The   Chaos becomes Discrete   , through the STPL Mechanism , which is the Energy–Space Generator

Markos Georgallides

[1]Larnaca (Expelled from Famagusta town   occupied by the Barbaric Turks Aug-1974) , Cyprus
Civil-Structural Engineer (NATUA) , Athens
* Markos Georgallides :   Email address   :   georgallides.marcos@cytanet.com.cy :

To cite this article:
Markos Georgallides :   The Energy Space Genesis Mechanism ,

Abstract:

Everything in this cosmos , is Done or Becomes , from a Mould .

Geometry has the Monad , *a discrete continuity AB* , Becoming from the *Zero-Point* $\equiv 0$, and **Mechanics-Physics** the Recent-Acquisition   of The Material-Geometry , where Zero-point $0 = \varnothing = \{\oplus+\ominus\}$ = The Material-point = *The Quantum =* Positive Space and Negative Anti-Space . [58]

Monad in Geometry $\rightarrow$ Linearly is , through mould of Parallel Theorem [44-45] ,*which are the equal distances between points of parallel and line $\rightarrow$ **In Plane** is through mould of Squaring the circle [46-47] , where the two equal and perpendicular monads consist a Plane acquiring the common Plane- meter   ,π, $\rightarrow$ **In Space** (volume) is through mould of the Duplication of the Cube [44-46] , where any two Unequal perpendicular monads acquire the common Space-meter ,$^3\sqrt{2}$, to be twice each other . **Monad in Mechanics and Physics** is $\rightarrow$ The Material-point = *discrete continuity* $|\{\oplus+\ominus\}|=$ **The Quantum** through mould of Space – Anti-space in itself , *which is the material dipole in inner monad Structure and is Identical with the Electromagnetic cycloidal field of Energy monads .This is ,*the distance , *the deep concept of Material-geometry.*

Energy monads presuppose Energy-Space Base (*the beyond Planck`s length ,Gravity`s and Spaces` levels*) the [PNS] Space Anti-Space as work $\rightarrow$ W = $\int$ P.ds = 0 , which is the cause of Spaces existence and the motion of particles . Since these also are Quantized as the Complex numbers , then , this property is encountered in Stationary waves   where energy E , is proportional to angular velocity **w** .

This property of particles , *Angular momentum = Spin* , becomes from the Intrinsic , *Inward* , cycloidal wave motion, which is their cause of external motion *as outward waves* .The varying lever arms ,on cycloid-evolute is the cause of vibrations and which cause the EM-waves and Spin . Common-circle of radius , r_c , is the common source of vibration excitation for the Space , Anti –space , considered as rotating with angular velocity ,**w**, and then their relative motion becomes the , Rolling of Space ABC on Anti-space $A_E B_E C_E$ and since also this relative motion is applied on STPL [Six Triple Points Line] Mechanism , then D_A , P_A , points on it are the corresponding linear links of vibrations and Poles of rotation . [STPL] is a ***Geometrical Mechanism*** that produces and composite all opposite Space and Anti-space Points to Material-points $\rightarrow$ Waves $\leftarrow$ the three Breakages { [$s^2 = \pm (\overline{w}.r)^2$, [∇i] = $2(wr)^2$ of [MFMF] mechanism under $\overline{v} = \overline{c}$ thrust } , and through it are becoming   ***The Fermions $\rightarrow$* [$\pm\overline{v}.s^2$]** and ***The Bosons*** $\rightarrow$ [$\overline{v}.\nabla i = [\overline{v}.2(\overline{w}.r)^2]$ = **[$\overline{v}.2s^2$]** , [35]

Keywords :   Glue-Bond-Stresses on STPL is Particles` Velocity - Spin the cause of Particles` motion

1

1. Introduction

Zeno`s Paradox and the nature of Points .

Word , *quantization* , has to do with the discrete continuity, which describes the Physical reality through the Euclidean conceptual , for Points Straight lines, Planes , the Monads in Universe and the Dual Nature of Spaces as *discrete* and *continuous* **.** Euclidean Geometry is proved to be the *Model of Spaces* and Material Geometry the *Model of Physical Reality* since it is Quantized as the Complex numbers , which are such.

The   proposed   Euclidean solution.

Straight   line AB   is continuous in Points between   A and   B   [i.e. all points between line segment   AB   **are the elements which fill   AB** , *and which Points are also Nothing* , or Everything else and are Anywhere as in above and for Achilles in order to run the 100 m, has to pass the infinite   points   between point A and point B [1.1] . A point ,T, is on line   AB only when exists   TA + TB = AB (*or the whole AB   is equal to the parts   TA , TB , as it is the logic of equality and the logic for equations*) .
Since in nature exists the Principle of Equality and Un-equality consequently any Comparison is including the following three cases .

1.. In case   TA + TB > AB   then   point   T is not on line AB   , **it is OUT**,   and then issues the Property of   **Anequality**   and it is the triangle ABT   lying in   ABT Plane .
This is the main difference between the Euclidean and the   Non-Euclidean geometries . On this is based the Philosophy of Parallel fifth Postulate which is proofed to be a Theorem   and also all the Ancient unsolved and now solved problems . [44-47]

In Euclidean Geometry points   A , B , T consist the Plane   ABT , while for Others is a curve in Plane ABT .

The Definition   2 (*a line   AB   is breathless length*) is altered as   → *for   any point*   T *on line*   AB   *exists*   TA + TB = AB   i.e. it is the equation which is also and equality .   [9-10]

Since points have not any dimension and since only   AB   has dimension (the length AB   and for any $\overline{AT}$ the length AT)   and since also on $\overline{AB}$ exist infinite line segments AT < → AB ,   which become the quantized

material- lengths and have **infinite   Spaces , Anti-Spaces   and   Sub-Spaces** ,   then is impossible in--bringing   Achilles to the Tortoise′s   starting point   B , and also for Tortoise′s   to 110 m ,   because as follows ,

Straight   line   AB   is not   continuous unless   a   Common   Dimensional   Unit   AT > 0   or   AT = ds → AB   is accepted and thus in this way exists ,

   a.. Straight   line AB   is continuous with points as filling   (*Infinitively divisible*)
   b.. Straight   line AB is discontinuous   (*discrete*) with dimensional Units , ds, as filling (that is made up of finite indivisible parts the Monads , ds ≠ 0 , as in Material geometry) defining the Space Anti-space at A,B points and Sub-space as
[ds ≠ AB /n , where n =1,2,→∞)
   c.. Straight line AB   is continuous in ,ds, with ds = 0   as points of   filling , and also discontinuous   (*discrete*)   with the dimensional Units , ds ≠ 0 , defining the Space , Anti-space at A,B points and Sub-space , where ,

ds = quantum = AB / n , **{** where n = 1,2,3 → ∞ ,

= [a+b.i] /n = complex number *and Infinitively divisible which is keeping   the conservation of Properties   at   End   Points   A , B* **}**   as filling , ***and continuous with points as filling*** *(for n = ∞   then ds = 0   i.e. the   ∞ Positions of points in ds)* , i.e.
Monads   ds = 0 → ∞ are simultaneously (*actual infinity*)   and also (potential infinity) in Complex number form , and this defines that, infinity exists between   all   points   which are not   coinciding ,   and because   ,**ds,** comprises any two edge points   with imaginary part then   this   property differs between all the   infinite   points .

This is the Vector   relation of Monads , ds , (or , as Complex Numbers in their general form $\overline{w}$ =   a + b . i   ) , which is the Dual   Nature of lines (discrete as $\dfrac{\overline{w}}{|a^2+b^2|}$ ***and continuous as points (.) and in recent Material-Geometry the Work ≡ Energy ≡ Monads ≡ Imaginary part   ,i,   )* .** [57-58]

2.. In case   TA + TB = AB   then   point T

is   **ON** straight line AB   where then issues the   Property of Equality.

On *Monad* AB which maybe equal to $\rightarrow 0 \leftrightarrow AB \leftrightarrow \pm \infty \leftarrow$ exists < *a bounded State of energy for each of the Infinite Spaces and Anti-Spaces* called ***Energy monad*** in Space moulds > and this [*Dipole AB = Matter = The meter of the reaction to Energy-change*] is the communicator of Impulse [*Force P*] *of Primary Space* . This Energy-monad is modified as the Quanta of Energy , *the monad* , and is represented as above Dipole i.e.

This motion is Continuous and occurs on Dimensional Units , ds , *which is the Maxwell`s Monads-Displacement-Electromagnetic-current* [$E+\bar{v}xP$] , and not on Points which are dimensionless , upon these Bounded States of [PNS] , *the Spaces and Anti-Spaces* , *and because of the different Impulses* P_A , P_B , *of edge points* A , B , *and that of Impulses* , P_{iA} , P_{iB} of Sub-Spaces , *they are* either on straight lines AB or on tracks of the Spaces , Anti-Spaces and Sub-Spaces of AB . The range of *Relative velocities* is bounded according to the single slices of spaces (*ds*) . [14 -15] , [39-40] .

3.. In case TA + TB < AB then point ,T, is **IN** straight line AB , *where then is NOT issuing the Property of Equality or Un-equality* .

It is issuing a ***New Paradox in Geometry*** which is the recently new Material-Geometry as in articles [55-56] and connects , Geometry-Mechanics–Chemistry-Physics.

From D. Hilbert`s $\rightarrow$ 4. Problem of the straight line as the shortest distance between two points A and B become the following :

Lobachevsky : (Hyperbolic Geometry) is excluding the axiom of parallels or assume it as not satisfied .

Rieman`s : (Elliptic Geometry) is excluding the axiom of parallels , assuming that one and only one Point lies between the other two.

Hilbert`s : (Non-Archimedian Geometry) is excluding the axiom of parallels , assuming that Infinitive Points on Parallels lie between the other two and straight line is the shortest distance between the two points .

Euclid`s-Markos : (Geometry - Material Geometry) ,

The Definition 2 , (*a line AB is breathless length*) is altered as , *for any point T on line AB exists* Equality TA + TB = AB .

The critic of all above is in my articles , and because of the inattention in the establishment in these Definitions , allowed the creation of Non-euclid Geometries which acted Negatively to the Right-Orientation of sciences. The deep concept of Material-Geometry is this , *distance* .

1.1. Achilles and the Tortoise :

The Problem :
(0m) → (100 m) (110 m)
A ------------------T---------------- B → -----

< *In a race , the Quickest runner* , *Achilles* , *can never overtake the Slowest* , Tortoise , *since the Pursuer must first reach the Point whence the Pursued started , so that the Slower must always hold a lead* >

This problem was devised by Zeno of Elea to support Parmenides′s doctrine that < *all is one in Euclidean Absolute Space* > , contrary to the evidence of our senses for plurality and change and to others arguing the opposite . Zeno′s arguments are as proof by contradiction or (*reduction ad absurdum*) which is a philosophical dialectic method . Achilles at point ,A, allows the Tortoise at point ,T, a head start 100 m and each racer starts running at some constant speed , *one very fast and one very slow* , the Tortoise say has further 10 m at point ,B, .
Since Straight line AB is continuous with points as filling , *The Quickest* , has to pass *Infinitive* points to reach point T , so since the steps are the points ($\frac{AB}{\infty} = 0$) ,*The Quickest* will never reach point T . The same also for *The Slower* with step , ($\frac{TB}{\infty} = 0$) will never reach point B .

1.2. The Arrow Paradox (*Arrow*) :

The Problem :

< *If everything when it occupies an equal Space is at rest , [PNS] , and if that which is in locomotion is always occupying such a Space at any moment , the flying Arrow is Therefore motionless* >

3

| (10 m) |
(10m) **ds = a+b.i = v.dt** (10 m)

   A   ---------------------->   B

   A ------- C - D ------->   B

The Arrow Paradox is not only a simple mathematical problem , because is referred also to **motion in Absolute Euclidean Space ,** i.e. in a Space where **issues Geometry** , *with all the unsolved till recently problems as ,The Parallel Postulate the Squaring of circle etc.*, and also the **Physical** where Space [PNS] is not moving and because of its Duality (*discrete and continuous as Complex numbers are*) , shows that ,

Time is not existing as any essence but only a measure for measurements , a number .

This Paradox **is not** in metaphysical sphere of mind since is was proved in [15] that , Complex numbers and   Quantum Mechanics Spring out of   **the   Quantized   Euclidean Geometry .**

As before Straight line AB   is discontinuous (**discrete**) with dimensional   Units , **ds=CD** as filling and   **continuous with points**   as filling   (The Complex Numbers in the general form   w = a+b. i) , **which is the Dual Nature of lines** (line = *discrete with , Line-Segments , and   continuous with points*).

It has been shown that PNS   Primary Neutral Space is not moving   and Time is not existing , *so   Points* , in Primary Space   cannot   move to where they are because are already there and motion   is impossible . Since any *Points   C , D* of   the Primary   Neutral   Space , PNS , are motionless   (v =   0) this is at any Time   (the composed   instants   are   dt = 0) , and so   then   motion is impossible , i.e. issues   [ds = a + b. i = v.dt   ] where ,   *for*

a = 0   then   ds =   b.i = v.dt   *and for* b ≠0 and dt = 0   then   *ds   =   Constant   = =   v . 0   →*   i.e. **v   =   ∞ ,** *For b = 0*   then   ds = a = v.dt   *and for* dt = 0   then →   *ds = a = Constant = v . 0 →* i.e. again ,   **v   =   ∞   ,**

Therefore in   PNS ,   v = ∞ , T = 0 , meaning infinite velocity and Time not existing ,   so

Since   Arrow   is moving   from   point A   to   point   B ,   then exists   the Numerical   order   A → B   which   is   not valid   for Temporal order (dt) . In case that dt = 0   then motion from   Point   A   to point   B   has not any concept , and the distance   CD   and   anywhere   exist   the Equal   CD   is unmovable   **, i.e. Motion of points   C , D   of   PNS   is not existing *because time (dt = 0) and   infinite velocity (v = ∞) exists , while motion of   the same points   C , D   exists* in PNS   out of a moving Sub-Space of   AB (** arrow CD is one of the ∞ roots of AB)   **where ,**

   (*ds = CD = The Monad   in   PNS* **).** [15] .

It has been   shown   that   Primary Neutral Space [PNS] is not moving and Time is not existing   , *so Points* , in Primary Space cannot move , *to where they are* , because are already there and   motion   is impossible.   Since *Points   T , C,,,* of   Primary Neutral   Space , PNS , are motionless   (v = 0) at any Time (the composed instants   are   dt = 0) then motion (*s=v.dt*) is impossible . i.e.

In   PNS   v = ∞   and   Time = 0 , meaning infinite velocity   ,v, and Time is not existing , so since any Arrow (a vector) moving   from point A   to   point   B , then exists a Numerical order A → B   which   is not valid   for Temporal order (dt) . In case   dt = 0   then motion from Point   A   to   point   B   has not any concept , and distance , *CD magnitude ,* and anywhere exist the Equal CD   it is unmovable (*s=v*) ,

  i.e.   *The Motion   of   points   C , D , T….. of PNS   is not existing because time (d t = 0) and for ds = Any constant exists with infinite velocity (v = ∞)   while motion of   the same points C , D ,T   exists* in   PNS   out of a moving *Sub- Space   of   AB* (Included Arrow CD   is one of the   ∞   roots of   line segment AB). Monads   ds =CD= 0 → ∞ are Simultaneously, *actual infinity* (*because for   n = ∞   then ds = [AB / (n = ∞)] = 0   i.e. a point*)   *and , potential infinity ,* (*because for   n = 0   then ds = [AB / (n = 0)] =   ∞   i.e. the   straight line through sector AB .* *Infinity   exists   between   all   points which are not   coinciding , and because Monads ,ds, comprises any two edge points with   Imaginary part , then this   property   differs between the*

,i, infinite points or as $d\bar{s} = \lambda i + \nabla i$, which ($\lambda \equiv$ Space, $i \equiv$ Energy), is the Quaternion.

Since Primary point ,A, is the only Space then on this exists the Principle of Virtual Displacements W = $\int_A^B P.\,ds$ = 0 or [ds.(P_A+P_B) = 0] , i.e. for any monad ds > 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 exists , because of this equilibrium Static Inner Impulse , on the contrary should be one point only (Primary Point A ≡ Black Hole → ds=0 and P = ∞).[17,22] . Monad AB is dipole [{A(P_A) ←0→(P_B)B}] and it is the symbolism of the two opposite forces (P_A) , (P_B) which are created at points A,B . This Symbolism of primary point (*zero 0 is nothing*) shows the creation of Opposites , A and B , points from this zero point which is the Non-existence. [13] .

All points may exist with force P = 0 → { PNS the Primary Neutral Space} and also with P ≠ 0 , (P_A+P_B= 0) , { PS is the Primary Space} for all points in Spaces and Anti – Spaces , therefore [PNS] is self-created , and because at each point may exist also with P ≠ 0 , then [PNS] is a (perfectly Homogenous , Isotropic and Elastic Medium) Field with infinite points (i) which have a ± Charge with force $P_i = 0$ → P = Λ→ ∞ and containing everything .

Since points A ,B of [PNS] coincide with the infinite Points , of the infinite Spaces , Anti-Spaces and Sub-Spaces of [PNS] and exists there rotational energy ± Λ and since Motion may occur at all Bounded Sub–Spaces (± Λ , λ), 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 (The monads = segments) A_iB_i = ds , which equilibrium by the Primary Anti-Space by an Inner Impulse (P) at edges A , B where $P_{iA}+P_{iB}$ ≠ 0 , and ds = 0 →N→ ∞ .

Monad , *discrete* , (Unit ds = Quaternion) $\overrightarrow{AB}$ is the ENTITY and [AB – P_A , P_B] is the LAW , therefore Entities are embodied with the Laws . Entity is quaternion $\overrightarrow{AB}$, and law |AB| = Energy length (*the energy quanta*) of points |A,B| or the wavelength where then

AB=0 and imaginary part are the equal forces P_A , P_B as the fields , *the medium* , in monads , (*This is distinctly seen for **Actions at a distance** , where there the continuity of all intermediate points being also nothing , **is succeeded on a** quantized , tiny energy volume which consists **the material point** i.e. A field , the medium , **or** by the Exchange of energy in the Inner-monads field*) . [39-40]. Pythagoras definition for a **Unit** → *it is a Point without position while* **a Point** → **is the Material Point** *which is a Unit having position* .

1.3. The dichotomy Paradox (*Dichotomy*) :

The Problem :

< *That which is in locomotion must arrive at the half-way stage before it arrives at the goal* >

(0m) → → (50 m) (100 m)
A --------D----------- C-------------------- B

As before Straight line AB is not continuous unless a Common Dimensional Unit AC > 0 or ds = 0 → AB / 2 → AB is accepted and this because point C is on line AB where then issues CA + CB = AB and since CA = CB then CD < CB therefore point D on (AD) will pass through C on(AC) before it arrives at the goal B on (AB) .

1.4. The Algebraic Numbers :

From priors *Monad* ≡ **AB = 0 ↔ AB ↔ ± ∞ ,** **is and also represents** the Spaces ,A, the Anti-Spaces ,B, Sub-Spaces of AB which are **the Infinite Regular Polygons** , on circle with AB as Side , and on circle with AB as diameter , and it is what is said , *monad in monad* . According to De Moivre's formula the n-th roots on the unit circle AB are represented by the vertices of these Regular n-sided Polygon inscribed in the circle which are Complex numbers in the general form as , **w = a+b.i** = **r.e** [(iφ)] , and , **a** and **b** = Real Numbers , **r** = $\sqrt{a^2+b^2}$, (±) **i** = Imaginary Unit. We will show that since Complex Numbers are **on Monad AB** (*Any two points non coinciding are monads*) and it is the only manifold , for the Physical reality , *so then **Euclidean Geometry** is also Quantized* . This geometrically is as follows,

a. Since Exists $^2\sqrt{1} = \pm 1$ or square roots of monad are **[-1 ↔ +1]** , therefore **xx** (axis) coordinate system represents the one-dimensional Space (+1) and the Anti-Space (-1) which is (the Straight line) , 1.1 = 1 , (-1).(-1) = 1 **[+ i]**

b. Since Exists $^2\sqrt{-1} = \pm i$ or **[↕]** , therefore **yy** (axis) coordinate system represents **[- i]** a perpendicular on (-i).(- i) = + i ^{2} = + (-1) = -1 , (+ i).(+ i) = + i ^{2} = -1

c. Since Exists $^3\sqrt{1} =$ the three roots **[1 , - ½ + (√ 3.i) /2 , - ½ - (√ 3.i) /2]**

therefore **xx-yy** coordinate system represents the two - dimensional ± Spaces and ± Complex numbers , (the Plane) 1.1.1 = 1 , [-½ +(√3.i) /2] ^{3} = 1 , [-½ -(√3.i) /2] ^{3} = 1 + i

d. Since Exists $\sqrt[4]{1} = {^2\sqrt{^2\sqrt{1}}} = {^2\sqrt{\pm1}} =$ **[+1 , -1] , [$^2\sqrt{-1}$ = + i , - i]** or -1 ↔ +1 , ↕ therefore coordinate systems **xx - yy** represent all these Spaces , - i , (± Real and ± Complex numbers) , where Monad = 1 = (*that which is one*) , represents the three-dimensional Space and Anti-Space (the Sphere) which is , $[\pm1]^4 =$ = $[\pm i]^4 = 1$.

The fourth root of **1** *are the vertices of Square in circle* with **1** as diameter and this because the Geometrical Visualization of Complex numbers , is the formula $^4\sqrt{1} = \pm 1 , \pm i$ …(d) and also since ± 1 is the one-dimensional *real Space* (*the straight line*) , the vertical axis is the other one-dimensional *Imaginary Space* ± i .

Since for dimension , *discrete* , are needed N+1 points , then (d) is representing the Space with three dimensions (dx ,dy ,dz) which are Natural , Real and Complex . Monads (The Entities = AB) are the Harmonic repetition of their roots , and since roots are the combinations of purely real and purely Imaginary numbers , *which is a similarity with Complex numbers* (*Real and Image*) , then , *Monads are composed of Real and Imaginary parts as Complex Numbers are* , i.e.

Objective reality contains both aspects (Real and Imaginary **,** discrete , AB , and Continuous **,** Impulses **P_A** , **P_B** , etc.) meaning that *Euclidean -Geometry is such Quantized , which is the Energy-Space* . [15]

i.e. The Position and Dimension of all Points which are connected across the Universe and that of Spaces exists , because of this Static Inner Impulse P , on the contrary should be one point only (Primary Point ≡ Black Hole → ds = 0) . [43 - 45] *Impulse is ∞ and may be Vacuum , Momentum or Potential or Induced Potential.*

Change (motion) and plurality are impossible in Absolute Space [PNS] and since is composed only of Points that consist an Unmovable Space , then neither Motion nor Time exists i.e. a constant distance AB = **ds** = monad anywhere existing is motionless . The discrete magnitude **ds =[AB /n] > 0** = *the quantum* , and for infinite continuous **n** , **then ds** convergence to **0** . Even the smallest particle (say a photon) has mass , *the reaction to velocity change* , [15] and any Bounded Space of ds > 0 is not a mass-less particle and occupies a small Momentum which is the motion .

The Physical world is scale-variant and infinitely divisible , consisted of the finite indivisible entities ds = AB → 0 called monads and of infinite points (ds = 0) , i.e. The Euclidean and the Material Geometry.

All entities are Continuous with points and Discontinuous , *discrete* , with ds > 0 .

In PNS dt = 0 , *which is the meter of velocity changes* , so motion cannot exist at all , *ds=v*.

Since any points A,B of PNS coincide with the infinite Points , of the infinite Spaces , Anti-Spaces and Sub-Spaces **of PNS** , and since Motion may occur at all Bounded Sub-Spaces then this *Relative motion* is happening on the ,**e**, -dimensional to **xx** Space and ↔ Anti-Space (the Straight line) between all points belonging to PNS and all those belonging to other Spaces .

Time exists in Relative Motion and it is the numerical order of material changes in the PNS - Space , and is not a fundamental entity as is said in Relativity.

On *Monad* AB , in any Space-level , and which is = 0 ↔ AB ↔ ± ∞ exists < *a bounded State of energy for each one between the Infinite Spaces and Anti-Spaces >* and the

[Dipole AB = Matter = monad] is the communicator of Impulses [P] *of the Primary Space.*

This Energy monad is modified as the Quanta of Energy and is represented as the Dipole of energy monads in any Space-level .

2.. Euclidean and Non-E Geometries .

Synopsis   1 :

Primary point *, which is nothing and* **has not any Position** *may be anywhere in Space , if there is any Space , therefore , the unique Primary point ,* A *, being nothing also* **in no Space** *,* **is the only Point** *and no-where, i.e. Primary Point is the only Space and from this all the others which have Position ,and because it is the only Space thus 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 *, and it is* [PNS] = [A ≡ B] *. The position of points in* [PNS] *creates the infinite dipole* AB *and all the quantum quantities which acquire Potential difference and an Intrinsic momentum* (± Λ) *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 . Since Primary point , A , is the only Space then on this point exists the Principle of Virtual Displacements ,Work* $W=\int_A^B P.\,ds=0$ *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 *. This Monad , discrete , (Unit ds = Quaternion)* $\overrightarrow{AB}$ *is the ENTITY and* [AB – P_A , P_B] *is the LAW* ≡ *the Content , therefore Entities are embodied with the Laws . Entity is quaternion* $\overrightarrow{AB}$ ≡ a+b.i = r.e^{(iφ)} *, and Form* |AB| *= Energy length (the energy-quanta) of points* |A ,B| *or the wavelength , and imaginary part are the equal forces* P_A , P_B *as fields , or the medium , in monads . Line segment* AB *is not continuous unless a Common Dimensional Unit* AT > 0 *or* AT = ds → AB *is accepted and thus in this way exists* TA+TB= AB *then point* T *is* ON *straight line* AB *,i.e. the whole* AB *is equal to the parts* TA ,TB *, where then issues the Property of Equality and the relation between Whole and Parts . This property in Geometry issues in all Physical levels .*

Primary Segment *is of the* **Form** $\overleftrightarrow{AB}$ *, where* **Form** |AB| , **Finite** AB *and* **Infinite** ,∞, *to Point zero* $L_v=e^{i.(\frac{N\pi}{2})b=10^{-}N=-\infty}$ *, and for* N =∞ → 0 *, where is* **Content Atraction** P_A↔P_B *and the* **Repulsion** P_A→ ←P_B *, the* **Quantity** *in Real part* AB =L_v *, and in Imaginary part where* **(**P_A + P_B**)** =0 *, and when the* **Quality (**P_A + P_B**)** ≠0 *is a differentiation , and so on .*

Since also **Imaginary Part** *is always* **(**P_A + P_B**)** = 0 *then Form and Content are absolutely inseparable and pass from zero for all Opposites , so all Entities are embodied with the Laws , and since also valid* **(**P_A + P_B**)** ≠0 *then , the* **Zero equality is the Critical-Energy-Quantity** {CEQ} *for any transition in Quality , a kind of Catalyst which is not changing the composition of Primary Segment , it is* the unity of opposites *and since also Work* ≡ *Energy involved in all levels , and generally → is holding that ,*

In Primary Segment $\overrightarrow{AB}$ ≡ a+b.i = r.e^{(iφ)} ***exists the Contratiction and Identity ,*** *an Extrema-state of Unstable-equilibrium on the edge of nothing , or the opposites interpenetrate in Unity , or Similar charges Repel each other whereas opposite kinds attract , or a Tiny - Energy - Space , Anti-space containing Work* ≡ *Energy* ≡ *Eternal Self-Motion as Wave , forming the Material world ,* ***Apriori*** *.*

The Ideal is nothing else than this Material-world reflected by the human mind and translated into forms of thoughts . Since Monads are quaternion as w = a+b.i = r.e^{(iφ)} *, composed of Real* (a) *and Imaginary part* (bi) *as Complex Numbers are , so Work , Energy , is Monads the most characteristic .*

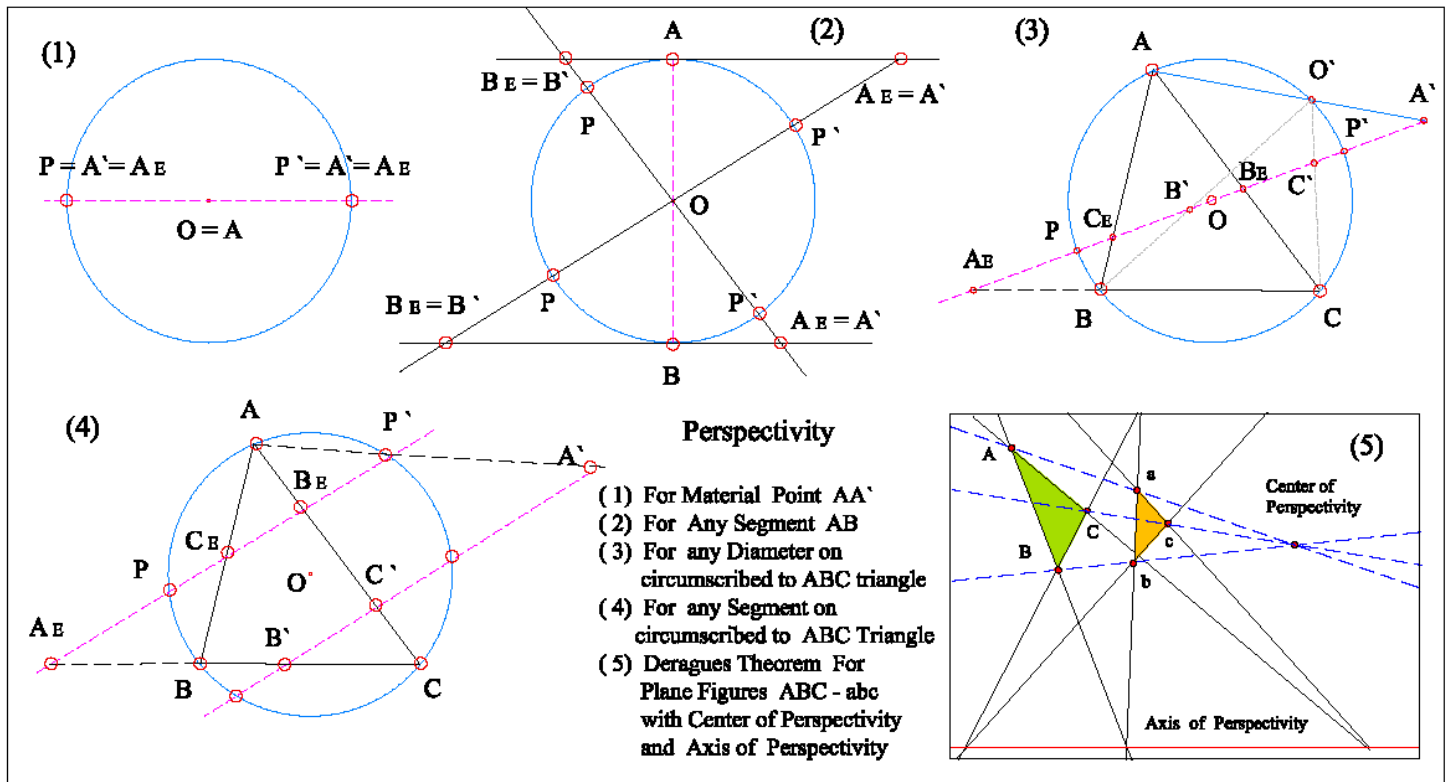
7

Figure.1..   Pole and Axis of Perspectivity   for   Points   , Sectors   , Planes   , Volumes.
The two Perspective Desargues triangles   ABC – abc   with their Axis and Center of Perspectivity.

2.1.   Perspectivity   :

Projective in geometry has to do with Points , Lines , Planes and Spaces embedded in Euclidean geometry as in Fig.1.

In (1) Perspective Points   P , P` lie on line PP` which is monad AA` , and where O is their middle point of this material point AA`.

In (2) Perspective Points P , P` lie on the circumference of the circumscribed sphere of Plane ABO through AB axis , where O is the common circumcenter of Segment AB.

In (3) Perspective Points   P , P` lie on the Diameter of the circumscribed circle in Plane ABC , where O is the circumcenter of triangle ABC and O` is the concurrent point on circle .

In (4) Perspective Points P , P` lie on any segment of circumscribed circle in ABC Plane , with O as center and parallel to conjugate A`B`.

In (5) Perspective Points   P , P` lie on the Axis of Perspectivity of the Planes of circumscribed circles of Planes   ABC , abc   being centrally perspective.

*Projective geometry , (**Desargues`theorem**) , declares that , two triangles   ABC , abc   are in perspective   axially ,   if   and   only if they are   in perspective   centrally .*

We will   show that   , ***Perspective and Projective Geometry***   is embedded and it is an   **Extrema**   in Euclidean   geometry. Proof   :

a.. In F1-(4) , Two points P , P′ on circumcircle of triangle ABC , form   **Extrema** on line PP′. Symmetrical axis for the two points   is the mid-perpendicular of   PP′ which   passes through   the   center   O   of   the circle, *therefore* the Properties of   axis PP′ are transferred on the Symmetrical axis in rapport with the center   O (central symmetry) ,   *i.e.* the *three   points of intersection* A_E , B_E , C_E *are   Symmetrically placed as the other three points* A′ , B′ , C′ *on this Parallel axis .*

b.. In F1-(3) points P , P′ **are on any diameter** of the circumcircle , and then line PP′ coincides with   the parallel axis , the points   A′ , B′ , C′ are Symmetric in rapport with center O and *the*

8

Perspective lines AA', BB', CC' are concurrent in a point O' situated on the circle .

When in F1-(5) , a pair of lines of the two triangles (ABC , abc,) are parallel , then extrema case is when their point of intersection recedes to infinity ,and   axis PP' passes through the circumcenters of the two triangles , (Maxima) and is not needed " **to complete** "   the Euclidean plane to a projective plane   .i.e.

   Perspective lines of   two   Symmetric triangles   in a circle   are concurrent   in a point , on   the diameters and   through the vertices of the corresponding triangles .

c..   When all pairs of   lines of   two triangles are parallel , the equal   triangles , then points of intersection recede to infinity , and   axis   PP` passes   through   the   circumcenters   of   the two triangles (The Extrema case).

d..   When the second   triangle is a point   **P** then axis PP' passes   through   the circumcenter of triangle .

From above is shown   that   Perspectivity exists between any triangle   ABC , a line PP' and a center   O , where then exists Extrema for each Point , Line , Plane , Space etc. i.e.

Perspectivity on a Plane   is transferred on lines   and from lines to Points . This is the compact logic   into Euclidean geometry , which holds   in Extrema Points , and thus Projective and Perspective - Geometry **is an Extrema in Euclidean–Geometry in all levels without controversy or contradiction .**

Mathematical interpretation and all the relative Philosophical reflections based on the   Non - Euclid geometry theories , must be properly revised and resettled in the truth one.
For conceiving alterations from Point to sectors discrete , lines , plane and volume is needed Extrema knowledge where there happen the inner transformations on geometry and the external transformations of Physical world .
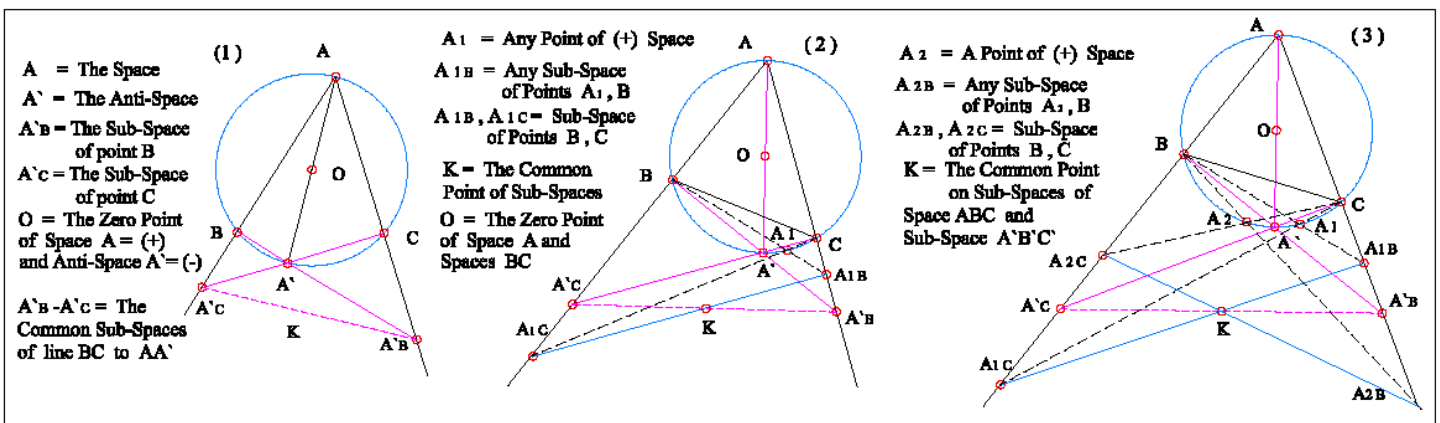

Figure.2..   The Coexistance of Space ABC and Anti-space   A`, B`, C`   in a Plane .

The Spaces , Anti-Spaces of   One Point is   A↔A`, of   Two Points   B,C ↔A` B , A`c of   Three Points   ABC , the Plane , is   ABC ↔ A `, A` B , A` c   and are the Extrema points   on any circumcircle in triangle   ABC .
Discrete , on Geometry happens in all levels and Primary in STPL as shown below.

2.2. The Extrema Euclidean Geometry :

1.. In Figure .2.   Extrema of a point A is point A` on Straight line AA` and the middle point of segment AA` is point O with equal distance OA = OA` . From point O is drawn the only one circle (O,OA=OB) on which exist infinite points forming any triangle ABC in the circle of this diameter AA' . Point A represents the Space and point A` the Opposite Anti-space .

In E-geometry the two points equilibrium because of *equal distances*   **OA , OA`** from midpoint O   while in Material-Geometry equilibrium because of *equal Forces*   $P_A$ , $P_{A`}$ at end points A , A` , from midpoint O . i.e. it is Dipole =[⊕⊖]=∅=AB .

Is shown also the relation between point   **A`** which is the Anti-space , with the three points A,B,C representing the Space-Plane . Lines CA′,

9

BA′ produced , intersect lines   AB , AC at points A`$_C$ , A`$_B$ respectively . Points A`$_C$ , A`$_B$ represent the Sub-space of , Space , Anti space   A↔A`.

A1   is any point on the circle between the points   B , A′.

CA1 , BA1 produced intersect lines AB , AC at points   A$_{1C}$, A$_{1B}$ respectively.

Show that lines   A$_{1C}$, A$_{1B}$ are concurrent at the circumcenter K of triangles C A$_{1C}$ A$_{1B}$, B A`$_B$ A`$_C$.

Proof :

Since angle < ACA`$_C$  = 90° so angle < A`CA`$_B$ = 90° also ,   therefore the circumcenter of triangle   CA`$_C$A`$_B$ is point K , the middle point of diameter  A`$_C$A`$_B$. Fig.2-(2)

Considering angle < A`$_C$CA`$_B$ = 90° as constant then all circles passing through points C ,A`$_C$ , A`$_B$ have common radius KC . Considering angle < A`$_C$BA`$_B$ = 90° as constant then all circles passing through points B ,A`$_C$, A`$_B$ have their center on A`$_C$A`$_B$

Considering both angles < A`$_C$BA`$_B$=A`$_C$CA`$_B$= 90° then lines BA`$_C$ , CA`$_B$ produced meet lines AA`$_C$, AA`$_B$ at points A$_{1C}$, A$_{1B}$ such that line A$_{1C}$ A$_{1B}$ passes through point K

(*the common to* A$_{1C}$ A$_{1B}$, A`$_C$A`$_B$ *segments*) and when angle <BAC = 0 as extrema case then point   K , coincides with Anti-space point A` which are both on the circle ,

i.e. **From all contrary cases , In an angle < BAC *of triangle ABC exists a constant point K , such that all lines passing through this point intersect sides AB , AC at points A$_{1C}$, A$_{1B}$ so that internal lines A$_{1C}$ A$_{1B}$ concurrence on the circumcircle of triangle ABC and in Extrema case ,* angle <BAC = 0 , *this point becomes the Anti-point* A` ≡ A$_E$ *where then lies on line AK becoming the* AK$_A$ *sector .***

The case of an angle < A equal to 180° is next examined in* Fig.3 *as the general extrema cases in a Plane triangle .
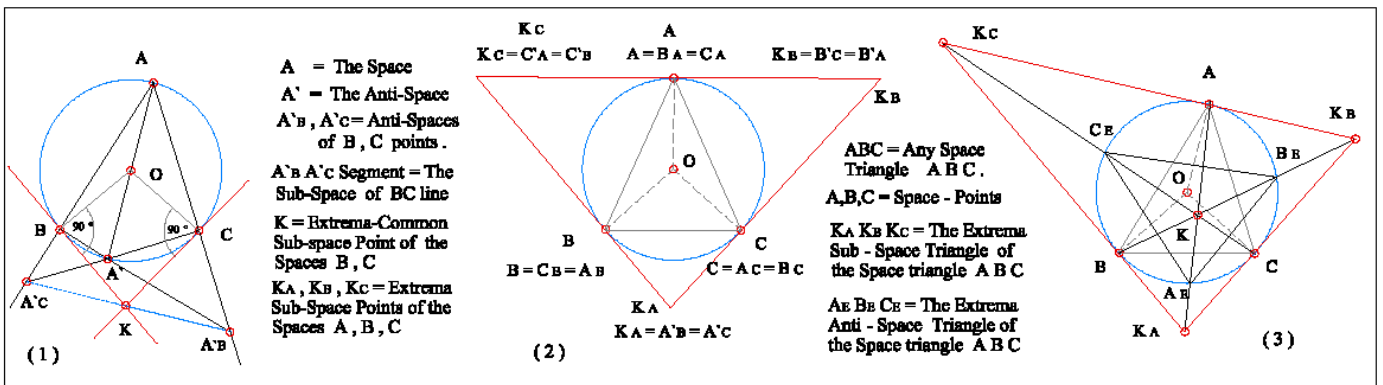

Figure.3.. In (1) Concurrency points   in and out   of any circumcircle   of triangle   ABC .
In (2) The Extrema Concurrency points of vertices of any triangle ABC .
In (3) The Extrema Sub-Space and Anti-Space of any Space Plane-triangle ABC.

2.. In Figure .3. Extrema of the circumcircle triangle ABC on its vertices :

In (1) , When any point A$_1$ coincides with point   B (Superposition of points A$_1$, B) then line B A$_1$ is the tangent at point B , *extrema* , where then angle   < OBK = 90° . When any point A$_1$ coincides with point C , (Superposition of points A1 , C) then line   C A$_1$ becomes the tangent at point C   , where then angle   < OCK = 90° .

Following the above logic for the three angles $\widehat{BAC}$, $\widehat{ABC}$, $\widehat{ACB}$, then , K$_A$B , K$_A$C are tangents at points B and C and angles   < OBK$_A$ = OCK$_A$ = 90 °. K$_B$C ,K$_B$A are tangents at points C and A and angle   < OCK$_B$ = OAK$_B$ = 90° . K$_C$A , K$_C$B are tangents at points A and B and angle < OAK$_C$ = OBK$_C$ = 90° . F.3-(2) Since at points   A , B , C of the circumcircle exists   only one tangent then ,

10

The sum of angles $OCK_A + OCK_B = 180°$ therefore points K_A, C, K_B are on line $K_A K_B$.

The sum of angles $OAK_B + OAK_C = 180°$ therefore points K_B, A, K_C are on line $K_B K_C$.

The sum of angles $OBK_C + OBK_A = 180°$ therefore points K_C, B, K_A are on line $K_A K_C$ i.e.

The circle (O , OA = OB = OC) is the inscribed in triangle $K_A K_B K_C$ and the circumscribed on triangle ABC .
In all Plane levels of Euclidean Geometry , the Space points A , B , C , the Anti-Space points [A`,B`,C`] ≡ [A_E, B_E, C_E] , and Sub-Space points K_A, K_B, K_C lie on the Circumscribed circle and Circumscribed to ABC triangle and it is the Extrema of it , to its vertices . This coexistence of the three Spaces in One is the main property of Spaces and into this Mechanism Stabilizer is the Work ≡ Energy as Glue-Bond between them . [58]

Theorem : On any triangle **ABC** *and the circumcircle exists one inscribed triangle $A_E B_E C_E$ and another one circumscribed* **Extrema** *triangle $K_A K_B K_C$ such that the* **Six** *points of intersection of the six pairs of* **triple lines**

are collinear → (6+6+6) = 18 . Fig.3 –(3) The six-triple points-line [STPL] is line → of Points D_A, D_B, D_C - P_A, P_B, P_C where ,

Triangle **ABC** → is the Space Triangle.
Triangle **$A_E B_E C_E$** → is the Anti-Space.
Triangle **$K_A K_B K_C$** → is the Sub-Space Plane.

Proof : Fig.2 - Fig.3. (3) - Fig.4

Let ABC be any triangle (The Space) , the K_A, K_B, K_C are the points of intersection of tangents at A,B,C points of circumcircle (The Sub-Space) , A_E, B_E, C_E be the points of intersection of lines AK_A, BK_B, CK_C and the circumcircle (The Anti-space) respectively .

1.. When points A_1, A coincide, then internal lines CB_1, BC_1 coincide with sides CA, BA, so line $K_A A$ is constant . Since point A_E is on Extrema line AK_A then lines $C_E B$, $B_E C$ concurrent on line AK_A. The same for tangent lines $K_A K_B$, $K_A K_C$ of angle < $K_B K_A K_C$.

2.. When points A_1, B coincide , then internal lines CA_1, AC_1 coincide with sides CB, AB, so line $K_B B$ is constant . Since point B_E is on Extrema line BK_B then lines $A_E C$, $C_E A$ concurrent on line BK_B. The same for tangent lines $K_B K_C$, $K_B K_A$ of angle < $K_C K_B K_A$.

3.. When points A_1, C coincide , then internal lines AA_1, BA_1 coincide with sides CA, CB, so line $K_C C$ is constant . Since point C_E is on Extrema line CK_C then lines $B_E A$, $A_E B$ concurrent on line CK_C. The same for tangent lines $K_C K_A$, $K_C K_B$ of angle < $K_A K_C K_B$, i.e.

Triangles ABC , $A_E B_E C_E$, $K_A K_B K_C$ are Perspective between them , and consequently between the Spaces.

Since Triangles ABC , $A_E B_E C_E$ are Perspective between them , therefore the pairs of Perspective lines [AA_E, BC_E,CB_E] , [BB_E, CA_E, AC_E] , [CC_E, AB_E, BA_E] are concurrent in points P_A, P_B, P_C , respectively .

Since Triangles ABC , $K_A K_B K_C$ are Perspective between them , therefore the pairs of Perspective lines [$K_B A$, CB, $C_E B_E$] , [$K_A B$, AC, $A_E C_E$] , [$K_B C$, BA, $B_E A_E$] , are concurrent in points D_A, D_B, D_C respectively .

Since lines ($K_A K_B$, $K_B K_C$, $K_C K_A$) are Extrema (tangents to circumcircle) for both triangles ABC and $A_E B_E C_E$, of sides (BC , $B_E C_E$), (AB , $A_E B_E$), (AC , $A_E C_E$), then , the points of intersection of these lines lie on the same line . i.e.

This compact logic of the points [A , B , C] , [A_E, B_E, C_E] , [K_A, K_B, K_C] when is applied on the three lines ($K_A K_B$, $K_B K_C$, $K_C K_A$) then the **SIX** *pairs of the corresponding lines which extended are concurrent at points P_A, P_B, P_C for the triple pairs of lines (Pascal`s Perspectivity of points in Euclidean geometry ) , [ $AA_E, BB_E, CC_E$ ] , [$BB_E, CA_E, AC_E$] , [$CC_E, AB_E, BA_E$] and at Points $D_A$, $D_B$, $D_C$ for the triple pairs of lines [$K_B K_C$, BC, $B_E C_E$] , [$K_A K_C$, AC ,$A_E C_E$] and [$K_A K_B$, AB , $A_E B_E$] , ( Desargues`s Perspectivity of points in Euclidean geometry) and all the 18 common points lie on a straight line the→ STPL Mechanism .*

As proved   , Straight line AA_E is continuous in ,ds, with ds = 0 as points of filling , and also discontinuous   (*discrete*) with the dimensional Units , ds ≠ 0 , defining the Space , Anti-space at A ,A_E points and Sub-space at K_A , where , *ds = quantum* = AA_E/ n , (where n = 1,2,3 → ∞ , = [a+b.i] /n = complex number *and Infinitively divisible which is keeping   the conservation of Properties at End Points   A , A_E) as filling , **and continuous with points as filling** (and for n = ∞   then   ds = 0   i.e. the   ∞ Positions of points in ds) .* On line AA_E exists Euler-Savary mechanism for Couple-Curves.

2.3. Remarks on The Physical meaning of the Geometrical   Properties.

The [STPL]≡Six Triple Points Line Mechanism.

The Geometrical mould on Physical world :

1.. [STPL]   is a ***Geometrical   Mechanism*** that produces and composite all opposite Space Points from Spaces (The three characteristic points A-B-C forming a Plane) , Anti-Spaces   (The corresponding points $A_E B_E C_E$ of opposite direction through the Zero space) and the   Sub-Spaces (The Zero Plane points K_A , K_B , K_C is similar to Positive axis which passes from Zero in order to pass to the Negative axis) in a Common Circle , *Sub-Space* , line or a cylinder .

2.. Points   A,B,C   and lines   AB,AC,BC   of ***Space , communicate   with*** the   Extrema corresponding $A_E B_E$, $A_E C_E$, $B_E C_E$, of ***Anti-Space*** , separately or together with bands of   three lines at points P_A , P_B , P_C , and with bands of four lines at points D_A ,D_B ,D_C ***on common circumscribed circle***   (O , OA) , ***consisting the Sub-Space***. [17]

3.. If   any monad   AB (*quaternion or Vector*) , [s, $\bar{v}.\nabla i$] , *all or parts of it* , somewhere   exists at points A,B,C or at segments AA_E ,BB_E ,CC_E then [STPL]   line or lines , is the Geometrical expression of   the   Action of the External triangle , $K_A K_B K_C$, *the tangents as extrema is the Subspace* , on the two   Extreme triangles ABC and A_E , B_E, C_E (*of Space Anti-Space*) creating 1,3,5, spin , *the minimum Energy - Quanta .*(this is the How Opposites combine and produce the Material-Neutral) . [29]

When the monad (quaternion with real part = s = 2r and Imaginary part $\bar{v}$ =∇i = $\bar{\Lambda}$ = Ω = m.v.r) is in the recovery equilibrium

(*a surface of a cylinder with 2r diameter*) , and because velocity vector is on the circumference , then the two quaternion elements   identify with points   A,B,C (of the extreme triangles ABC of Space ABC) and Imaginary part with points A_E , B_E, C_E (of the extreme triangles $A_E B_E C_E$ (of Anti-Space) , on the same circumference of the prior formulation and are rotated with the same angular velocity vector $\bar{w}$ = 2πf . The inversely directionally is the rotated Energy ±$\bar{\Lambda}$ and 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 tangential triangles $A_E B_E C_E$) , through the only Gateway which is the center O of the Plane Geometrical Formulation Mechanism (mould) of the [STPL] line . [43]

Since the origin of Space [S] *becomes, through the Principle of Virtual Displacements as ,*

$W=\int_A^B Pds= 0$ *from Primary Point* A *which is the Space , to* A_E *which is the Anti-space as the Inner distance ,ds, of Space and Anti-Space in all Layers then , Distance*   ds = AA_E *is the Work embedded in monads and it is what is vibrated .*
Since also Work of the Inner Impulse distance of Space and Anti-Space is embedded in all material

points of universe , stationary points *, a Torsional Oscillation $\bar{\Lambda}$ in STPL mechanism happens and thus a Natural Wave-Frequency $f_m = w/2\pi$ is embedded   in Material-Geometry , from which exist the Euler-Savary equations with the rotating and Rolling curves , and thus become the   figures of Conchoide to Spirals and all the others .* [58]

Point, which is nothing and has not any Position may be anywhere in Space , therefore , the Primary point A , being nothing also in no Space , is the only Point and nowhere, i.e. Primary Point is the only Space and from this all the others which have Position , therefore it is the only Space and so to exist point A at a second point B somewhere else , point A must move towards point B , where then A ≡ B.
Point B is the Primary Anti-Space which Equilibrium point A , [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 ± Λ in the three Spatial dimensions

12

(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] . Again , since Primary point A , is the only Space then on this point exists the Principle of Virtual Displacements as ,

$$W = \int_A^B P. ds = 0 \quad \text{or} \quad [ds .(P_A + P_B)= 0] ,$$

All points may exist with $P = 0 \rightarrow$ (PNS) and also with $P \neq 0 \rightarrow$ (Spaces) because , $(P_A + P_B = 0)$ 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 $P = 0 \rightarrow P = \Lambda \rightarrow \infty$.

Work (W) is quantized on material-points as EM wave and spin $\pm(\bar{p})$ and from this , equilibrium and quantized angular momentum $\bar{\Lambda}$ which is independently of time and is capable of forming the Wave nature of Spaces , following the Boolean logic and distorting momentum $\bar{p}=\bar{\Lambda}$,

as energy , on the intrinsic orientation position of points , on all points of the microscopic and macroscopic homogeneity .
Since also in common circle rotational velocity ,$\bar{w}$, and momentum , $\bar{\Lambda}$, are constants , *and because of these the constant velocity ,c, is created* ,so thus it consist a Pure quaternion which is the cause of their Inner motion , (*This is the Electromagnetic wave which produces Spin*) and of their Outer Spin (*This is the screw helically Kinetic Energy wave Motion conjugation*) .

Conjugation equation of the two gives ,

$$(\partial/\partial t , \ \bar{w}) © (0 , \Lambda) = (- \bar{\Lambda} , w x \Lambda) =$$
$$(- \ \overline{HxP}, \nabla x \Lambda) = [\lambda , \nabla x \ \bar{\Lambda}] . [13-15] .$$

3.. The Material Geometry and Properties .

All above Geometric logic is simultaneously presented on Space , Anti-space and on the deep relation of the Material-Geometry and Physics , because by Considering $\rightarrow$ point A as the positive Space = $\oplus$, point A_E as the negative Anti-Space = $\ominus$, and point K_A as the Neutral = $\varnothing$ Space then , in Fig.5 ,
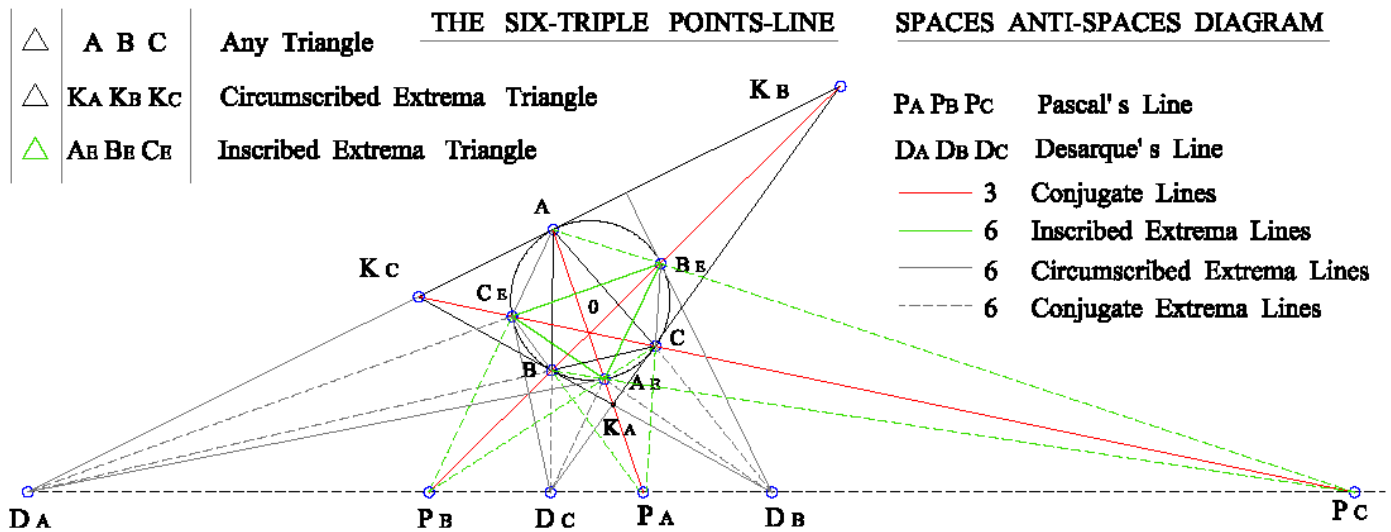

Figure.4.. *The Six , Triple Concurrency Points , Line .* [STPL] $\rightarrow$ D_A , D_B , D_C - P_A , P_B , P_C

[ABC $\equiv$ The Space] , [A_E, B_E, C_E $\equiv$ The Anti-Space] , [K_A, K_B , K_C $\equiv$ The Sub-Space]

This Property of links ,constitutes the Instaneous rotation of , Plane Space , Anti-space , [For point A is the Rotation of Triangles OAD$_A$, OA A$_E$ with velocity , $\bar{v}$, on the circumference of circle (O,OA)] with Instaneous centers of rotation D$_A$, P$_A$ on STPL Line , where then equilibrium happens on A K$_A$ straight line . Simultaneously Euler - Savary equation relates three directed quantities lying on the path normal AK$_A$ *and reduces to having* K$_A$A$_E$, K$_A$P$_A$ *always laid off in the same sense*

along the line AK$_A$*, and also the converse of Positions since inflection circle* (O,OA) *is the location of couples points whose curves have an infinite radius of curvature as in Figure 5. where angle* < AOA$_E$ = 180°*. Euler-Savary equation gives the radius and the center of curvature of this coupler curve between the Instaneous Rotation of , Space and Anti-space .*

In Figure. 5-6-7 , is shown the Lorentz factor γ $\equiv$ *sec.φ* , becoming from STPL mechanism

13

and *related to All known Particles , following the Conchoide of Nicomedes to   COSC* . [58]

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

It has been shown [16] that Projective and Perspective geometry are Extrema in Euclidean geometry into [STPL] line , their boundaries becoming from common Space and Anti-space. Energy , *Motion*, follows this Euclidean moulds, because this Proposition , *Principle*, belongs to geometry, and not to Energy which is only motion. In [33-36] Un-clashed Fragments

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

[$\pm s^2 = \pm (wr)^2$] and [$\nabla i = 2(wr)^2$] where then become Waves { *Distance* ds=AA$_E$ *is the Work embedded in monads and it is what is vibrated* } with Vibrating equations of motion becoming as

A   →   Particles, with   Inherent Vibration ,

B   →   Gravity-field-energy, without Vibration

C   →   Dark-matter-energy constituents as,

A.. [$\pm\overline{v}.s^2$] → Fermions and [$\overline{v}.\nabla i$] → Bosons,

B.. [$\pm s^2$]   → [MFMF] Field, and the binder , Field is [∇i] → Gravity force,

C.. [$\pm\overline{c}.s^2$] → Dark matter , and the binder Gravity force [∇i] , [$\overline{c}.\nabla i$] → The Expanding Dark energy.
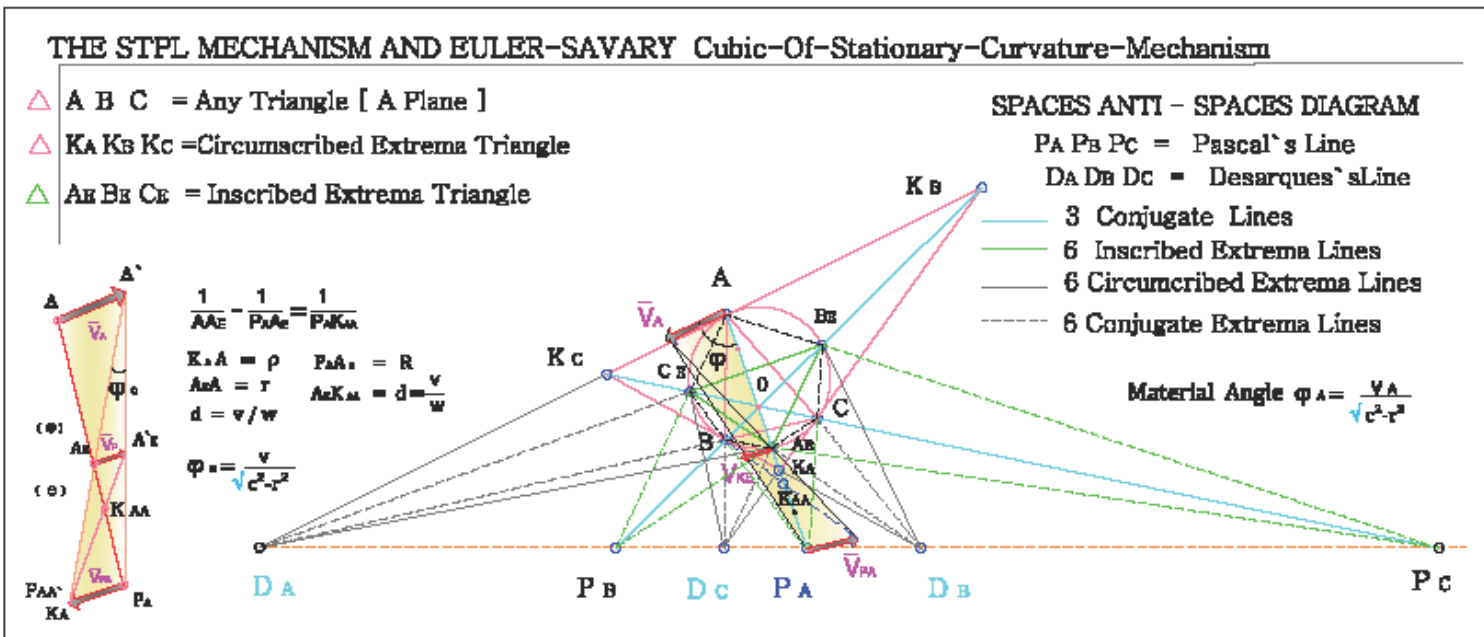

Figure.5..   ABC is any triangle (The Space) , $K_A K_B K_C$ triangle is the (The Sub-Space) , $A_E B_E C_E$ triangle is (The Anti-space) respectively . The Instaneous Pole **P** ≡A$_E$ of rotation is off the circle on AA$_E$axis .Inscribed to ABC circle is Common circle of STPL-{D$_A$-P$_A$} mechanism
The Reference System {D$_A$- P$_A$}≡[R] (x',y',z', t') *moves with velocity ,$\overline{v}$, parallel to ,* x-x', *axis with respect to the fixed and Absolute System*   {D$_A$- O} ≡ [S](x,y,z, t) **.**
The Space point , A , moving on (p) curve , and Anti-Space point A$_E$ moving on (ε) curve are rolling on the same Sub-space circle (O,OA) ≡ (O,OA$_E$) which is the common cave-circles of Material Geometry in STPL-{D$_A$-P$_A$} mechanism .

3.1. The Instaneous Pole P ≡ A$_E$ of rotation , on the Inflection-circle of Plane AD$_A$A$_E$ of STPL
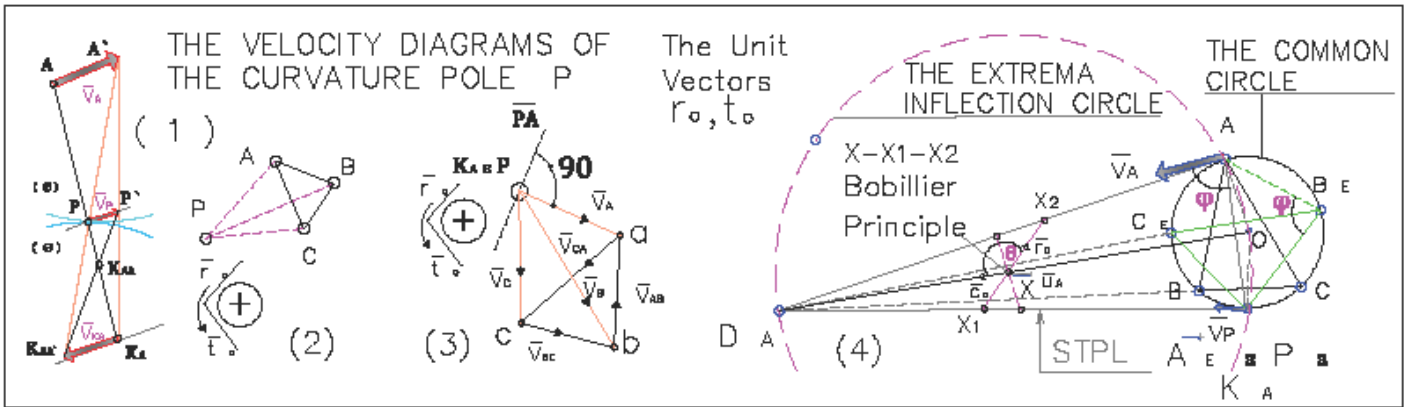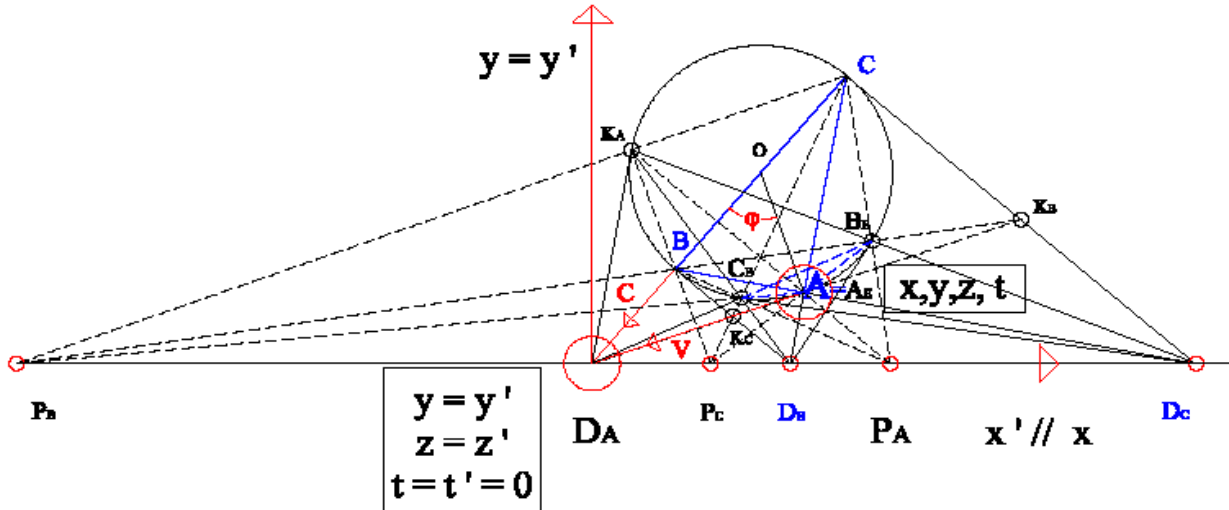
Figure.6.. ABC ,is any triangle (The Space) , $K_A K_B K_C$ triangle is the (Sub-Space) , $A_E B_E C_E$ triangle is the(Anti-space) respectively. The Instaneous Pole **P** of rotation coincides with Anti-space point A_E on the circumscribed to ABC Circle .
The Velocity diagrams for the Instaneous Pole **P** of rotation in STPL≡ [O,ABC]-{ D_A-P_A} mechanism , on the inflection circle of the Plane points A , B , C .
In (1) point K_{AA} is the velocity instaneous center for point A in S_o system .
In (2) point P is the Pole of rotation for points A , B , C .
In (3) Figure is the Velocity Diagram P–a ,b, c for points A , B , C
In (4) When STPL is Tangential to (O,OA) circle then the two circles , *The common-circle and Inflection circle* , cut on AP chord which is common to Velocities , and the Accelerations of points A , P , coincide with D_A , P_A Desargues and Pascal`s points .
On $AD_A A_E$, Material lines $X_1 X X_2$, formulate all referred curves .
Any rotation in three dimensions can be represented as a combination of a vector $\bar{v}_A$ and of a scalar angle ,φ, on $AA_E≡AP$ axis which is the *Euler rotation theorem-axis* . [58]

3.2. The Angular Momentum of any Material point in STPL mechanism .

From Physics momentum p = m.v = m $\frac{ds}{dt}$ ...(1) where → mass = the reaction to the change of velocity → |v| = the instant velocity equal to ds/dt which is the change of displacement ds , where ds = l , is Dipole =|[⊕⊖]|=∅=l=AB . [40]
Angular Momentum **L = l x p** = |l|.|p|.sin φ ..(2) where φ = Angle subtended between direction of l and p . [41]
l = a position vector . Differentiating (2) then $\frac{dL}{dt}$ = $\frac{d l}{dt}$ x p + l x $\frac{dp}{dt}$ = vxp + l x F = $\frac{pxp}{m}$ + l x F = 0/m + l x F = l x F = J . $\bar{a}$ ......(3) , where J = moment of Inertia , $\bar{a}$ = acceleration.
Since **p = m** x **v** , and which is a Torque acting on the particle about its axis through l , or $\frac{dL}{dt}$ = l x F → is a Torque also , i.e.

It is the Linear momentum .

Remark : $\frac{dL}{dt}$ = l x F = Torque → which suggests that , equation (3) is the ***Extrema case between , the Linear and Angular Momentum*** , where then for instaneous velocity v = w.r , then

L = m(w.r) . l i.e. Angular momentum is equal to the followings →
1.. To the reaction ,m, of the change of position vector ,l, through material point axis AB .
2.. To the Intrinsic angular velocity ,w, of the material Point as a cave.
3.. To circular orbit of radius ,r, of material point.
4.. The length |l| of the position vector which is the wavelength λ = 4π.r of the material point .
Since any Monad , (Unit) $\overrightarrow{AB}$= L , is the ENTITY and [A,B – P_A , P_B] is the LAW , so Entities are embodied with the Laws.

Since Entity is quaternion $\overrightarrow{AB}$, and law |AB| = length = the Real part which is the Space of points A,B then imaginary part (i)are the forces P_A,P_B or the fields in AB .
By definition i =√-m.1 and(-m1)^2= -1m i.e. [Energy]^2 = - [Space] = Anti-space and since also exists Λ x Λ = - (- m.1) ^{2} = ± Λ.∇i , the basic equation of quaternion becomes [-(ΛxΛ)/m ± Λx∇i] = [λ , ± Λx∇i]

i.e. wavelength λ = - (ΛxΛ)/m where m = a constnant depending on the reactions to the present or other conditions .

15

Applying this in energy cavities then $\lambda =$

$= e^{-i[(\frac{\pi}{2})b]^2} = e^{-i[(\frac{2\pi}{2}).b]} = e^{-i[(\pi).b]} \rightarrow$ i.e.

The Massive mechanism Diffraction and the Energy mechanism Diffraction , *The Quanta* , are Interchangable as, $e^{-i.(1,78.10-7)^2} = e^{-i.(3,56.10^-14)}$ and for Relativity massive Energy $(\Lambda x\Lambda) =$

$(- m.i) \times (- m.i) = m (i)^2 = - m.(\bar{v})^2 = - m..\bar{v}^2$, where imaginary part , $i = \bar{v}$, i.e.

The Space aquires energy as velocity .
3.3.   The Absolute and Relative Motion .

Applying quaternion equation $[-\nabla\Lambda ,\nabla x\Lambda] = 0$ for point ,O, and constant velocity , $\bar{c}$, then $[-\nabla c ,\nabla xc] = 0$ where $[-\nabla c] \perp [\nabla xc]$ meaning that it is a mechanism that instantly transports breakage masses in two directions dynamically and perpendicularly to all Inertial frames Layers .

From Velocity-Energy vector are produced the three breakages $[\pm s^2 = \pm (wr)^2]$ and $[\nabla i = 2(wr)^2]$ and from them Fermion and Bosons . [26]

Figure.7... ABC is any Right-angled triangle at A (The Space) , $K_A K_B K_C$ triangle is the (Sub-Space) , $A_E B_E C_E$ triangle is the(Anti-space) respectively. The Instaneous Pole **P** of rotation is off the Circle of diameter BC . The Poles of rotation lie on $\{D_A - P_A\}$ Reference system.

Reference System $\{D_A - P_A\} \equiv [R]$ (x',y',z', t') moves with velocity ,$\bar{v}$, parallel to , x-x', axis with respect to the fixed and Absolute System $\{D_A - O\} \equiv [S]$(x,y,z, t) .
The Geometrical expression of Lorentz factor ,γ, is as **sec φ = γ** *=* $OD_A : AD_A$ *=* $\pm 1 / [\sqrt{1 – (v/c)^2}]$ *and which is the Conchoide of Nicomedes , { s = a + b. sec φ } ,*
and which acquires the material Angle $\varphi = \dfrac{v}{\sqrt{c^2-r^2}}$

The Relative Motion

Because Properties In and On [STPL] line , are relative to the only one Equilibrium and Absolute system $\pm \Lambda = r.m\bar{v} = r.m.\bar{w}.r = mr^2.\bar{w}$, so exists that what is called Relativity. As Absolute System let it be $[S] \equiv \{D_A - O\} \equiv$ STPL mechanism , and as the Relative (Reference, Affine) System, $[R] \equiv \{D_A - P_A\}$. Fig- 7

The Relative motion $[S] \equiv \{D_A - O\}$, $[R] \equiv \{D_A - P_A\}$ of the two above Systems :
It was shown , that in $\{D_A - O\}$,(x,y,z, t) , System $\bar{c},\bar{v}$, vectors are isochrones i.e. period T = L/V $= 2\pi R/V = 2\pi/[c/r_c] = 2\pi/[v/r_c] \rightarrow c/r_c = v/r_v$ $\rightarrow$ c.r_v= v. r_c ,where r_v , r_c are the radius of their intrinsic rolling circles . In F-7 , this relation is Geometrically expressed as $\rightarrow$

sec φ = O D_A : A D_A =**γ** =
$\pm 1/ [\sqrt{1-(v/c)^2}]$ = c / $[\sqrt{c^2 – v^2}]$, and it is a geometrical Cycloid property equal to Lorentz`s ,**γ**, factor. Newton`s laws are true into Reference System $[R] \equiv \{D_A - P_A\}$ by ,

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

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

16

***Centrifugal velocity of Absolute system* [S]** *is any constant , c̄ , and this because angular velocity ,w̄, is constant also and thus , is not needed to accept apriori this constancy of velocity* **c̄ = 0 → v̄ → ∞** *on circle* **(O,OA)** *to exist in frame* , so automatically *is defined the conversion factor t = time* , between the conventional time units (second) and length units (meter = A.D$_A$) or as c̄. r$_v$ = v̄. r$_c$, → c̄ (v)(T/2π) = v̄(c)(T/2π) → c̄(v)/w = v̄(c)/w which is happening with the same ,**w**, without any restrictions , in contradiction to General Relativity which is an axiom apriori.

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

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

From figure Fig-7 , sinφ = (v̄/c̄) *meaning that the Relative system* , [R](x',y',z', t') , *(the Affine Frame) is the projection of Absolute Frame* [S] ≡ {D$_A$-O} - (x,y,z, t) *where exists as Simultaneity for all motions , i.e.*

[R] ≡ {D$_A$-A} ≡ [(x',y',z', t')] ,

[S] ≡ {D$_A$-O} ≡ (x,y,z, t) = [R] ·γ ≡
(x',y',z', t')

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

This specific state of constancy , i.e., the Centrifugal velocity of Absolute system [S] to be a constant ,c̄, 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 also 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 ,**γ**, then this following , happens also to all frames which make this motion , and so issues {D$_A$-O} = γ.{D$_A$-A} ....(2-0)

On this Relative system D$_A$(x', y'=y, z' = z , t`) are conveyed , the Breakages [± (wr)^2 , 2(wr)^2] of (O,OA) circle after the colliding with the rotating velocity v̄ = w̄.r of the [S] system , and are the fundamental particles , Fermions and Bosons, or by escaping consisting the Rest Field and Gravity , or Dark matter and Dark Energy , as analytically is shown . [39]

Remarks :

a.. Material point A ≡ ± |(w̄.r)^2| of the Fixed System {D$_A$-O} travels with velocity v̄ at point D$_A$, so geometrical distance A.D$_A$ in the Relative System [R] ≡ {D$_A$- P$_A$} is A.D$_A$ = x'+ v̄t', and because of the isochrones motion in the Fixed System [S] ≡ {D$_A$-O}, it is holding ,

x = (x'+ v̄.t').γ or x = (x'+ v̄.t')γ = [x'+ v̄.t'] / [√1-(v/c)^2] .... (2a)

Inversely, by using (2a) , where [S]≡{ D$_A$-A}≡ {D$_A$-O}/ γ , then if Material point A of the Fixed System{ D$_A$-O} travels with velocity v̄ at point D$_A$, the geometrical distance A D$_A$ in the Fixed System [S]≡ {D$_A$-O} is → A.D$_A$ = x - v̄.t and in the Relative System [R]≡{ D$_A$- P$_A$} it is → x' = (x-vt).γ= [x-vt] : [√1-(v/c)^2] ......(2b)

3.4. The *Quantization of E-Geometry and its moulds* .

It was shown in [58] that common-circle of radius , r$_c$, is the common source of vibration excitation for the Space , Anti-space , considered as rotating with constant angular velocity w̄ . The same also on all lines joining the Space , with Anti-space points , and the STPL line , and Particles acquire the Inherent Vibration ,

This vibration is the configuration of Conchoide of Nicomedes which is connecting the Glue-bond of the Spaces , and Generally the changes on axis, from Instaneous circle of rotation of the Plane Space , and Anti-space AA$_E$ in STPL mechanism.

3.4. The Quantization Meter – Moulds .
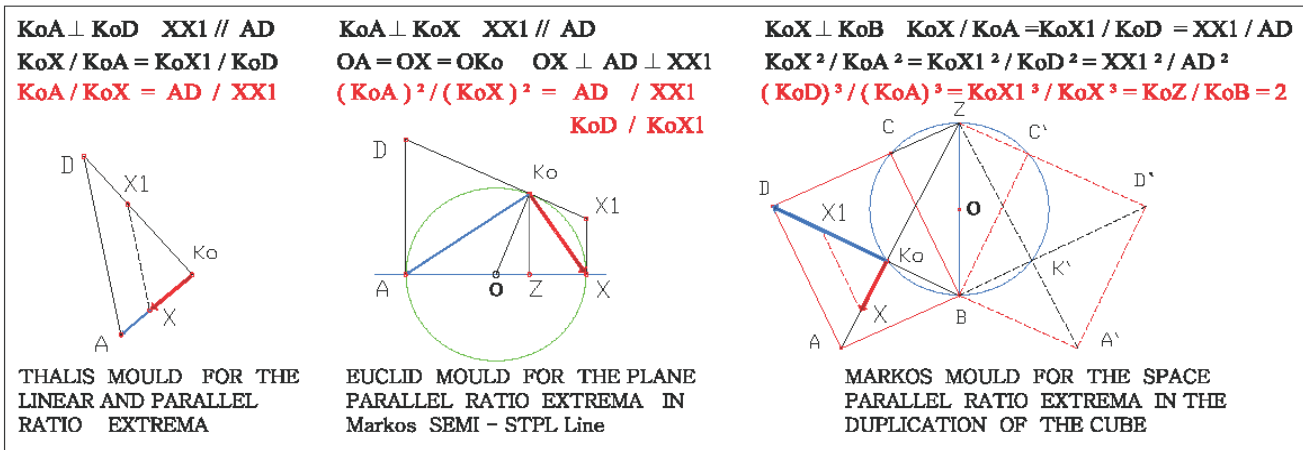
(1)   (2)   (3)

Figure.8..   The   *Thales , Euclid , Markos Mould ,*   *for the* **Linear – Plane - Space**   ,
Extrema Ratio , Meters .

In (1) is the **Linear - Ratio** where ,   length K_oA *analogous* to monad K_oX is equal
to AD / XX_1 following the Euclid`s parallels .

In (2) is the **Squared - Ratio** where ,   length K_oA *squared* to monad K_oX squared
is equal to linear ratio   AD / XX_1 following   the Euclid`s parallels .

In (3) is the **Cube - Ratio** where ,   length K_oA *cub* to monad K_oX cube   is equal
to linear ratio K_oZ / K_oB following   the Euclid`s parallels .

Quantization of   E-geometry is the way of   Points to become , *discrete* , as → (Segments ,
Anti-segments = Monads , Anti-monads) , (Segments ,Parallel-segments = Equal monads) , (Equal
Segments and Perpendicular-segments ≡ The Plane Vectors) , (The Un-equal Segments
twice-Perpendicular-segments ≡ The Space Vectors = Quaternion) . [15]
Monads and Segments being quaternion occupy Massive and Energy magnitudes called Meters .
Since points A , B , C (of the extreme triangles ABC which denote the Space ABC) are in the recovery
equilibrium with points A_E , B_E , C_E , (of the extreme triangles A_E B_E C_E which denote the
Anti-Space) and meet also in the same common circle which is the Common Sub-space , therefore
Energy between the two Spaces passes through Sub-space from   Extreme Spaces (Extreme
triangles ABC and Extrema Anti-triangle A_E B_E C_E in the Sub-triangle K_A K_B K_C meet in this
circle which is the common   to all spaces .
i.e.   common-circle of radius , r_c , is the common source of vibration excitation for the Space
, Anti-space , considered as rotating   with constant angular velocity   **,w,** .

Since Space , Anti-space are on the same circle then their relative motion is the , Rolling of Space
ABC on Anti-space A_E B_E C_E and since also this relative motion is applied on STPL line , then
D_A , P_A , points are the corresponding linear links of vibrations and Poles of rotation . [58]
Anti-segments = Monads , Anti-monads) , (Segments ,Parallel-segments = Equal monads) , (Equal
Segments and Perpendicular-segments ≡ The Plane Vectors) , (The Un-equal Segments
twice-Perpendicular-segments ≡ The Space Vectors = Quaternion) . [1]

18

3.5. The Deduction of *Projective- Geometry* And *Perspectivity* in E-Geometry and further in *Material-Geometry*

Perspectivity and Projectivity of Points :

A.. For One point A perspective point A`, lie on the straight line AA` which Coincides to axis PP` of Perspectivity .Since any Anti-point $A_E$ on Line PP` lies also on the circle of radius AA` , and since points P , P` lie on the same circle therefore points A` , P` , A_E coincide with PP` Axis of Perspectivity as in Fig1-(1).

B.. For Two points A,B perspective points A`,B`, lie on the straight line A`B` which is Parallel to axis PP` of Perspectivity . On Line PP` lie the Anti-points A_E , B_E which is the diameter *AOB of the circle* , and whose points P , P` lie on the circle . The Infinite Axis PP` of Perspectivity are Coinciding to Perspective lines of points A`,B` and are also Symmetrical to the center O as in Fig1-(3).

C.. For Three points A,B,C not coinciding , perspective points A`,B`,C` lie on the straight line A`B`C` which is Parallel to axis PP` of Perspectivity . On Line PP` lie the Anti-points A_E ,B_E ,C_E , which line PP` is *Symmetrical to center O of the circumscribed to ABC triangle circle* , and whose points P , P` lie on the circle . The Infinite Axis PP` of Perspectivity are Parallel to Perspective lines of points A`,B`,C` and also Symmetrical to center O as in Fig1-(3).

From above is seen that both Perspectivity and Projective - geometry are incorporated in Euclidean geometry and this because of the Anti-points of Material geometry .

Because the New logic , of Material Geometry responds to Physical reality , the consistent Systems of Non - Euclidean geometries - have to decide the direction of the existing mathematical logic. This is the why conversion factor , t = time, has not any essence in all universe , but it is a meter of changes only .

Since Time in Theory of Relativity is the main substance of Space - Time , then must be a quantity which has magnitude and direction and must follow the vector addition $\vec{a}+\vec{b}=\vec{ab}$. Unlike , the time intervals follow the Algebraic addition for scalar quantities a+b=t .

Proper time is measured between two events in GR Space-time and it is the Lorentz scalar ,

where there time , t , exists as a measure of changes in velocity and distance vectors of an isochronous Vectors-racing .

3.6. Waves and the exponential form of Monads

Angular velocity $\overline{w}$, and rotational momentum Λ in a cave conjugate and are represented as ,

$$(\partial/\partial t, \ \overline{w}) © (0 , \Lambda) = (- \underline{\Lambda} , wx\Lambda) = (- \ \overline{HxP},\nabla x\overline{\Lambda}) = \ [\lambda ,\nabla \ x \ \ \overline{\Lambda} \ ] . \quad [13\text{-}15] .$$

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 ± Λ and since Motion may occur at all Bounded Sub - Spaces (±Λ , λ) , 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) AiBi = $d\overline{s}$, which equilibrium by the Primary Anti-Space by an Inner Impulse (P) at edges A , B where $P_iA + P_iB \neq 0$, and it is ,

$$ds = 0 \rightarrow N \rightarrow \infty.$$

Monad , (Unit) $\overline{AB}$, Quaternion is the ENTITY and [A , B – $\overline{P}_A$, $\overline{P}_B$] ≡ Dipole =[⊕⊖]= ∅ = AB the LAW , the Material-point , so Entities are embodied with the Laws. Entity is quaternion $\overline{AB}$, and law |AB| = length = The Scalar and Real part which is the Space of points A,B and maybe any point A with its Pole B of rotation , and this since Space-curves are rolling on Anti-space curves , and Imaginary part the forces , $\overline{P}_A$, $\overline{P}_B$ or the Electromagnetic fields of AB . [58]

3.7. Cycloid → The Inner Isochronous motion of monads .

Isochronous motion of a point A , on cycloid happens in all Material-points , where the **y** axis reach **x-x** axis at the same time , regardless of the height from which they begin. This property is used for breakages on Common-circle *Before* these reach STPL line isochrones.

Isochronous motion on circles happens by the Rolling of equal circles[⊕⊖] in Material Point , due to Glue-Bond stresses {+σ-σ } with the same Period T = $\frac{2\pi}{w}$ dependent on angular velocity w , only , regardless of the position from which they begin rolling . This property is used for breakages on parallel *After* reaching STPL lines.
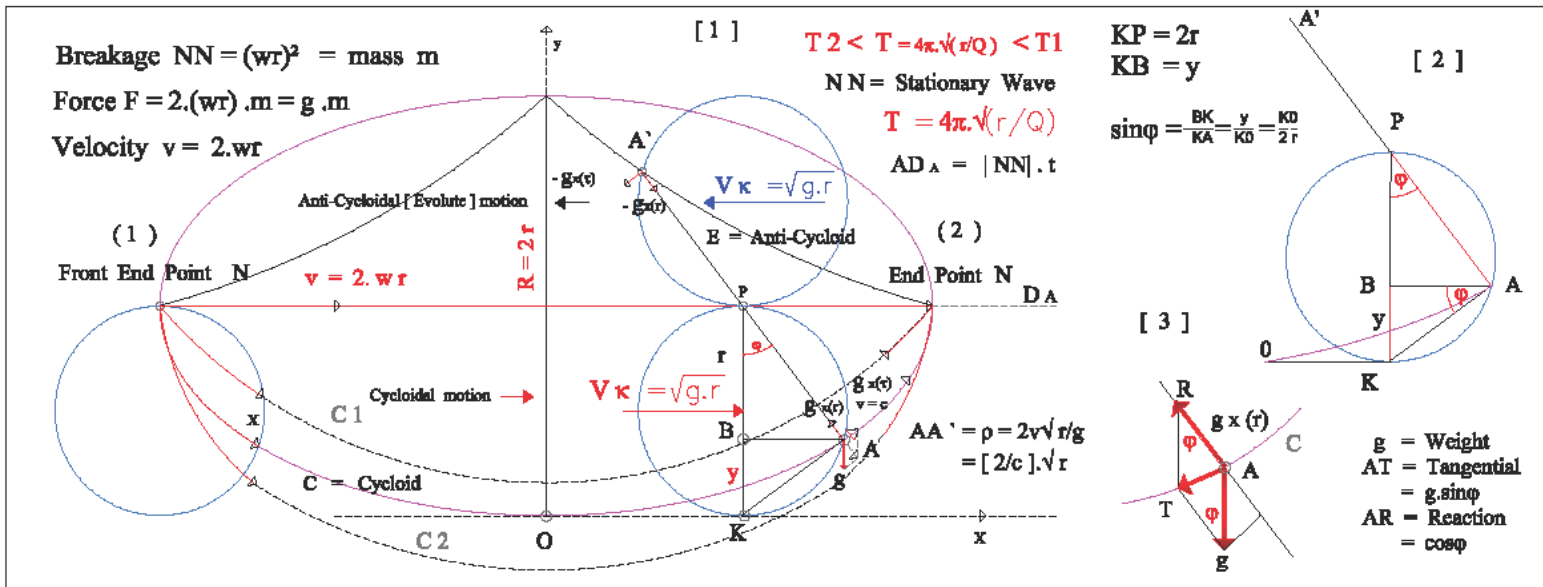
Figure.9.. *The Cycloidal motion in ,   Material Point* ≡*The monad is* Dipole ≡ [⊕⊖]=∅=AA`

where → A≡[⊕] →A`≡[⊖] → |AA`|≡ ∅ ≡*The Brachistochrone Curve* C ≡ N1→N2.
Motion on Curve C1 acquires a period   T1 > $4\pi\sqrt{r/g}$ while on C2   T2 < $4\pi\sqrt{r/g}$
which is not Isochronous .

Motion on Curve C , *Cycloid* , acquires a CONSTANT period T = $4\pi\sqrt{r/g}$ which
is Isochronous .
Monad (1) –(2) = NN The Electromagnetic Wave in NN , *is the energy distance* .

Motion of point A on cycloid [C] , equilibrium from the opposite motion of point A`

on Evolute {Anti-cycloid } . Vibration happens on AA` where the Mechanical motion

(*the velocity* ,v) transformed to Electricity (*the Electromagnetic wave*   E⊥P).

Space point A on cycloid [C] , is rolling on Anti-space point   A` of Evolute curve as the
Instaneous-Curvature Pole. [58] STPL   line is the circular Rolling motion of , Space , Anti-space , is
the cause of Vibration on the Instaneous Radius (diameter) of curvature centre of rotation through
Sub-space , and or , on every couple of lines between Spaces and Anti-spaces .
Extrema case of , *Pascal`s line-rolling of any two circles* , is Euler-Savary mechanism where
Instaneous -circle and Common-circle acquire the common Space , Anti-space Chord on where ,
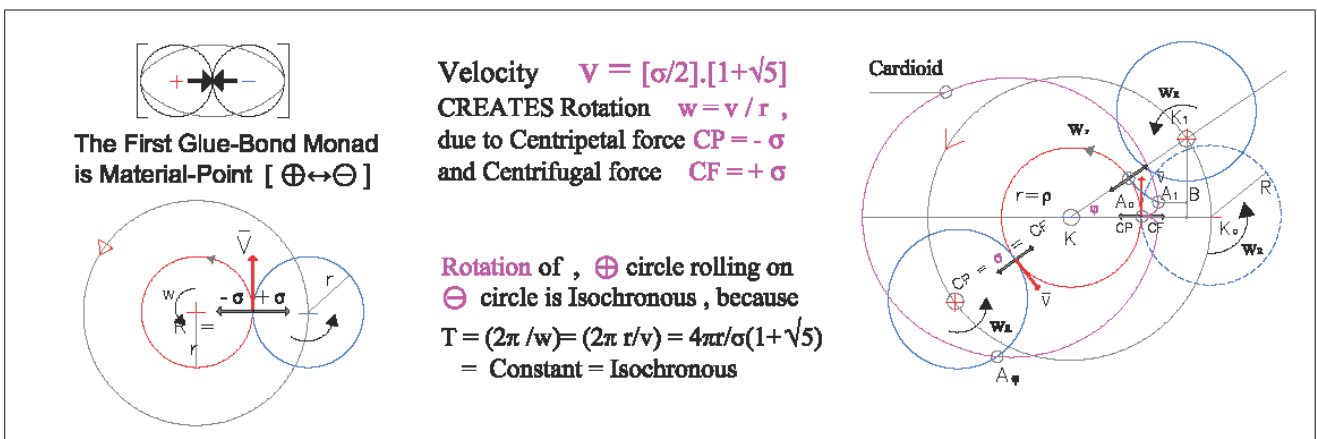*Rolling motion of the two curves is transformed to Vibration curves* .

Figure.10.. *The Isochronous Rolling of* circles[⊕⊖] (*in Material Point , due to Glue-Bond* {+σ-σ }) ,
happens because the period   T = $\dfrac{4\pi r}{\sigma(1+\sqrt{5})}$ = Constant , therefore Isochronous .

20

Properties (Fig.9) :

Cycloid is the curve described (traced) by a point **P**, on the circumference of a circle of radius , **r**, as this rolls along a straight line AA without slipping on an orthogonal coordinate system (x,y) at **O** . Let find the equation of this curve using the geometry logic in mechanics .

In absolute magnitudes $\frac{dy}{dx} = \frac{KB}{KA} = \frac{BA}{BP} = \frac{BA}{2r-y}$ and $(BA)^2 = (BP).(BK) = (2r-y).y$ and

by squaring $\rightarrow$ $(\frac{dy}{dx})^2 = \frac{y}{2r-y}$ ....(a)

which is the differential equation of cycloid ,

and or as $\rightarrow$ $(\frac{dx}{dy})^2 + 1 = \frac{2r}{y}$

For any element on trace ,ds , issues (a) and Pythagoras theorem as $(ds)^2 = (dx)^2 + (dy)^2 = (\frac{2r}{y} - 1).(dy)^2 + (dy)^2 = (\frac{2r}{y}).(dy)^2$ and

$ds = \sqrt{2r}.y^{-1/2}.dy$ and by integrating ,

$\int ds/dy = s = \sqrt{2r}.\int_0^y y^{-1/2} = \sqrt{2r}.\frac{y^{+1/2}}{-1/2} = 2.\sqrt{2ry} + C$

and since in axis for y=0 *exists* s=0 and C=0,

so $\mathbf{s} = 2\sqrt{KP.KB} = 2.\sqrt{KA^2} = 2.KA = 4r.\sin\varphi$ ...(b)

i.e. the length of Cycloid curve , from point O to point A , is twice the segment of chord KA and when point A is at the end point (2) → 2.KA=4r for the semi-cycloid.

The area between the curve and the straight line is A=3πr² and the arc length l = 8r.

For motion on cycloid , we consider a Weight Q , at point A , moving with free motion . Since reaction N is vertically acting , doesn`t give any Tangential component therefore the only one becomes from Q which is equal to AT= g. sin φ, and since from (b) , $\sin\varphi = \frac{s}{4r}$ then AT= g. $\frac{s}{4r}$.

Since acceleration = $\frac{d^2s}{dt^2} = \frac{dv}{dt} = \frac{d}{dt}(\frac{ds}{dt}) = -g.\frac{s}{4r}$

then $\frac{d^2s}{dt^2} = -g.\frac{s}{4r}$ *or* {$\ddot{x}=-w^2\dot{x}$ *where* $w=\frac{2\pi}{T}$} ...(c)

Equation (c) is a Harmonic Oscillatory motion showing that Acceleration is proportional to displacement and is directed towards the origin

with a period $T = \frac{2\pi}{w} = 2\pi.\sqrt{\frac{4r}{g}} = 4\pi.\sqrt{\frac{r}{g}}$ ...(d)

since $w^2 = \frac{g}{4r}$ i.e.

Equation (d) denotes that the Harmonic Oscillation due to any Force or Weight which follows the free motion on cycloid , is Independent of the amplitude of oscillation and , is Isochronous .

Since total period of oscillation T= $4\pi\sqrt{r/g}$ and which does not depend on speed of rolling, (Huygens cycloid pendulum) but only from rolling radius ,r, means that the arc length l=8r is completed for faster , as one revolution in less time than the slower one , meaning that ,

On cycloid all points of y axis reach x-x axis at the same time , regardless of the height from which they begin (isochrones) .This property is used for breakages to reach STPL line isochrones. Evolute also of a cycloid is a cycloid itself , (apart from coordinate shift) . Velocity vector of any motion is directed along the tangent and is the sum of the velocity vectors of the constituent motion , thus at each point A , of a cycloid , the line joining that point , to the point P, that circle is , then at the top of the generative circle is tangent to the Anti-cycloid and the line joining point A`, that is to that of bottom (of circle) is normal to the cycloid .

Evolutes of a cycloid is the balancing cycloid, and called Anti-cycloid.

The *Tangential component of Acceleration* is AT =g. sin $\varphi = \frac{g}{4r}$. s and analogous to OA arc ,

While the *Centrifugal component of Acceleration* $\frac{v^2}{\rho}$, is dependent on initial point of motion. Any Material point moving from A to P point , acquires velocity $v^2 = 2.g.PB = 2g(2r-y)$ and

$\frac{v^2}{\rho} = \frac{2g(2r-y)}{2.PA} = g.\cos\varphi = g.\frac{PA}{2r} = \frac{g}{4r}.\rho$ ....(e)

i.e. The *Centrifugal component of Acceleration is proportional to curvature radius ,ρ, with the same proportionality ratio* g/4r .

The velocity v = $\sqrt{g/4r}$. ρ is proportional to curvature radius ρ, with proportionality ratio the root of g/4r.

On cycloid , all moving points on y axis reach x-x axis at the same time (isochrones motion) regardless of the height from which they begin (they do not depend on the oscillation amplitudes) , or if , a particle of mass m=|(wr)²| =1 tied to a fix point A executes a Simple harmonic motion under the action (Thrust) of the tangential velocity $\bar{v}=\bar{w}.\bar{r}$, and since →linear momentum $\bar{p}$= [Breakage x Velocity] = |$\bar{w}$.r|. $\sqrt{g/4r}$. ρ = $\bar{w}.\sqrt{gr}$. ρ = $\sqrt{gr}.\rho.|\bar{w}|$, then follows a Cycloid`s trajectory with , a Total time period

T = $4\pi\sqrt{(r/)g}$ = = $\frac{r}{2v}.\sqrt{\frac{r}{g}}$ which is dependent

21

on angular velocity $\bar{w} = \bar{v}/r = \bar{c}/r$ only and it is the Spin of particle |AA|.

   Remarks :

   a.. Breakage **x** Velocity = $\sqrt{gr}.\rho.|\bar{w}|$, and force $F = [(\bar{w}.r)^2.(\bar{w}.r)] = 2(mg/\bar{c}). \bar{w} = 2mg.(\frac{\bar{w}}{\bar{c}})$,

This property is used to show that the wavelength of norm $|\bar{v}|$, of vectors ,$\bar{v}$, is a Stationary wave, with the two edges as Energy material nodes , Cycloidally carried on wavelength $|\lambda| = 2|A1-A2|$ twice the norm.

In Fig.9 $KA = 2.r. \sin\varphi$ and $KA.\sin\varphi = y$ so $\sin^2\varphi = y/2r$ and $\cos^2\varphi = 1-y/2r = \frac{2r-y}{2r}$ and by division becomes $\frac{v}{\cos\varphi}=\sqrt{4gr}$,which means that any Weight falling , or rolling on Cycloid from upper point A , ratio $\frac{v}{\cos\varphi}$ remains constant , and for the center of PK $v_K = v.\frac{r}{PA} = \frac{1}{2} . \frac{v}{\cos\varphi} = \sqrt{gr}$, i.e. the rolling circle has a constant *velocity* and with an area of moving circle $A = \pi.r^2 = \pi.(2r. \cos\varphi)^2 = \pi R^2.\cos^2\varphi$.

b.. Thrust is the velocity vector $\bar{v}=\bar{w}.r$ on the circumference of common circle of the inversely rotating Space, anti-Space becoming from the rotational energy vector $\pm\Lambda$ of PNS. The wavelength of norm of velocity $|\bar{v}|$ is the static equilibrium position vector of amplitude, ds, of dipole $|AB| =|\bar{v}|$ =ds and in terms of the static deflection, ds, then $T =1/f= 2\pi/w$ where ds = z = $\bar{v} = A.e^{i.wt} = \bar{v}.\cos wt + i.\bar{v}.\sin wt$.

i.e. Breakages acquire different velocities and different energy , and because are following cycloid trajectories , thus , need the same time (isochrones) to reach [STPL] line. Simultaneity is a property of Absolute system and the intrinsic property of vectors and Poinsot's ellipsoid now becomes a → < Cycloidal ellipsoid >, since on $c1(T1) > c > c2(T2)$.

Any material point [Medium-Field Material-Fragment] $\to[\pm s^2]=|\bar{w}x\bar{r}|^2 \to$[MFMF] Field following trajectory ,in=(c1), or ,out=(c2) , Cycloid=(c)=|A1-A2| needs more or less time $T(2) < T = 4\pi \sqrt{(r/g)}<T(1)$ to reach end A2.

And since frequency f = 1/T and energy E = h.f then Cycloid motion Controls constancy of Energy by changing velocity, $\bar{v} = \bar{w}.r$, and period ,T, of monads.

Breakage quantity $2.(wr)^2$ under the tangential action $\bar{v} = wr$ becomes $2.(wr)^3$ acting on point A → $2wr.\mathbf{m}$ of common circle. The same also for

points A,B,C of Space and A_E , B_E , C_E of Anti-Space . Because all velocity vectors AA,BB,CC carry material points A,B,C at points D_A ,D_B , D_C ,in time ,t, isochrones , then material points follow a cycloid with period the norm of wavelength of velocities |AA|,|BB|,|CC| . Fig.5

This Simultaneity is succeeded by Lorentz factor where transformations between Inertial frames that preserve the velocity of light will not preserve simultaneously.

c.. Work W , by a constant force $F = 2(wr)^2$ exerted on an object [breakage $\pm(wr)^2$] which moves with a distance times $dx=|(wr)^2|$ is capable of Vibration and is calculated in two perpendicular Formulations $(dx\perp dy)$ which is as, Stiffness k = N/m → velocity vector **v1** → *Electric field* E → and Flexibility f = m/N → velocity vector **v2** → *the Magnetic field P* . For more in [39-40] . The why Energy is transformed into velocity , and velocity to a field is explained also through Extrema Principle . [41]

Cycloid of Figure.9. is a cave and let this be IN Common-circle of STPL mechanism .

[1] *The applied force on this* NN *cave is*

   E = h.f = **w**.($h/2\pi$)= w . Spin , and

   Spin = $\frac{E}{w}$ = $[\pm\bar{v}.s^2]/w = (r.s^2)$

[2] **For** $E = \pm\bar{v}$ then →
   Spin = $\frac{E}{w}$ = $[\pm \bar{v}.s^2] / w =$**($\pm r . s^2$)** →

   Producing **±** *Fermions with spin* $\frac{1}{2}$

[3] **For** $E = [\nabla i=2(wr)^2=2.\bar{v}s^2]=\mathbf{2.(r.s^2)}$ then
   Spin =$\frac{E}{w}=[2.\bar{v}.s^2]/w = \mathbf{2.(r.s^2)}$ → Producing
   Bosons of spin 1

   i.e. Double energy [2.(r.s²)] on a constant cave creates **2** crests and doubling the frequency **(h) ,** with **Spin 1.** For **N-times energy [N.(r.s²)]** on a constant cave creates N crests N-times the frequency **(h)** with **Spin N/2** .

Since Energy in cave is an Electromagnetic Wave **[ĒxH̄] =** Pressure **=** Spin **S = ρ.c.w** , or **[εE²+μH²] / 2 = 2rc. sin.2φ** → then Energy / $\sin 2\varphi$ **= [εE²+μH²] / sin 2φ =** 2rc/ ρw = $4r^2$ /ρ = constant , happening only on Cycloidal motion , where **ε**=Permittivity and **μ** =Permeability .

Above property happens in *Piezoelectric-effect* where *the Mechanical Energy* as { pressure or vibration}, executed on a material point or on a Dipole =[⊕⊖]=∅=AB , *is converted into an Electric or transverse Magnetic wave* . [58]

Work from deformation is $dW =\frac{\sigma^2}{2E}(dx.dy.dz)$.

   22

It was shown that the Intensity is $I_d = \frac{\rho^2 \pi^2 c^3}{2\lambda^2}$,

and for ρ=1 then is $I_d = \frac{\pi^2 c^3}{2\lambda^2}$.[58]

Applying this to light-velocity-vector then Electromagnetic Wave $\{I_d = \frac{\pi^2 c^3}{2\lambda^2}\}$ in vector |c| , is creating a Mechanical deformation on Material point |c| { as **Outer-Spin** $= \frac{E}{w} =$ h.f }, which is then converted to an **inner** Electromagnetic Wave and which is recycled .

The linear electrical behavior of a Material point is , D = **ε** E , where D = the Electric displacement field , E = the Inside Electric field strength and then according to Maxwell`s equations ∇ . D = 0 , ∇xE = 0 and since in Elasticity , Hook`s law →

s = m. σ

   m = Young modulus then ,

Strain(s) ≡ m **x** Stress(σ)   and

∇. σ = 0 , s = $\frac{\nabla u + u\nabla}{2}$ where   u=displacement .

All above when combined in *coupled equations* then   s = m.σ +∂E   and   D = **ε** E +∂σ .

In case of a Dipole =[⊕⊖]=∅=AB in a Cave 2r , ON or OFF STPL , is [(+(wr)²)↔(-(wr)²)] and is oscillated in itself as **monad .** Fig.5-6 -12 , i.e.

The Free vibration of monad   AB =q̄=[s+v̄∇i]

oscillating under the action (a thrust) inherent in itself , subject to , *damping* , because energy is dissipated by the *stiffness* ,**k** , of monad and from a *constant of proportionality* ,**c**, regarding the motion of *mass* ,**m**, when placed into motion , the oscillation will take place at the natural frequency , f_n , which is a property of monad. **For Displacement** , x = AP$_A$,**The homogenous differential equation of this motion is** ,

     mẍ+cẋ+kx = 0   .... (1)

which corresponds physically to the free damped vibration , where   m = mass = a reaction coefficient to the change of velocity ẋ and k = stiffness = a reaction coefficient to the change of length ,|x|,   x = the displacement , ẋ = velocity of monad , k and c constants as above ,with general solution given by the equation   →   x = A .$e^{s1.t}$ + B.$e^{s2.t}$ where

s1,2 = - [c/2m] ± $\sqrt{\left[\frac{c}{2m}\right]^2 - \left(\frac{k}{m}\right)}$ and ,

S = $\sqrt{\left(\frac{k}{m}\right) - \left[\frac{c}{2m}\right]^2}$,   a constant coefficient ,
                 and for initial conditions

x(0) , ẋ(0) →   A , B   then displacement ,x, is ,

x   = $e^{-i.(c/2m)t}$.[A.$e^{S.t}$ + B.$e^{-S.t}$]   =
    = $e^{-i.(c/2m)t}$.[x(0).$e^{S.t}$ +ẋ(0).$e^{-S.t}$]   and

Oscillatory   x   = $e^{\pm i \sqrt{\left(\frac{k}{m} - \left[\frac{c}{2m}\right]^2\right)}.\ t}$ =

$\cos\sqrt{\left[\frac{c}{2m}\right]^2 - \left(\frac{k}{m}\right)}$ ± i.$\sin\sqrt{\left[\frac{c}{2m}\right]^2 - \left(\frac{k}{m}\right)}$ .....(2)
                              where ,

1.. For coefficients $\left[\frac{c}{2m}\right]^2 > \left[\frac{k}{m}\right]$, no oscillations are possible , *is the Over-Damped ≡ The Particle like nature of monad .*

2.. For coefficients $\left[\frac{c}{2m}\right]^2 < \left[\frac{k}{m}\right]$ the exponent becomes an imaginary number and the terms are Oscillatory , *it is the Under-Damped ≡ The Wave like nature of monad ,* and this because of space rotation only   ↺ .

3.. For $\left[\frac{c}{2m}\right]^2 = \left[\frac{k}{m}\right]$ then oscillatory , non-oscillatory and radical motion is zero , *It is the Critical Dumping in monads ≡ The Critical-Energy-Quantity* → CEQ *as in M-point .*

The Particle   and or the Wave nature of monads ,or when   → C$_c$ = 2m$\sqrt{\left[\frac{k}{m}\right]}$ = 2mw_n = 2.√ k.m   a relation depending on the three reactions   c , k , m .

Electromagnetic fields of monads :

Any damping can then be expressed in terms of the critical damping by the non-dimensional number **ζ** = C/C_c and   **S**   in terms of   **ζ** , $\left[\frac{c}{2m}\right]$ = ζ $\left[\frac{Cc}{2m}\right]$ = ζw_n is S = [-ζ± √(ζ²-1)].w_n and the differential equation of motion becomes ,

ẍ + 2ζw_nẋ + w_n^2x   = 0   ......(1- n)

with the general solution given by the following three cases and equations ,

For   ζ < 1   is the Oscillatory motion , *The Under-damped case ≡ Wave like nature .* x = $e^{-\zeta.wn.t}$. [A.$e^{i\sqrt{(1-\zeta^2)}.wn.t}$ + B.$e^{-i\sqrt{(1-\zeta^2)}.wn.t}$ = $e^{-\zeta.wn.t}$.{{[(ẋ(0)+ζ.w_n.x(0)).sin√(1- ζ²).w_n.t] / [w_n.√(1-ζ²)]}+ x(0).cos√(1- ζ²).w_n.t }}   ....**(2a)**

which indicates that the frequency of the damped oscillation is equal to w_d = $\frac{2\pi}{\tau d}$ = w_n. √(1- ζ²) and according to Planck`s formula E = h.f_n= h $\{\frac{w_n}{2\pi}\}$ represents the energy in monads .

 For   ζ > 1 is the Non-oscillatory motion , the *Over-damped case ≡ The Particle like nature*

23

with the two roots increasing and decreasing

with the general solution , $\dot{x} = \vec{v}$

$x = A._e{}^{[-\zeta+\sqrt{\zeta^2-1}].wn.t} + B._e{}^{[-\zeta-\sqrt{\zeta^2-1}].wn.t}$ where

A $= \{\dot{x}(0) + [\zeta+\sqrt{(\zeta^2-1)}].w_n.x(0)\}/ [2w_n.\sqrt{(\zeta^2-1)}]$

B $= \{-\dot{x}(0)-[\zeta-\sqrt{(\zeta^2-1)}].w_n.x(0)\}/ [2w_n.\sqrt{(\zeta^2-1)}]$

...(2b)

which indicates that the frequency of the damped oscillation is equal to $w_d = \frac{2\pi}{\tau d} = w_n.\sqrt{(1-\zeta^2)}$ and according to Planck`s formula $E = h.f_n = h \{\frac{w_n}{2\pi}\} = h\{\frac{\vec{v}}{2\pi r}\} = M.v_n$, *and since also* $\vec{v}_n = w_n.r$, *and* M = The complex mass , thus represents the Kinetic energy in monads depending on velocity $\vec{v}_n$ and M.

For ζ = 1 , is the Internally Isochronal oscillatory motion , (*the Inner cycloidal motion of monads*) is *The Extrema , critical damped motion case* and displacement **,x**, is as →

$x = e^{-w_n.t}. [A + B.t] =$

$= e^{-w_n.t}.\{ x(0) + [\dot{x}(0) + x(0).w_n].t\}$ ......(3b)

i.e. a double root $S1 = S2 = -w_n$ which is according to the Newton`s second law , the deformation of the real part ,|s|, which is k.|s| = - w = - mg and frequency $f_n = (1/2\pi).\sqrt{g/}$ |s| = $2\pi\sqrt{m/k}$ depending on the mass and stiffness of monad , being its properties.

Above indicate that Extrema-frequency of this critical damped oscillation is equal to $w_d = \frac{2\pi}{\tau d} = w_n.\sqrt{(1-\zeta^2)} = 2\pi.f_n$ and according to Planck`s formula $E = h.f_n = h \{\frac{w_n}{2\pi}\} = h\{\frac{\vec{v}}{2\pi r}\} = M.v_n$, *and since also* $\vec{v}_n = w_n.r$, *and* M = The complex mass , then represents the Kinetic energy in monads depending on velocity $\dot{x}(t)=\vec{v}_n$ and M , and for any position , x = x(t) , of vibration , and → When Velocity $\dot{x}(t)$ is ,

$\dot{x}(t) > 0$ then the type of response is Over x ,
$\dot{x}(t) = 0$ then the type of response is From x ,
$\dot{x}(t) < 0$ then the type of response is Under x ,

and the rate of decay of oscillation is measured on logarithmic decrement , *meaning that* ,

The Conservation of Energy in an , *Free - Vibration Un-damped system ,the* Energy is partly **Kinetic T and**,

a.. Because of the existence of *velocity vector* $\vec{v}_n$ it follows existence of mass , m , also { m = mass = *the reaction to the velocity change , which*

is a scalar quantity} and Energy-System quantity is stored in velocity vector $\vec{v}_n$ by virtue of its **velocity- vector-cave** and not in the scalar quantity .

b.. In the absence of velocity vector , mass is not existing {*mass ,which is the reaction to the constant velocity change , is zero* } and Energy-System is stored in velocity vector $\vec{v}_n$ by virtue of its **velocity -vector - cave** , although the scalar quantity is zero ,

And for the Energy partly **Potential U ,**

In the Absence of velocity vector , mass is not existing {*mass ,which is the reaction to the constant velocity change , is zero* } and Energy is stored in velocity vector $\vec{v}_n$,

a.. **in the form of Strain-energy in Elastic Deformation for the Work done and which is a Force-field for Solids**] which is reverted to an Electromagnetic field .
b.. **Strain-energy in monads is the Velocity-Cross-Product-vectors in the Homogeneous Deformation of the Work done and which is an Electromagnetic-field in the** $|\vec{v}_n|$, **Stationary - Wave – cave**] .

In [22-23] , any Monad NN = N(1) ↔ N(2) is the dipole , $(P_1 \leftrightarrow P_2)$, or **[{N(P_1) ← 0 → (P_2)N}]**

It is the symbolism of the two opposite forces (P_1) , (P_2) which vibrate perpendicularly in monad (*Resonance-cave with an Electromagnetic Response*) and are created Mechanical forces at the edge points N1 , N2 .

Balancing of Monads ≡ *Quaternions* , happens on Evolutes *Cycloid* , *Anti-cycloid* . For velocity $\bar{v} = \bar{c}$ = light velocity , curvature radius is

$\rho = XX` = 2c\sqrt{r/g}$ , and Spin S is , $\bar{S} = \bar{V}x(\tau)$ x XX` $= [g.\sin\varphi].\rho = [g.\sin\varphi].2c\sqrt{r/g} = 2c.\sin\varphi.\sqrt{rg}$ = **2c . $\sqrt{r.g}$. sin φ** , *i.e.*

Energy → c , *as Spin $\bar{S}$* , **is Unified with the Space-Energy** *as radius ,r.*

3.8. The Glue-bond of stresses in Material-point , Causes Rotation and motion .

In Figure.11-(3) , common point A executes a ± pressure on the two points of the circles K_r , K_R which is a Piezoelectric-effect , by causing a Centripetal force ,CP, and an equal and opposite Centrifugal force ,CF, which in turn creates rotation of the positive ,+, to the negative ,-, with Lever-arm Displacement , AP_A on AA_o.
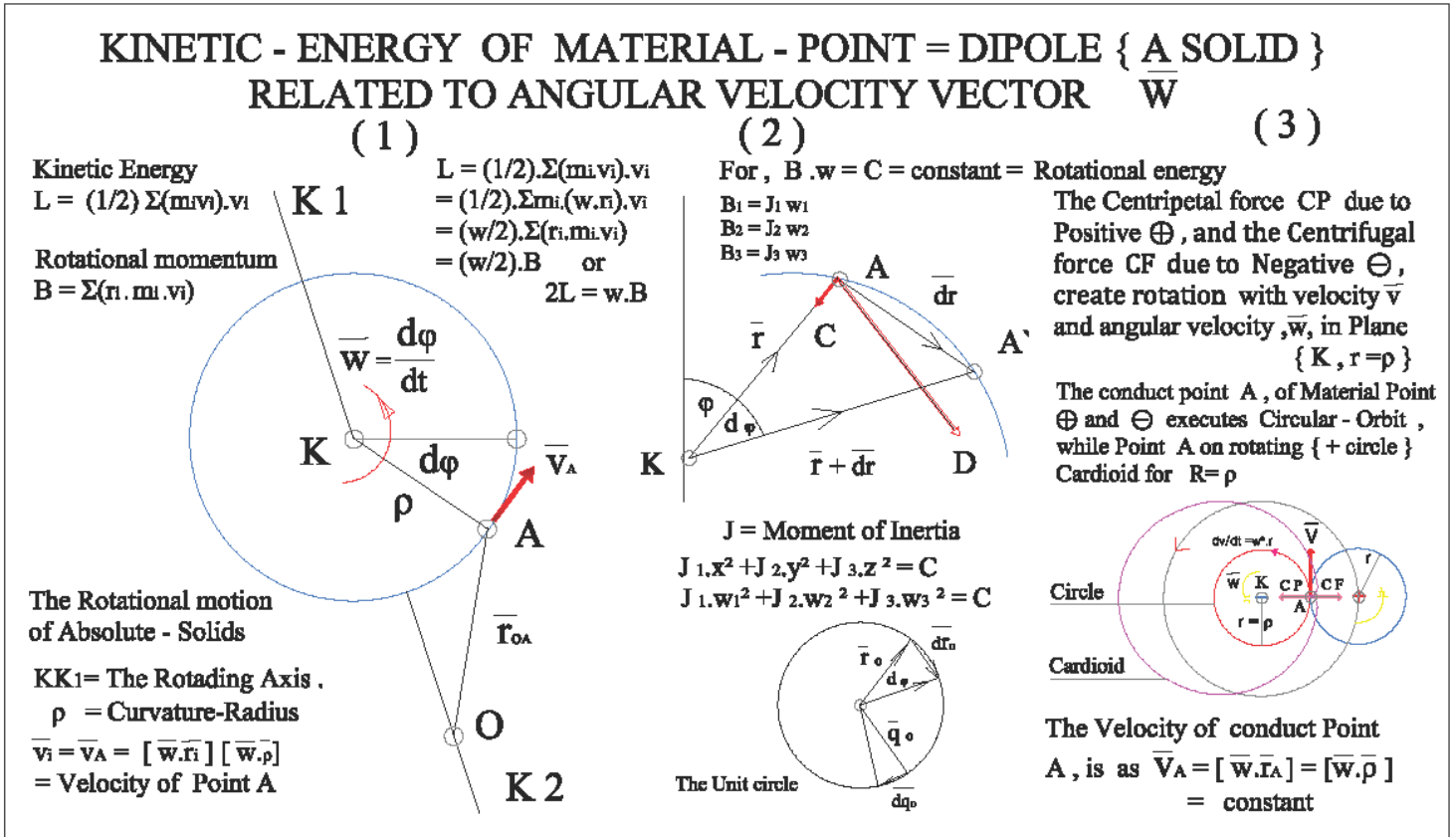
24

Figure.11. *The Cycloidal motion in , Material Point $\equiv$ The monad is* Dipole $\equiv [\oplus\ominus] = \varnothing = K_r A K_{R=r}$
where $\rightarrow K_R \equiv [\oplus] \leftrightarrow K_r \equiv [\ominus] \rightarrow \equiv 0$. The total torque becomes from $\pm$ Spin which
equilibrium in System of *circle* K_r ,*Evolute circle* K_R , as *Cardioid of the same center*.
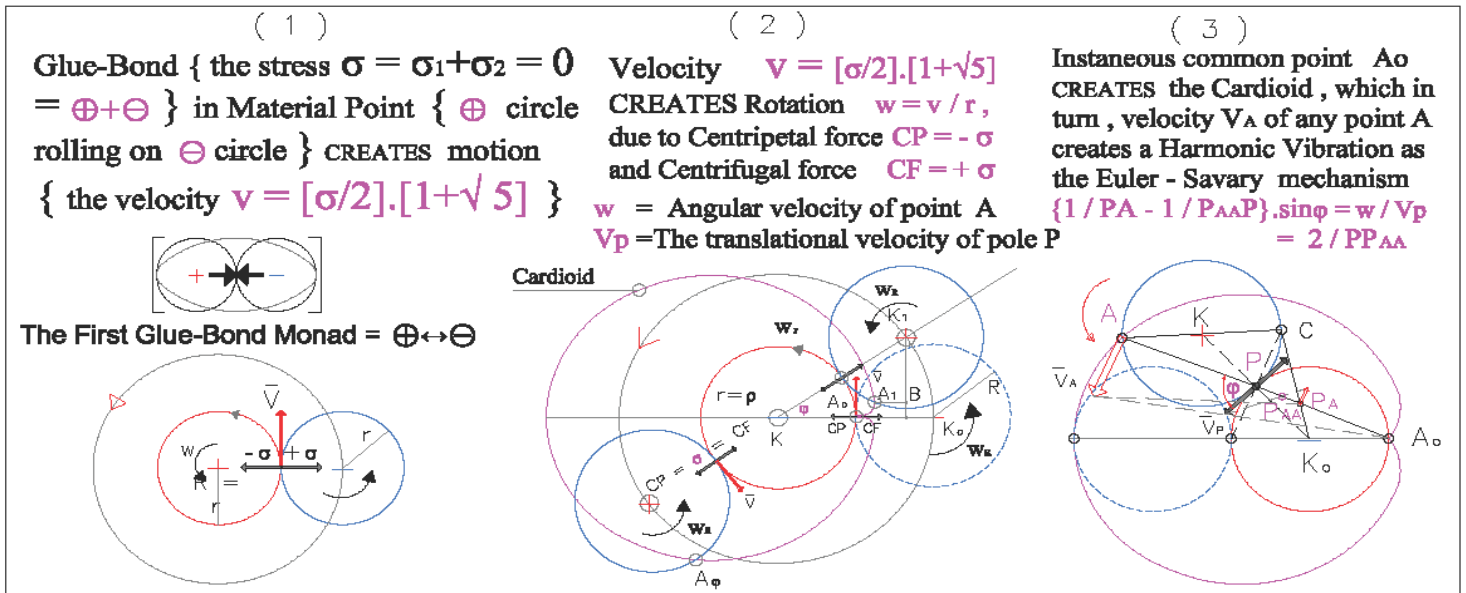

Figure.12. Pole of rotatation P , **on STPL line A P_A ,** is the Instaneous centre of rotation for $[\oplus]$,
Space on $[\ominus]$ Anti-space , through Sub-space ,$\varnothing$, and or , every couple of lines between
Spaces and Anti-spaces . Cardioid is the envelope of circles (K_o,R) , (K ,r=R) whose
centres K_o , K lie on a given circle (P,PA_o) which pass through a fixed point , Ao , on
the given circle (P , PA_o) . Analytically in [58] .

In (1) GLUE-Bond becoming from opposite ± stresses σ1= - σ2 and create Velocity $\bar{v} = \frac{\sigma}{2[1+\sqrt{5}]}$.

In (2) velocity $\bar{v}$ = w.r creates Rotation which becomes , according to Newton`s third law, from the Centripetal ,CP, and the Centrifugal force ,CF, and w is the angular velocity of point A.

In (3) velocity v_A=w.(AP$_{AA}$) of point A creates the Free Harmonic Vibration on AP monad following the Euler-Savary mechanism where , *Rolling motion is transformed to known Vibration curves* .
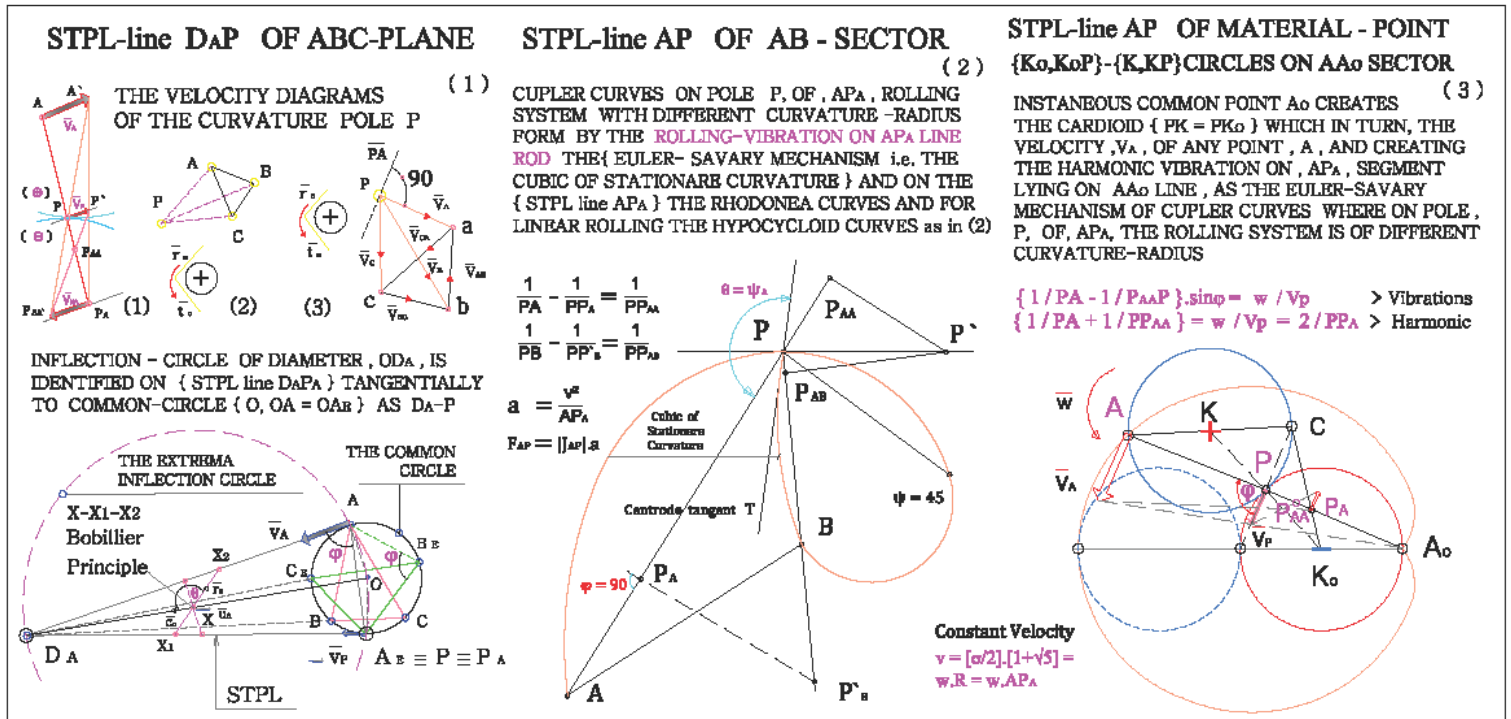

Figure.13.. The STPL line , **In** *a Material point* {⊖≡ K_o,K_oP – ⊕≡K , KP} , **In** *a Material-Segment* {AP} , *and* **In** *a Material-Plane triangle* { ABC } is as in (3),(2),(1)   .
   (±) Breakages { *in STPL lines* } become the *, Vibrating Curves of Material points* .

   In (1)   STPL line *of Plane ABC* , *extrema* $D_AP_A≡D_AP≡D_AA_E$ ≡ ,r, is tangential to Common-circle , and *Inflection- circle* passes through Space-point , A≡[⊕] , Anti-space point A_E≡ [⊖] ,which coincides with the Instaneous curvature-centre of rotation , *the Pole P* , and thus forming the material angle , $\vartheta = \vartheta_A. t = (\frac{v_A}{\sqrt{c^2-r^2}}) . t$, on angle < AD_AP .
All chords through the Sub-space Plane-triangle A D_AP , follow Bobillier-Principle for curvature centres D_A and CREATE the Vibrating Energy-Geometry-Segments D_AA ,D_AP .
Velocity of point   A , is v_A=$w_A. r_A$, *where* , w_A= the angular velocity of point A , r_A= the distance , AP, between the moving (+) point A and (-) point P the Pole .

   In (2)   STPL line , *of sector AB*   which two points , A , B , are OFF Common-circle , and lie on the circumference of Envelope-circles , *O,OA=OB* , with the common Anti-space point , P(-) , and thus forming the material angle   , $\vartheta = \vartheta_A. t = (\frac{v_A}{\sqrt{c^2-r^2}}) . t$, with centrode tangent T.
Euler-Savary mechanism establishes the relation among points A , P, P_A and P_{AA} and CREATE the Envelope curves , *Stationary-curvature paths* , generated by the Vibrating →Velocity-Energy - Geometry Segment A P_A , on AP line .

   In (3)   STPL line , **of** *Material point AP* , {⊖≡ K_o,K_oP – ⊕≡K , KP} of Space point A (+) and Anti-point P(-) is rotating through point A_o , which is the center of common-circle and forming the material angle , $\vartheta = \vartheta_A. t = (\frac{v_A}{\sqrt{c^2-r^2}}) . t$, CREATE the Cardioid-Envelope curves generated by the above Vibrating Velocity-Energy-Geometry-Segment   A P_A , on AA_o rotating line .

26

Synopsis   2 :

Point in E-Geometry , which is nothing and dimensionless , i.e. the Zero , can be derived from the addition of a Positive (+) *and a Negative* (-) *number , while* **Material point has dimension ,ds, and Energy the Work W** , *the Segment* **ds** = [⊕⊖] *and Work*   **W** = P.ds , *and originates in the the same way . Adding it to numbers i.e. to Monads ,* **creates Primary Particles , the Rest-Gravity constituent and the Atoms of the Periodic System** *in Planck`s Space-Level .Monads are Spinning because of the* **Inner Electromagnetic Waves**   , E ⊥ P , *which* **create External Spin** *and again the* **Inner Electromagnetic Waves**   , E - P , *continuing this eternal Cycle .*

In Mendeleyev`s Periodic Table , chemical properties of the elements are a periodic function of their atomic weight and in [58] was shown that   **, any Next-Atom Energy , is equal to Prior + the distributed.** *Since* all material points are produced from   (±) Breakages which consist the

[⊕ ,⊖ ,☼] Energy-Units as follows ,

Breakage s^2 = +$(wr)^2$ = The Positive ⊕   Unit ,

Breakage   - s^2 = - $(wr)^2$ = The Negative ⊖   Unit ,

[⊕↔⊖] = ∅ =The Rest Energy Quanta ≡ 0 the Zero Unit ,

Breakage $2s^2$ = 2$(wr)^2$ = The Energy   ☼   Unit , then

Primary Segment of Material-point *is of the* **Form** [⊕↔⊖] = ∅ = 0 , *and its* **Content** $\bar{v}$ = $\frac{\sigma}{2[1+\sqrt{5}]}$,

Finite |⊕↔⊖| *and* **Infinite** , $\bar{v}=\bar{w}.r=\infty.0$, *to all Monads* $L_v = e^{i.\left(\frac{N\pi}{2}\right)} b = 10^{-}N = -\infty$, *and for* N≡$\bar{w}$=∞ → 0 , *the* **Atraction** [⊕↔⊖]*and the* **Repulsion** ⊕→ ←⊕ , *the* **Quantity** *in Real part* Form AB=L_v=|⊕↔⊖| *and in Imaginary part* [⊕↔⊖]=0 , *and the* **Quality** [⊕↔⊖=σ] ≠ 0 *by differentiation , and so on .*

Since also **Imaginary Part** *is always* [⊕↔⊖] = 0 *then Form and Content are absolutely inseparable and pass from zero for all Opposites , so all Entities are embodied with the Laws , and since also valid* [⊕↔⊖] ≠ 0 *then ,*   *the* **Zero equality is the Constant and Critical-Energy-Quantity** → CEQ *and is* {{ Stress , σ = CEQ is Producing velocity $\bar{v}$= w.r , *and consists the* **Hidden-variable of this tiny and Self– Moving– Energy– Dipole , System** }} , *for any transition in Quality , a kind of Constant-Catalyst which is not changing the composition of Primary Material-Segment ,* the unity of opposites *and also the Work* ≡ *Energy involved in all levels . In this way in nature nothing remains constant because by changing ,w,r, in an eternally existing constant velocity vector* $\bar{v}$ *then everything is in a perpetual state of transformation , motion and change . The Rest Energy-Quanta acquire a Resistance in motion which is Stress ,* σ = CEQ , *i.e. a meter , a number measuring this magnitude and it is that what is called* **Matter** *which has nothing to do with energy.* **GR considering Energy and Mass equivalent** *creates a great confusion because , Energy is motion is the* **Content** $\bar{v}$= $\frac{\sigma}{2[1+\sqrt{5}]}$≡[⊕↔⊖] , *while Mass* **is a Number** *measuring the changes in*   *velocity-vector motion* |$\bar{v}$| , *and it is the law ,* **while Content** |AB| ≡ |$\bar{v}$| ≡ [⊕↔⊖]≡ *The Energy length (the energy-quanta) of opposite points* |A ,B| .

In Primary-material-point , **Form** (r) **and Content,** [⊕↔⊖] , *is constant while in all others issues the law of transformation of* **Quantity into Quality** , *extended from the smaller particle to the largest phenomena . Since Material-point is of Form* [⊕↔⊖] = ∅ = 0 *it is with binding points with no energy released . Since mass is the meter of Energy-velocity-vector changes , then this meter cannot exceed the frequency of light-velocity . The why light-velocity* $\bar{v}$ *is the maximum and constant in* [58] .

Changing the Form(r) *means much more the Content* ⊕ *or* ⊖ , *or* [⊕↔⊖] ≠ 0 , **is Negative-Energy ,** *while the ,* **Changing of Content ,** *is an increasing in frequency which occurs in standing-waves and where then decreases the reaction to the motion (the mass) , because* v = w.r = $\frac{2\pi r}{T}$ = 2πr.f = constant .

It was shown in [58] *that ,*   **any Next-Atom , Energy** , *is equal to Prior + the distributed i.e.* **the law of Quality and Quantity** *.The same also in Chemistry from gas to liquid or solid which is usually related to variations of temperature and pressure .*

Anti-Energy or Negative-energy is not existing because it is the Difference between the two (+) ≡ ⊕ *and* (-) ≡ ⊖ *Contents , in Energy-Form , i.e. it is a meter of the difference between the two magnitudes .*

Energy , motion , and **the reaction to the change of velocity-vector** , *mass , are absolutely inseparable.*

Remarks in Figure 13 :

a.. It was shown in [58] that *Clashed Breakages which are located* IN *the STPL Cylinder , Acquire Oscillation from their inherent Vibration as in* (1) –(2) , *and consist the Moving   Particles while , Un-clashed Breakages located* OUT *the STPL Cylinder , Acquire Oscillation from their between Glue-bonding and consist the Rest Particles* (3).

In all cases , STPL line mechanism consists the < Energy-Geometry-Length ≡ Quantum ≡ AP >

The Space as Velocity-vector-energy V , in the cavity of the Common-circle of radius ,r, and constant angular velocity ,w , is transported as Energy from point A to Pole P , coinciding , with Point P as $P \equiv A_E \equiv P_A$, where then the two conjugate points ,T,J, lie on STPL line as Pascal`s P_A and Desargues D_A points with the constant angle < φ = < $D_A AP_A$ ≡ < $D_A OA$, on Common circle and on Extrema circle .

b.. Since all properties of Physical entities exist only in Pairs and exists the scientific notion that < Opposites   Attract   > < Similar   Repel   > then ***considering*** , Material point A≡[⊕]Anti-space point A_E≡[⊖] or AA_E = AP as a ***Physical System*** which has only one physical property which is ***Stress ≡ σ*** can predict measurements produced , and also results which are according to the Newton`s second law , the Forces of Circular motion and tangential and angular velocities $\bar{v},\bar{w}$, **v̄= w.r** which is the ***Hidden-variable of the System*** .

This continuously equal velocity v̄, creates on any Material-point [Point , A–Anti-point P=A_E] ≡{Energy-Geometry-Length ≡ Quantum ≡ AP } the envelopes of Cardioids which are of Wave function , whose domain is the configuration space in ***Material-point -energy-equilibrium***. Since also an Isolated system does not loses or gain Energy so , this Material-point is self consisted and <u>constitutes</u> , ***The First Eternal***

 < ***Self – Moving – Energy – Dipole***   > ≡   ***The Quantum ,   of this cosmos .***

c.. It was proved in [58] that , in case of a curve rolling on its constant envelope curve , then the curvature center of the envelope curve coincides to that of the rolling curve . In Figure 12-3,Euler-Savary mechanism on AP is [$\frac{1}{PA}$ - $\frac{1}{Paa\,P}$].sin φ = $\frac{w}{Vp}$ = $\frac{Angular\ Velocity}{Tangential\ Velocity}$, i.e.   a *Geometry-energy-motion relation in the*

Material-Point , where energies become from , **w** , is the angular velocity of point A   and v_P is the translational velocity of pole P , and Creating the curves , Free Harmonic Vibration .

d.. It was shown in [14-16] that , *in The Elastic material   Configuration the Strain energy   is absorbed as Support Reactions and displacement field in the three dimensions* [∇**ε** ($\bar{u},\bar{v},\bar{w}$)] *upon the deformed   placement* , (these alterations of shape by   pressure or stress is the equilibrium state of   the Configuration) , *as*

$G.\nabla^2. \varepsilon + [m.G / (m-2)] . \nabla [\nabla. \varepsilon] = F$, *where*

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

The linear electrical behavior of a Material point is , Ď = **ε** Ê , where Ď = the Electric displacement field , Ê = the Inside Electric field strength and then according to Maxwell`s equations ∇ . Ď = 0 , ∇xÊ = 0 and since in Elasticity , Hook`s law → **ε** = E . σ   and then , ∇. σ = 0   ,   **ε** =$\frac{\nabla u + u\nabla}{2}$ *where* u=displacement . All above when combined in *coupled equations then →*   **ε** = E . σ +∂Ê   and Ď = **ε** Ê +∂σ …(1) and since in Material-point   σ =2(1+√5).v̄ = constant , *since*   v = w.r , then (1) becomes ,

ε = E . σ +∂Ê =   2.E(1+√5). v̄+∂Ê

Ď = **ε** Ê +∂σ =   **ε** Ê +0 =   **ε** Ê   ………(2)

System (2) defines the Strain **ε** ,and the Electric displacement field   Ê = [⊖] ,in Material-point .

3.9. The Geometry of STPL .

In Figure.3-(3), the tangents at points   A,B,C formulate triangle $K_A\ K_B\ K_C$, the inscribed to it largest circle O,OA=OB=OC , which incenter is the intersection of the three internal angle bisectors at K . Because the internal bisectors of angles are perpendicular to their external bisectors , it follows that the centers of the incircle together with the three excircle centers form an orthocentric system .On this coordinate system is possible any geometrical analysis.

By using the Trilinear coordinate system on ABC Space –triangle then for , Incenter   is   →   1 : 1 : 1

28

Excenters is   →   -1 : 1 : 1 , 1 : -1 : 1 , 1 : 1 : -1

Incentral triangle Vertex opposite A = 0 : 1 : 1
Incentral triangle Vertex opposite B = 1 : 0 :1
Incentral triangle Vertex opposite C = 1 : 1 : 0

External triangle Vertex opposite A = -1 : 1 : 1
External triangle Vertex opposite A = 1 : -1 : 1
External triangle Vertex opposite A = 1 : 1 : -1

Defining the lengths

$a = K_B K_C$, $b = K_C K_A$, $c = K_A K_B$,
$d = [\frac{a+b+c}{2}]$ = The semi-perimeter then

Inscribe radius r = $\frac{\sqrt{d(d-a)(d-b)(d-c)}}{d}$ = |OA|

Coordinates for point   K   are,

$\frac{bc}{b+c-a}$: $\frac{ca}{c+a-b}$: $\frac{ab}{a+b-c}$

Coordinates for point   O   are,

$\frac{b+c-a}{a}$: $\frac{c+a-b}{b}$: $\frac{a+b-c}{c}$

The STPL mechanism is the Mould consisted from any Common circle $O,OA=[OA`\equiv OA_E]$, $O,OB = [OB`\equiv OB_E]$, $O,OC = [OC`\equiv OC_E]$, **and the common lines** D_A-P_A , D_B-P_B , D_C-P_C all on a line of STPL . **On the infinite sectors** AD_A-AP_A , BD_B-BP_B , CD_C-CP_C **vibrate the breakages** [± $s^2 = \pm (wr)^2$] and [$\nabla i = 2(wr)^2$] **forming all families of curves and the Euler-Savary Coupler-curves of the Cubic-Of-Stationary - Curvature mechanism of Space , Anti-space Vibrating end-curves .**

Dimensioning of the mechanism is possible by using   analytical geometry.

4..   Epilogues .

The origin of Space [S]   *becomes , through the Principle of Virtual Displacements* $W = \int_A^B P.ds$ = *0 , from Primary Point   A which is the Space , to point   B which is the   Anti-space as the Inner distance of Space and Anti-Space in all Layers becoming as shown from   STPL Mechanism .*
The origin of   Energy *becomes , through the same Principle because are co-related and is the Work executed by the displacement ,* ds *, which is conserved and never vanishes .*
This means that Universe is Energy-Space and nothing   else , which follows the Glue-Bond - Principle in all Positions and Layers starting from

The First Eternal   < Self – Moving – Energy - Dipole > ≡   The Quantum ,   of this cosmos.

The Torsional oscillation *of Caves (cleft , slit)*

w , is transformed as inner Wave-frequencies which   in turn ,   to   monads and moving Particles transforming Inward-Spin to the Outward-Spin and motion . All above are produced in and from STPL .

Energy produced *by Reference System* {D_A- P_A}≡[R] (x',y',z', t') *moves with velocity ,*$\bar{v}$, *parallel to , x-x', axis with   respect to the fixed and Absolute System* {D_A- O} ≡ [S](x,y,z, t) *and is conserved .*

Energy of the whole universe *is defined as a whole , all at once , and not , the Energy of different pieces.*
   It was referred that Energy in Gravitational – Field is Torsional and Negative and always attractive . [27]

In General-Relativity *is referred that Space time is giving energy to matter or absorbed it from matter ,and thus the Total energy is not conserved . Here are not   clarified the three Basic Quantities ,* **Energy , Matter and Time** *.*

The   Argument < Energy is not conserved but it changes because Spacetime   does >

is the great-confusion for these magnitudes *.* In [31-36]   and [39] was clarified that →

1) Because of Zero acceleration of rotational velocity $\bar{w}$ in a cave , velocity $\bar{v}$ is also constant , so thus GR   failed   **to explain the WHY   speed of light is constant** , considering constancy of light as an axiom from which derived the rest of its theory .

2) For the reality of discrete monads , GR failed **to explain the WHY → Wave nature , is the Intrinsic   Electromagnetic Wave of Particles** and speed of light is constant in a Stress-Strain System with (where Red-shift happens as low **f** and-Blue-shift , as high **f**) Photon to be as Particle and Wave also as above, but considering constancy of light as an axiom deriving theory .

Here is referred that , Since the mass is equal to **m** = $\frac{2}{c^2}$ $(wr)^3$ = $\frac{h.w}{2\pi.c^2}$, *analogous to energy w ,* → then   **mass is a factor measuring energy** ,

3) GR , by Appealing space-time a Priori   is **accepting the two elements , Space and Time , as the fundamental elements of   universe** without any proof   for it , and so anybody can say that this   **Stay on air** .

It has been proofed [22-26] that any space AB is composed of points A,B which are nothing and

equilibrium by the opposite forces $P\overline{A} = -P\overline{B}$ following *Principle of Virtual Displacement.*

4) GR by Presenting Time as element of universe *could not perceive that , Time (t) is the conversion factor between the conventional units (second) and length units (meter) , and by considering the moving monads (particles etc. in space) at the speed of light pass also through Time ,this is an* **widely agreeable illusion** *. It was proved that Time is a meter ,* **A number** *, measuring the alterations of Space concerning velocity* .

5) GR by Presenting Space-Time universe **Becoming from Big Bang** is accepting Infinite priors. Euler-Savary equation of couple-curves is related to the Tangential and angular velocity from (Space , *Path* , Anti-space , *Evolute*) and is

The Rolling-Glue-Bond of Space , Anti-space , and which happens on the instaneous center of curvature by STPL line . [58]

6) The Energy - Space Genesis Mechanism : Everything in this cosmos , is Done or Becomes , from a Mould where ,

In Geometry Mould is the Monad , the discrete continuity AB from points ,

In Mechanics-Physics Mould is the Recent Acquisition of Material-Geometry where , Material-point =The discrete continuity $|\oplus + \ominus|$ = **The Quantum** = Energy distance ,

In Plane Mould is number ,π, becoming from the Squaring of the circle as extrema case ,

In the Space ,volume, Mould is the number $\sqrt[3]{2}$ becoming from the Duplication of the Cube

[STPL] Geometrical Mechanism , is itself the Mould which produces and composite all opposite Spaces and Anti-spaces Points , to Rest-Material-points which are the three Breakages $\{[s^2 = \pm (\overline{w}.r)^2 , [\nabla i] = 2(wr)^2]$ of [MFMF] Gravity , under thrust $\overline{v} = \overline{c}$ } , where become **Fermions** $\rightarrow$ **[±v̄.s²]** and **Bosons** $\rightarrow [\overline{v}.\nabla i = [\overline{v}.2(\overline{w}.r)^2] = $ **[v̄.2s²]** .

Big Bang and GR was the temporary solution to the weakness of what men-kind had to answer . Nature cannot be described through infinite concepts , as this can happen in Algebra and values , because are devoid of any meaning in our Objective - Reality , or the Physical world , *or the Nature* or the cosmos .
Solutions of geometric classification problems with moduli Spaces , and Algebraic geometry by giving a universal space of parameters for the problems , must follow the -logic of Geometry.

And which is this logic ? This way of thinking is nothing else than the Dialectic way of thinking for solving the geometrical problems.

Material Geometry is the Science and the Quantization-Quality of this Cosmos which joints the , infinite dimensionless and the meaningless Points , *which have only Position* , with those of Nature which are *Qualitative the, Positive - Negative - Zero Points and which have , Positions , infinite Directions and Magnitudes with infinite meanings* , which through the Physical laws are the language of them in itself . One of the most important concept in geometry is , *distance* , which is the Quanta in geometry, while in Material-geometry the composition of opposite , which is the Quanta in Chemistry and Physics . A wide analysis in [58] Book .

The Work , *as Energy* , is the Essence of this deep connection of Material-Points , *The Space* , and through the Conservation-laws is making the Material-Geometry from STPL mechanism .

Extension of the Material - Geometry to the chemical-sector gives the possibility for new materials in a drained way of thinking .

In summary, my personal confidence is that nature is produced from Euclidean Geometry moulds as Space only, by following the Principle of Virtual work , and not any other logical starting point.

The essential difference between Euclidean and the non-Euclidean geometries has been attentive in the very specially written article [32] for the nature of the parallel lines, a unique Postulate directly connected to the physical world . Now, [STPL] line (doubled cylinder in spatial CS) is the creation Mould for Particles, *Quanta*, which are created between all the Space-Levels and which Spaces are directly connected . [58]

Particles and Forces consist the monads *i.e.*

The Vibrations caused by the varying lever arms , *the varying lengths between Cycloid and Anti - cycloid of inner structures of monads ,* and which cause the Inner Electromagnetic waves and Spin of Energy caves create motion . Inner

Spin and EM wave is transformed to the Outer Electromagnetic Wave of Particles as this is in Photon .Their Inner Electric and Magnetic forces are related to gravity`s forces , and thus unify all physics . Moreover , the articles concerning the Ancient and Special unsolved till yesterday Greek problems of E-geometry argue , and defense on all the above referred . [44-49]-[52]

30

Synopsis   3 :

The Material-point *is the discrete continuity* **Content** $\equiv |\{\oplus+\ominus\}| =$ ***The Quantum*** through mould of Space –Anti-space in itself , *which is the material dipole in inner monad Structure and is Identical with the Electromagnetic cycloidal field of Energy monads .This is ,*the Energy-distance $\equiv$ **The Form** , *and consists the deep concept of Material-geometry ,* ***i.e.***

Material-Point becomes as , DISCRETE - FORM , from Euclidean-Point which is the CHAOS , by the Eternally-Moving-Content → the in Mode Content of existence , which is the Energy-Quanta in Mechanics. In Article is clarified the How , the When and the Why CHAOS becomes DISCRETE and thus Joining Euclidean-Geometry – Mechanics – Physics in One Unity and with the same Universal Laws , from Zero $\equiv$ Non-existence $\equiv$ Chaos , to Discrete , Microcosms to Macrocosms .

***In Primary**-material-point , **Form** (r) **and Content**, $[\oplus\leftrightarrow\ominus]$, is constant while in all others issues the law of transformation of **Quantity into Quality** , and this is extended from the smaller particle to the largest phenomena , i.e. in all levels of the Energy-space universe .*

Form (r) , **of *Material point* AB** ,$\{\ominus\equiv K_o, K_o B - \oplus \equiv K, KB\}$ *of Space point* A $(\oplus)$ *and Anti-point* B$(\ominus)$ ***and created on STPL Mould*** *by the rotating velocity vector* $v_A = w.r$, ***is forming*** *the material angle ,* $\vartheta = \vartheta_A . t = (\frac{v_A}{\sqrt{c^2-r^2}}) . t$, *which in turn* { **r** *and* ϑ } *create the Envelope of Harmonic-Vibration-curves on this ,* r , ϑ *rotating STPL line .*

*The transformation of **Quantity into Quality** can be seen in many levels as , the velocity* v_A *of any point* A *in Primary-Dipole* AB *creating Infinite Free Harmonic Vibrations on* AB *monads , following Euler-Savary mechanism where Rolling motion is transformed to Vibration curves , and on different waves which properties is determined by the number of oscillations per second ,   i.e. the **frequency related to vibrations** is the quantitative change giving rise to different kinds of the wave-signals. Increasing the rate of vibrations turns the colours from Red indicating low frequency , to Orange - Yellow , to Violet , to the invisible Ultra-violet and X-rays , and to gamma rays .*
Reversing the process at the lower end , we go from infrared and heat rays to radio-waves , as in [39]. *Also the changing of Temperature offers no resistance to electric-currents   and for Helium which is the only substance which cannot be frozen because is in Primary-Form and exists the Critical – Energy -Quantity   CEQ as before . The difference between Organic and Inorganic Chemistry is only relative , i.e. the different collection of atoms and the DNA structure.*

The elementary particles which make up the atoms interact constantly by passing into each other while at every moment are both themselves and something else (are a different entity which in turn determines the behavior of its component parts) while the Union of atoms into molecules follows chemical formulas, the atoms themselves had remained unchanged with only a purely quantitative relationship , in contradiction to Molecule which cannot be reduced to its component parts without losing its identity . The Principle of the < Whole being equal to the parts > issues for all compositions either in Form or in Content or for both , as happens to the square root of a number which can be either positive or negative .

It was referred that the Zero equality in Content , $(P_A + P_B) = 0$ *is the Critical-Energy-Quantity {CEQ} for any transition in Quality , is a kind of Catalyst which is not changing the composition of Primary Segment ,* the unity of opposites *and also the Work $\equiv$ Energy $\equiv$ Heat $\equiv$ Pressure $\equiv$ velocity $\equiv$ motion involved in all levels , and generally on Material-Points   in Material-Geometry . Beyond a certain Critical-Energy-Quantity the   Bonds $\equiv$ Content   are broken and then a qualitative leap occurs .*

AS Zero(0) *is the Border-line between all Positive (+) and Negative magnitudes (-) and stands in a relation of infinity to every other number and represents a real magnitude ,THUS {CEQ} which is zero in Material-point , is identified with Zero of Euclidean-geometry.*

Quality in a particle is   ± Spin dependent on its direction , giving the Outer Electromagnetic-Wave of moving and the Inner Electromagnetic-Field of monads . This Inner unity of opposite is , in nature , the velocity $\equiv$ motor-force of all motion , starts to recover → gathering strength as Spin which in turn to

Outer-Spin and to the   Electromagnetic-Wave . [40]

All above occur either by Rolling of Space A ≡ (⊕) *on Anti-space* B ≡ (⊖) sphere , joint by ,σ, Stress , *on   STPL Mould* , or *by Rolling of Space* A ≡ (⊕) *on Anti-space* B ≡ (⊖) Evolute-Cycloid , *joint by the ,v̄, energy , on STPL Mould-length which is the →* Isochronous curvature radius *from the Cycloid , Evolute-cycloid Rolling points .*

References

[1]   Matrix Structure of Analysis by J.L.MEEK library of Congress Catalog 1971.

[2]   Der Zweck im Rect by Rudolf   V. Jhering 1935.

[3]   The great text of J. L.Heisenberg (1883-1886) English translation by Richard Fitzpatrick.

[4]   Elements Book 1.

[5]   Wikipedia.org, the free Encyclopedia.

[6]   Greek Mathematics, Sir Thomas L.Heath – Dover Publications, Inc, New York. 63-3571.

[7]   [T] Theory of Vibrations by William T. Thomson (Fourth edition).

[8]   A Simplified Approach of Squaring the circle, http://www.scribd.com/mobile/doc/33887739

[9]   The Parallel Postulate is depended on the other axioms, http://vixra.org/abs/1103.0042

[10]   Measuring Regular Polygons and Heptagon in a circle, http://www.scribd.com/mobile/doc/33887268

[11] The Trisection of any angle ,http://vixra.org/abs/1103.0119

[12] The Euclidean philosophy of Universe, http://vixra.org/abs/1103.0043

[13] Universe originated not with BIG BANG, http://www.vixra.org/pdf/1310.0146v1.pdf

[14] Complex numbers Quantum mechanics spring from Euclidean Universe, http://www.scribd.com/mobile/doc/57533734

[15] Zeno`s Paradox, nature of points in quantized Euclidean geometry, http://www.scribd.com/mobile/doc/59304295

[16] The decreasing tunnel, by Pr. Florentine Smarandashe, http://vixra.org/abs/111201.0047

[17] The Six-Triple concurrency line – points, http://vixra.org/abs/1203.0006

[18] Energy laws follow Euclidean Moulds, http://vixra.org/abs/1203.006

[19] Higgs particle and Euclidean geometry, http://www.scribd.com/mobile/doc/105109978

[20] Higgs Boson and Euclidean geometry, http://vixra.org/abs/1209.0081

[21] The outside relativity space – energy universe, http://www.scribd.com/mobile/doc/223253928

[22] Quantization of Points and of Energy, http://www.vixra.org/pdf/1303.015v21.pdf

[23] Quantization of Points and Energy on Dipole Vectors and on Spin, http://www.vixra.org/abs/1303.0152

[24] Quaternion`s, Spaces and the Parallel Postulate, http://www.vixra.org/abs/1310.0146

[25] Gravity as the Intrinsic Vorticity of Points, http://www.vixra.org/abs/1401.0062

[26] The Beyond Gravity Forced fields, http://www.scribd.com/mobile/doc/203167317

[27] The Wave nature of the geometry dipole, http://www.vixra.org/abs/1404.0023

[28] Planks Length as Geometrical Exponential of Spaces, http://www.vixra.org/abs/1406.0063

[29] The Outside Relativity Space – Energy Universe, http://www.scribd.com/mobile/doc/223253928

[30] Universe is built only from Geometry Dipole, Scribd : http://www.scribd.com/mobile/doc/122970530

[31] Gravity and Planck`s Length as the Exponential Geometry Base of Spaces, http://vixra.org/abs/1406.0063

[32] The Parallel Postulate and Spaces (IN SciEP)

[33] The the fundamental Origin of particles in Planck`s Confinement. On Scribd & Vixra (FUNDAPAR.doc)

[34] The fundamental particles of Planck`s Confinement. www.ijesi.com (IJPST14-082601)

[35] The origin of The fundamental particles www.ethanpublishing.com(IJPST-E140620-01)

[36] The nature of fundamental particles, (Fundapa.doc).www.ijesit.com–Paper ID:IJESIT ID: 1491

[37]   The Energy-Space Universe and Relativity IJISM, www.ijism.org–Paper ID: IJISM – 294 [V2,I6,2347-9051]

[38] The Parallel Postulate, the other four and Relativity (American Journal of modern Physics ,

32

Science PG – Publication group USA) ,1800978 paper .

[39] Space-time OR, Space-Energy Universe (American Journal of modern Physics , science PG Publication group USA) 1221001– Paper.

[40] The Origin of ,Maxwell`s-Gravity`s, Displacement current . GJSFR (Journalofscience.org) , Volume 15-A , Issue 3 , Version 1.0

[41] Young`s double slit experiment [Vixra: 1505.0105] Scribd :
https://www.scribd.com/doc/265195121/

[42] The Creation Hypothesis of Nature without Big-Bang. Scribd :
https://www.scribd.com/doc/267917624 /

[43] The Expanding Universe without Big-Bang . (American Journal of modern Physics and Applications Special issue: http://www.sciencepublishinggroup.com/j /
Science PG-Publication group USA – 622012001– Paper.

[44] The Parallel Postulate and the other four , The Doubling of the Cube , The Special problems and Relativity. https://www.lap-publishing.com/. E-book. LAMBERT Academic Publication .

[45] The Moulds for E-Geometry Quantization and Relativity , International Journal of Advances of Innovative Research in Science Engineering and Technology IJIRSET :
http://www.ijirset.com/..Markos Georgallides

[46] [M] The Special Problems of E-geometry and Relativity http://viXra.org/abs/1510.0328

[47] [M] The Ancient Greek Special Problems as the Quantization Moulds of Spaces. www.submission.arpweb.com(ID-44031-SR-015.0

[48] [M] The Quantization of E-geometry as Energy monads and the Unification of Space and Energy . www.ijera.com(ID-512080.0

[49] [51] The Why Intrinsic SPIN (Angular Momentum) ½ -1 ,Into Particles . www.oalib.com(ID-1102480.0

[50] [M] The Kinematic Geometrical solution of the Unsolved ancient –Greek Problems and their Physical nature http:www.jiaats.com/paper/3068.ISO 9001

[51] [M] The Nature of Geometry the Unsolved Ancient-Greek Problems and their Geometrical solution www.oalib.com(paper. ID-1102605.0
http:www.oalib.com/Journal:paper/1102605

[52] E-Geometry , Mechanics-Physics and Relativity, http:gpcpublishing.com/GPC :
volume 4, number 2 journal homepage

[53] [M] Material-Geometry and The Elements of the Periodic-Table .
www.ijerm.com(ID-0306031.0)

[54] The Material-Geometry Periodic Table of Particles and Chemistry . http://ijemcs.in/

[54] The Material-Geometry A-Periodic Table of Particles and Chemistry. **www.iosrjournals.org**)

[55] Material-Geometry , the Periodic Table of Particles , and Physics. **http://ephjournal.com**

[56] Big-Bang or the Glue-Bond of Space , Anti-space ??. (**www.TechnicalDean.org**)

[57] The Eternal Glue-Bond of Space , Anti-space , Chemistry and Physics
www.globaljournals.org .

[58] Big-Bang or the Rolling Glue-Bond of Space ,Anti-space , book@scirp.org ,http://www.scirp.org/

[59] STPL Mechanism is the Energy – Space Generator . http://viXra.org/abs/1612.0299

[60] The Chaos becomes Discrete through the STPL mechanism which is Energy-Space Generator.

[61] [M] Material Geometry and , The origin of Black-holes , Black-matter .

[62] [M] The origin of SPIN of the fundamental Particles and their Eternal motion.

[63] [M] The Doubling of the Cube . The Squaring of the circle.

[64] [M] The origin of , Maxwell`s Postulates.

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

Markos Georgallides comes from Cyprus and currently resides in the city of Larnaca, after being expelled from his home town Famagusta by the Barbaric Turks in August 1974. He works as a consultant civil and architect engineer having his own business. He is also the author of numerous scholarly articles focusing on Euclidean and Material Geometry and mathematical to physics related subjects . He obtained his degree from the Athens , National Technical , Polytechnic University [NATUA] and subsequently studied in Germany , Math theory of Photoelasticity .

33