinate System and base for all motions and forces. The material points as Figure 1 (2), Object in mechanics maybe also the Material wavelength \(\lambda = (1)-(2)\) in the \([\text{Medium-.Field-Material.Fragment}]\) -\([\text{s²}]²=|w \cdot r|\) which is a standing wave in cavity\((1)-(2)\) with Scalar breakage \(|w \cdot r|²\) as medium (1)-(2) field and (J1) as Energy to point \(1\) by following the cycloidal motion from (1) to (2) which is isochrones. Velocity \(v\), during shifting is analyzed into two velocity vectors \(v₁:\text{.}v₂\), which undergo vibrations causing two waves that represent the two Electric and Magnetic perpendicular components following the trajectory, \(\text{in}=(1), \text{out}=(2)\). On cycloid \(c=(c)=|\text{[A1-A2]}|\) is needed the isochrones time \(T = \pi. \sqrt{Rc / g}\) to reach end A2.

So, Gravity is the minimum attractive and biding Force \(\text{in} = 2(\text{r})²\) on \([\text{MFMF}]=|\text{[MF]}²|\) Base, which interact with all other particles, and also since gravitational acceleration \(a = dv\cdot \text{.}dt = (\text{d}²\text{v}/\text{d}t²)\). Then for, \(\lambda =\) any constant (or zero) and \(v\to \infty\), \(\text{then} → 0\), \(\text{appealing} → \text{air}\)

Appealing space time 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 proved [22-26] that any space \(AB\) is composed of points \(AB\) 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, \(p + \rho v²/2 + \rho gh = \text{constant}\), where \(p = \text{pressure}\), \(\rho = \text{density}\), \(v = \text{velocity}\), \(h = \text{the elevation}\) and \(g = \text{the gravitational acceleration}\), and (1)-(2) points lie on a stream line. The one-dimensional continuity equation gives, \(p₁-p₂ = (p/2)(v²-v₁²)\) and \(A₁v₁ = A₂v₂\), therefore \(A₂ < A₁\), \(v₂>v₁\) and \(v₂>p₁\)

or, decreasing area = increasing velocity and increasing velocity = decreasing pressure(Force).

Spinning ball in 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 \(\vec{v}\) through its quantized wavelength \(|\lambda = \vec{v}, T|\), is a property of any standing wave, into the Medium \(|\lambda = (1)-(2)|\), and involves the Absorption and Reemission of the wave quantized energy \(J = (J₁)=(J₂)\) by the two neighbor edges (1) and (2) of the medium. The Absorption of energy causes \(J₁\), within edge (1) to undergo vibrations as \(ds\text{d}t²\) which causes a new wave with the same frequency (because \(L=E/h\)) as the first wave but delaying the motion through the medium until Reemission by travelling, \(J₁\) to \(J₂\), 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,\n
It was shown in [27] that on dipole \(AB = \text{[km, A]}\) under the influence of Space Anti-Space forces \(dP = \text{PB-PA}\) are created from forces \(dP\) Space lines the Static Force Field \(E\), from forces \(dP\) Space lines the Static Force Field \(P\), where \(P \perp E\), which then experience on any moving dipole \(AB\) with velocity \(v\), a total force \(F = F_E + F_P = (\text{km, E} \times (\text{km, P})) \perp P\) which combination of the two types result in a helical motion, with stability demand \(F = (\text{v} \times P) \perp (\text{v, P}) \perp P\) which is the alternative conservation of momentum \(\lambda²/2\lambda m\), in the two perpendicular fields \(E, P\).

In case \((\text{km})\) = \(q\) then total force \(F = F_E + F_P = q.E + q.v \times P = q.(E + v \times P) \rightarrow\) 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, \( \mathbf{v} \) and \( \mathbf{c} \):

Since velocity \( \mathbf{v} = \mathbf{v} \cdot \mathbf{r} \) and acceleration for a quaternion \( \mathbf{z} = (s + \mathbf{v} \cdot \mathbf{i}) \) is \( \mathbf{a} = [\mathbf{d}^2 \mathbf{z}/dt^2] = (\mathbf{d} \mathbf{d} \mathbf{t}, \mathbf{(wz} \mathbf{z} / dt + \mathbf{wx}) \mathbf{z}) = 0 \) and, this because \( \mathbf{r} \) and \( \mathbf{v} \) are constant, therefore velocity \( \mathbf{v} = \text{constant} \).

When element \( ds = ADx = \mathbf{v} \cdot dt = \lambda T = \text{constant} = \varepsilon \cdot T \) then \( ds^2 = dx^2 + dy^2 + dz^2 = (cT)^2 \) which is the spatial equation of Space[\( ds \)] and Energy[\( \varepsilon \cdot T = \mathbf{K} T \)].

Since quaternion \( = [\mathbf{E}] = [\mathbf{S}] \) = Space = Anti-space = \( [-(\mathbf{A} \mathbf{v})/m \pm \mathbf{A} \mathbf{v} \mathbf{i}] = \{[\lambda \pm \mathbf{A} \mathbf{v} \mathbf{i}] \} \rightarrow \) is meaning that the massive mechanism Diffraction \( \lambda \), and the Energy mechanism Diffraction \( \pm \mathbf{A} \mathbf{v} \mathbf{i} \), are Interchangeable.

A Particle with wavelength \( \lambda = (1 \cdot 2) \) and spin say, \( h/2 \), is consisted of two parts, The one because of the translational motion of speed \( \mathbf{v} \), and the second of the, common circle, self-rotation velocity \( \mathbf{Vc} = k/T = \mathbf{F} \cdot = [\mathbf{v} - (\mathbf{c} \mathbf{c})^2]. \mathbf{f} \) and Energy \( [\mathbf{A} \mathbf{v} \mathbf{i}] = (J1) \) as velocity vector, \( \mathbf{v} \), is the cross product of two velocity vectors \( \mathbf{v} \mathbf{1} \mathbf{v} \mathbf{2} \) or \( \mathbf{v} = \mathbf{v} \mathbf{1} \mathbf{x} \mathbf{v} \mathbf{2} \), with head at point (1) and analyzed, in a perpendicular to (1) - (2) directional, plane, into the two orthogonal velocity vectors \( \mathbf{v} \mathbf{1} \mathbf{v} \mathbf{2} \) which heads are at point (1).

Energy J1 is carried to point (2) by following the cycloid motion in \( \lambda = (1 \cdot 2) \) 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 \( q = [\lambda, \pm \mathbf{A} \mathbf{v} \mathbf{i}] \) 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 \( T = (\mathbf{v}/2 \mathbf{c}) \), and energy \( \mathbf{A} = r.m. \mathbf{v} = r.\mathbf{p} = r.m(\mathbf{w} r)^2 = m.\mathbf{r}^2 \mathbf{g}^2 \) depending on \( \mathbf{w} \), only (it is spin) and thus forming the spherical standing waves. \[49\].


The Content of This Article: 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 \( W = \int P \cdot ds = 0 \), from Primary Point A which is the Space, to B which is the Anti-space as the Innerdistance 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, are in all quantized Spaces, i.e. Particles, [MFMF] Field, moving vectors, free velocity monads, Material Points and lines- Surfaces and bodies.

4. The minimum Quantized Energy, Quanta, are, is diffused as energy, SPIN, in all quantized spaces as material volumes.

5. The definition of Material Point as (±) Dipole Breakage in [MFMF] medium.

6. The definition of Material Object as the Wavelength, \( \lambda \) of the(±) 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 [STTPL] 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, x = ds = \( \lambda m \), as pressure \( \sigma \), 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 \( \lambda \) 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.
The Geometries related to the Euclidean by Lorentz factor, consist, The Geometrical expression of Spaces and Anti-Spaces in Relative systems and is represented by STPL cylinder lines.

The Cause and Events as it is the Energy quantization in caves λ and the velocity Breakages as, masses, and velocity, only is the Thrust of masses.


The Structure of the Energy-Space Universe and the boundaries of the Space-time of General Relativity.

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.

The Origin of Color - forces from the Retardation and the Birefringence of Spaces.

The Dual nature of Monads, of wavelength | İ as Particle, and Wave as the Stationary Electromagnetic Wave in | İ, which is an intrinsic property of the Cycloid motion of velocity, ε, and Spin, forming the plane and spherical standing waves which are < The Inner structure of Spaces >.

The Cycloidal motion as the intrinsic property of vectors which is a Stationary wave on wavelength of vector, where < Poinset’s ellipse > becomes → cycloid Ellipsoid and spin to be ½ and ½.

The mechanical relation between the speed of light and principal stresses, guided to, Permittivity, Permeability, in free space medium.

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 ε.

The Relative motion of moving systems through Stationary system can be detected only by the Tangential velocities v = w:ron circumference of a cave, r, with radius R > r.

The equations of inner Structure of Gravity field and the stability of the whirling Space, Anti-space, the Spinand Momentum advanced to moving monads.

The immense confusion in the basic ideas regarding the Quantized Energy-Space, what are The Quanta, → vanishes.

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.

In articles was presented the Creation Hypothesis without Big-Bang and without any other coherent Energy-level. Anextend elucidation has been previously done for some very important definitions as that of Quanta of Space and the Quanta of Energy, The expansion off 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 – matterand Dark-energy. It was analyzed that Gravity-fields 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, and it is composed of the two opposite signed elements also, and Dark-energy moves also with velocity offlight, so is continually effecting on the two fragments separately and are slinging them further, formulatingthe Infinite and attracting Geometrical Universe, i.e. Thrust [ε, V] with light velocity, ε, acting on the Five Energy and Space Fragments →

\[ ( V \ell), (+s^2), (s^3), (c+s^2), (c-s^2) \] and on \[ [( V\ell)→(+s^2)→(s^3)] = The Energy-dipole Gravity-field \] and also on →

\[ [( V\ell)→(c+s^2)→(c-s^2) = The Energy-dipole Gravity-Dark-matter - field ] \] carrying them in the three dimensional parallel space with the light velocity, ε, 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 outerreality of it, and not on Axioms and Postulates which do not agree with this Physical reality.

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.

In summary, my personal confidence is that nature is produced from Euclidean Geometry only, i.e.→from

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PrimaryPoint(A which is nothing) 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 disagreement 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 → 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 → [+ ↔ -]) 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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The Doubling of the Cube. The Squaring of the circle.

The origin of, Maxwell’s Postulates.

The Quantization of Points and Potential and the Unification of Space and Energy with the universal principle of Virtual work, on Geometry Primary dipole by Markos Georgallides.

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