## HIGGS BOSON (PARTICLE) AND EUCLIDEAN GEOMETRY

The present attempt is the describing of Origin of Spaces [Spaces, Anti-Spaces, Sub-Spaces] on any first dimentional Unit  $AB = ds > 0 \rightarrow < \infty$  and the Origin of Mass, Energy which is a meter of the motion of the infinite Sub-Spaces in Spaces Anti-Spaces that construct Spaces in Chaos.

Markos Georgallides : Tel-00357-99 634628 Civil Engineer(NATUA) : Fax-00357-24 653551 15 , N .Mylona St , 6010 , Larnaca Cyprus Expelled from Famagusta town occupied by The Barbaric Turks - Au.1974 .

Email < georgallides.marcos@cytanet.com.cy>

Geometry and geometrical constructions [ Spaces , Anti-Spaces , Sub-Spaces ] are able to connect Properties , such as Mass , Energy and the conservation laws of Physics with only one substance, that of Vector  $\mathbf{ds} = \mathbf{AB} > \mathbf{0} \to <\infty$  with Impulses  $\mathbf{PA} + \mathbf{PB} = \mathbf{0}$ ,  $\neq \mathbf{0}$  at edge points A , B . Since neutrons may travel faster than light and also gravity instantly affects , a new explanation is needed The present article < **The Higgs Boson ( Particle ) and Euclidean Geometry** > describes the motion of one of infinite Subspaces in [PNS] ( Primary Neutral Space ) , [11] – [17] as this is shown below. A short Concentrated analysis for Point in Euclidean geometry follows [2]:

- **1a..** *Point* is nothing, has not any Position and Magnitude, and may be anywhere in Space *therefore*, the 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*). [6]
- **2b..** *Straight line* is 0, Positive, Negative  $\pm \infty$  points, and since is composed of infinite points which are filling line, then nature of line is that of Point (the all is one for Lines and Points).
- **3c..** *Plane* is Positive, Negative,  $\pm$  Neutral and  $\pm$  Complex points and since is composed of infinite Straight lines which are filling Plane, then, nature of Plane is that of Line and that of Points (the all is one for Planes, Lines and Points).
- **4d.** Space is Positive, Negative, ± Neutral and ± Complex points, and since is composed of infinite Planes which are filling Space, then, nature of Space is that of Plane and that of Points (the all is one for Spaces, Planes, Lines and Points).

## FUNDAMENTAL PRINCIPLES.

1.. The first dimensional Unit AB of two points A, B not coinciding is the geometrical Shape that has as Position (the direction  $\hat{A}B$ ,  $B\hat{A}$ ) and as Magnitude (the length  $AB = 0 \rightarrow N \rightarrow \infty$ ) AB is a straight line through points A, B. (F.1b), [6]

 $\mathbf{ds} = \mathrm{An}$  Infinitely small increment of length AB in the direction  $\tilde{A}B$  or  $B\tilde{A}$ .  $\infty = \mathrm{An}$  Infinitely great magnitude AB in the direction  $\tilde{A}B$ ,  $B\tilde{A}$ . Any point C is on Straight line AB, only when exists equation CA + CB = AB, i.e.

The Whole AB is equal to the Parts CA and CB. (equation). (F1.b) In case CA + CB > AB then point C is not on line AB, and this is the main difference between Euclidean and Non-Euclidean geometries. In Definition 2 (a line AB is breathless length) is altered as, for any point C on line AB exists CA + CB = AB. [6] Edge points A, B not coinciding on Monad AB, keep the properties of Complex numbers with Imaginary part which differs between the infinite points. [11] – [13]

 $N = 0 \rightarrow AB \rightarrow \infty$ ), when

A = B = Principle of the Equality.

 $A \neq B$  = Principle of the Inequality.

 $A \rightarrow \longleftrightarrow B = \infty$  Principle of Virtual Displacements.  $\mathbf{W} = \int P.d\mathbf{s} = 0$ ,  $\mathbf{ds} = \partial W / \partial P$ 

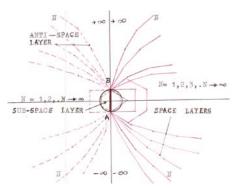
PA + PB = 0 Principle of Stability

Monads = Quantum = ds = AB / (n =  $\infty \rightarrow 0$ ) = [a ± b.i] = 0  $\rightarrow \infty$ , are simultaneously (actual infinity) and also (potential infinity) in Complex number form, and this defines, infinity which exists between all points which are not coinciding (ds > 0), and because ds comprises any two edge points with Imaginary part then this property differs between the infinite points. Plank length is a Monad ds = 1,62x10<sup>-35</sup>, for two points A, B, and for the moment is accepted as the smallest possible size. This Monad is also infinitely divided because edge points A, B are not coinciding i.e. ... ds = 1x10<sup>-</sup>N <  $\infty$ , where N is any number.

- 2.. **Spaces of Unit AB** are (in Plane) the Infinite (+) Regular Polygons inscribed in the circles with AB as Side, (repetition of Unit AB), the Nth Space, the Nth Unit Tensor of the N equal finite Elements ds, and for the  $\infty$  Spaces, the line AB  $\leftrightarrow$  . (F.2) The diameter of this circles extends to infinity (it is of potential nature). [11]
- 3.. Anti Spaces of Unit AB are (in the three dimentional space) the Symmetrically Infinite (-) Regular Solids inscribed in the Sphere with AB as side of the Solid, (The Harmonic Repetition of Unit BA, symmetrical to AB), the Nth Anti-Space, the Nth Unit Tensor of the N equal finite Anti Elements and for the  $\infty$  Spaces, the Plane through line BA  $\leftrightarrow$  . (F2), The diameter of this Spheres extends to infinity (it is of potential nature). [11]
- **4...** Sub-Spaces of Unit AB are (in Plane) the Infinite Regular Polygons inscribed in the circle with AB as diameter, (Harmonic Repetition of the Roots in Unit AB) and in Nth Sub-Space, the Nth Unit Tensor of the N finite Roots and in case of  $\infty$  Elements are the points on the circle, and for 3DSpace, the points on Sphere AB). (F.2) The Superposition of Spaces, Anti-Spaces and Sub-Space Layers of Unit AB is shown in F.2. Remark: (+) Spaces, (-) Anti-Spaces, ( $\pm$ ) Sub-Spaces, of a unit AB are between magnitude (Point = 0 = Nothing), and the Infinite magnitude ( $\leftrightarrow = \pm \infty = \text{Infinite}$ ) which means that all Spaces are in one Space. (F2) Because in Spaces and Anti-Spaces, the  $\infty$  Spaces of Unit AB is line AB  $\leftrightarrow$ , and in Sub-Spaces the  $\infty$  Sub-Spaces of Unit AB are the points on the circle with AB as diameter, then this ordered continuum for points on the circle of Unit AB and on line AB shows the correlation of Spaces in Unit AB.

Monads  $ds = 0 \rightarrow \infty$  are Simultaneously, actual infinity (because for  $n = \infty$  then  $ds = [AB/n = \infty] = 0$  i.e. a point ) and, potential infinity, (because for n = 0 then  $ds = [AB/n = 0] = \infty$  i.e. the straight line through 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 infinite points. [11]

**4a. The Superposition of Plane Space**, **Anti-Space Layers and Sub-Space Layers** (**F.2**): The simultaneously co-existence of Spaces, Anti-Spaces and Sub-Spaces of any unit AB, **Unit AB** =  $\mathbf{0} \to \infty$ , (A  $\equiv$  B) i.e., Euclidean, Elliptic, Spherical, Parabolic, Hyperbolic, Geodesics, Metric and Non-metric geometries, exists in Euclidean Model as an Sub-case within. The Interconnection of Homogeneous and Heterogeneous bounded Spaces Anti-Spaces and Subspaces of the Universe. The Unity of Opposites. This is also the *Quantized* property of Euclidean geometry  $\langle all\ is\ one \rangle$  as it is, Discrete (for Monads AB) and Continuous (for Points A, B). F.2 [13]. For Primary Point A, it is the only Space [17]



F.2

- 4b. The Unique Case where P = 0 and  $\Delta s > 0 = AB \to \infty$  is the Primary Neutral Space [PNS] The Spherical connection of the same points in PNS, is related on the influence ( $P = 0 \to \hat{A}B \to \infty$ ) of the infinite ( $\infty$ ) Equilibrium Primary Spaces and Anti-Spaces. For every point in [PNS] exist the three Spatial dimensions (x, y, z) and the infinite dimensions of the (i) Layers at this point, existing from the other Layers (at small scale using coordinate system) of Primary Anti-Space and Sub-Space where  $i = 1 \to \infty$ . It has been also shown that, Every point M of Primary Neutral Space [PNS] exists in this Space with a deficit of Impulse  $Pm = 0 \to \infty$ , due to the influence of the other Equilibrium Primary Spaces. This Property of points in Neutral Space is the cause of their Continuously Survive. So at any point M there are all Impulses of all other Spaces. All Points of [PNS] are Homogenous (i.e. all points of PNS are Equivalent) and Isotropic (i.e. all directions of AB are Equivalent), [A=A] [10]
- **5..** Algebraic Numbers: According to F.2 *Monad*  $AB = 0 \leftrightarrow AB \leftrightarrow \pm \infty$ . Spaces, Anti-Spaces Sub Spaces of AB are **the Infinite Regular Polygons**, on circle with AB as Side, and on circle with AB as diameter. 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  $\mathbf{w} = \mathbf{a} + \mathbf{b}.\mathbf{i} = \mathbf{r.e}(i\phi)$ ,  $\mathbf{a}$  and  $\mathbf{b} = \text{Real Numbers}$ , and with  $\mathbf{r} = \sqrt{a^2 + b^2}$ , and  $(\pm) \mathbf{i} = \text{Imaginary Unit}$ .

It has been proved [11] that, since Complex Numbers are on Monad AB (any two points) and it is the only manifold for Physical reality, then Euclidean Geometry is Quantized, this because

- **a.** Exists  $\sqrt[2]{1} = \pm 1$  or  $[-1 \leftrightarrow +1]$ , therefore **xx** (axis) coordinate system represents the one-dimensional Space and Anti-Space. (the Straight line), 1.1 = 1, (-1).(-1) = 1
- c. Exists  $\sqrt[3]{1} = [1, -1/2 + (\sqrt{3.i})/2, -1/2 (\sqrt{3.i})/2]$  therefore **xx-yy** coordinate represents two dimensional  $\pm$  Spaces and  $\pm$  Complex numbers. (the Plane) 1.1.1 = 1,  $[-1/2 + (\sqrt{3.i})/2]^3 = 1$ ,  $[-1/2 (\sqrt{3.i})/2]^3 = 1$
- d. Exists  $\sqrt[4]{1} = \sqrt[2]{\sqrt{1}} = \sqrt[2]{\pm 1} = [+1,-1], [\sqrt[2]{-1} = +i,-i]$  or  $-1 \leftrightarrow +1, \uparrow$  therefore coordinate systems xx yy represent all these Spaces, -i ( $\pm$  Real and  $\pm$  Complex numbers), where Monad  $= 1 = (that \ which \ is \ one)$ , represents the three-dimensional Space and Anti-Space. (the Sphere).  $[\pm 1]' = [\pm i]' = 1$  The fourth root of 1 (unity) are the vertices of Square in circle with 1 as diameter and since the Geometrical Visualization of Complex numbers, is formula  $\sqrt[2]{1} = \pm 1$ ,  $\pm i$ ...(d) and since  $\pm 1$  is the one-dimentional real Space (the straight line), the vertical axis is the other one-dimentional Imaginary Space  $\pm i$ . Since for dimension are needed N-1 points then (d) is representing the Space with three dimensions (x, y, z) which are Natural, Real and Complex Monads. A distance is not purely spatial because  $ds = a \pm b.i$  and since  $ds^2 = (a^2 b^2) + 2.a.b.i$  and also  $ds^3 = (a^3 3.a.b^2) (b^3 3.b.a^2) \cdot i$  then the two and three dimensional Spaces are Complex also. The same exists fore every Space, since binomial  $ds^n$  is a complex number also. i.e.

(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 PA, PB, etc), i.e., Euclidean geometry is Quantized. and ...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  $\rightarrow$  ds = 0, dP = PB - PA = 0  $\rightarrow \infty$ ). [11-12] Impulse is  $\infty$ , and may be Vacuum, Momentum, or Potential or Induced Potential.

Change (motion) and plurality are impossible for points of Absolute Space [PNS] and since it is composed only of Points, that consist an Unmovable Space, then neither Motion nor Time exists i.e. a constant distance AB = ds anywhere existing is motionless. ds = [AB/n] > 0 = quantum and for infinite continuous n, ds convergence to 0. [10] Physical world is scale-variant and infinitely divisible, consisted of finite indivisible entities  $ds = AB > 0 \rightarrow$  and infinite points (ds = 0) i.e. is Continuous with points and Discontinuous with ds > 0. [13]. In PNS dt = 0, so motion cannot exist at all.

**6..** Motion: Since on Primary point A exists, Principle of Virtual Displacements [ ds. ( PA+PB ) = 0 ] and Impulse  $P = (PA + PB) = 0 \rightarrow P \rightarrow \infty$  may have any Price, then for P = 0 exists PNS. Since points A, B of [PNS] coincide with the infinite Points of, Spaces, Anti-Spaces and Sub-Spaces of [PNS], and since also Motion may occur at all Bounded Sub-Spaces then, this **Relative motion** is happening between all points belonging to [PNS] and to those points belonging to the other Sub-Spaces ( $A \equiv B$ ). [11]. For the points in [PNS] exist the three Spatial dimensions (x, y, z) and the infinite dimensions of the (i) Layers at these points, existing from the other Layers of Primary Anti-Space and Sub-Space, where  $i = 1 \rightarrow \infty$ . Motion is Continuous and occurs on Dimensional Units, ds, and not on Points which are dimensionless, upon these Bounded States of [PNS], Spaces and Anti-Spaces, and because of the different Impulses PA, PB of points A, B and that of Impulses PiA, PiB, of Sub-Spaces is either on straight line AB (linear) or curved for points PiA, PiB, not on line AB. Since all moving Sub-Spaces move in [PNS] there are three types of motions, Linear, Curved and Circular depending on the position of motion, occurring relatively to Primary Space and anti-Space. It will be referred later that this property in [PNS], the curvature, is not a property of [PNS] but it is of the relative motion of Spaces. Since distance ds is the mass of the bound State, then [dP = PB - PA] the vibrational Bounded State of a closed String interact and bend space. Following Pythagoras theorem on 11/5/2012 has been proved that Energy (motion) is conserved and in two dimentional Spaces, the Changeable Square HNMC + Changeable Square HPP1C1 = Total Area of Square CADP and so this answers conservation laws in Physics . Because Total Energy is conserved all interactions are mediated with Energy (wave motion), (Photons etc.). Following the dialectic logic of ancient Greeks ( Αναξίμανδρος ) «τό μή Ον , Ον Γίγνεσθαι» 'The Non-existent, Exists when is done', 'The Non-existent becomes and never is' and the Structure of Euclidean geometry [6] in a Compact Logic Space Layer, as this exists in a known Unit (case of 90 angle), then, we may find a Geometrical Mechanism that produces all Spaces and angles. Since Non-Existent may be at a point A (Primary point) and also everywhere, then how Existence of Space is found and is done everywhere?? [Answer: Because Primary Point is the only Space and from this all the others ].

In Euclidean geometry points do not exist, but their position and correlation is doing geometry. Since Geometry is consisted of Real (ds) and Imaginary Parts (PA, PB), the universe cannot be created, because becomes. Monads = ds = AB / (n =  $\infty \rightarrow 0$ ) = [a ± b.i] =  $0 \rightarrow \infty$ . Since all Points in [PNS] may exist with P = 0 and also with  $P \neq 0$ , (PA + PB = 0 for points in Spaces and Anti-Spaces), therefore [PNS] is self created, and because at each point may exist  $P \neq 0$  this [PNS] is a Field with infinite points which have a Charge  $P = 0 \rightarrow P \rightarrow \infty$ , i.e. a Dynamic Tensor with absolute dimensions  $X_0$ ,  $Y_0$ ,  $Z_0$  and Charges  $P_0 = 0 \rightarrow P_0 \rightarrow \infty$ ,  $P_0 = 0 \rightarrow P_0 \rightarrow \infty$ ,  $P_0 = 0 \rightarrow P_0 \rightarrow \infty$ , i.e. a

On Monad  $AB = 0 \leftrightarrow AB \leftrightarrow \pm \infty$  exists < a bounded State for each of the Infinite Spaces and Anti-Spaces > and the [Dipole AB = Matter] is the communicator of Impulse [P] of Primary Space, with the Bounded Impulses (PA, PB) of Dipole or [10]

Since motion occurs on Dimensional Units, ds, and not on Points which are dimensionless and because of the different Impulses PA, PB of points A, B and that of Impulses PiA, PiB, of Sub-Spaces, it is on straight line AB or on tracks of Spaces, Anti-Spaces, and Sub-Spaces of AiBi. [10-11]. All particles act as wave (wave-particle duality) because of the Total energy conservation law of Pythagoras. [16] In Particular Physics, every particle is a wave.

The range of Relative velocities is bounded according to the single slices of spaces (ds). The Bounded Spaces, Anti-Spaces, Sub-Spaces, of the First dimensional Unit AB = a + b.i are composed of the two Elements  $\rightarrow$  the [Dipole AB = matter] which is the communicator AB, and the Impulse [P] of Primary Space, with the Bounded Impulses (PA, PB) of Dipole or is, Forces at points A, B of  $[PNS] = [P] \leftrightarrow [FMD = AB - PA, PB] \rightarrow PA, PB$ 

When the difference of Impulses dP = PB - PA > 0 then Dipole AB is of + (deficit quality) When the difference of Impulses dP = PB - PA < 0 then Dipole AB is of - (deficit quality)

A point in [PNS], where exists  ${\bf PA}+{\bf PB}=0$ , is that of the symmetrical Primary Space and Anti-Space, and when  ${\bf PA}+{\bf PB}>0<\infty$  is that of Space, and when  ${\bf PA}+{\bf PB}<0<-\infty$  is that of Anti-Space.

Points A, B of AB (A $\equiv$ B) carry the bounded Impulses PA, PB which achieve Stable State so this allows other Primary Spaces to exist differently in the same Space. (Charges PA, PB  $\rightarrow$  Electric field  $\rightarrow$  Magnetic field  $\rightarrow$  PA, PB) and for every dipole ds = AB, dP = PB - PA, a property called  $\pm$  charge of ds.

Question 1: How geometrical constructions are able to connect such Properties as, Mass Energy and the conservation laws of Physics? answer 14/3/2012

Let us clarify what is , Geometrical Construction and Properties such as , Mass , Energy and laws of Physics . All Principles are holding on any Point A . For two points A , B not coinciding , exists Principle of Inequality which consists another quality . These Points consist the monad AB with [Spaces , Anti-Spaces , Sub-Spaces ] having steady boundaries , which exist in their Position under the Principle , *Equality and Stability in Virtual displacement which presupposes Zero Work in a Restrain System* ). [11] . Page 2,3 , i.e.

[A 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, so then this primary point A to exist at a second point B somewhere else, point A must move at point B, where then  $A \equiv B$ .  $\rightarrow$  Since Spaces, Anti – Spaces and Sub-Spaces are created from the first Unit AB, and are Property of this Unit only, therefore these are also a Restrained System (S). Presupposition for Unit AB = ds (the displacement ds) is the Point A to move at the New position B, and  $(A \equiv B)$ , and this means an IMPULSE (P) removes point A to B. Since in each Restrained System (S) the Work done (W) by Impulse (P) on a Virtual displacement (ds > 0) is zero, or,

W = 
$$\int P.ds = 0 \rightarrow [ds \cdot (PA + PB) = 0]$$
  
A-B

[ ds. (PA+PB) = 0 ], Therefore, Each Unit AB = ds > 0 exists, by this Inner Impulse (P) and so PA+PB = 0 i.e. The Position and Dimension of all Points which are connected across the Universe and that of Spaces exists, because of this Static Inner Impulse, on the contrary should be one point only (Primary Point  $A = Black\ Hole \rightarrow ds = 0$  and  $P = \infty$ ). Black Hole may happen anywhere in Universe when Points of [PNS] coincide,  $A \equiv B$ , ds = 0 and  $P = \infty$ . The fact that on every point in [PNS] exist infinite Impulse  $P = 0 \rightarrow P \rightarrow \infty$ , grows the idea that Matter was never concentrated at a point and Energy was never < very high energy > i.e. Bing Bang has never been existed.

Impulse is  $0 \to \infty$  and may be Vacuum, Momentum or Potential or Induced Potential and it is one Type of Effect, of Push nature (Impulse  $\to$  Motion = Energy)  $\leftarrow$ ]

This Equilibrium presupposes Homogenous Space and the Symmetrical Anti-Space. For two points A, B which coincide, exists  $Principle\ of\ Superposition\ (A \equiv B)$  which is a Steady State containing Extrema for each point separately . i.e. In three dimentional Space, the infinite points exist as Space because of the Equal and Opposite Impulses ( $Opposite\ Forces$ ) which is a new  $Notion\$ ,  $for\ Mass\ and\ Energy\ in\ AB\ distance$  (Points A, B are embodied with Opposite Forces). From this point, laws of Physics start.

## Remarks:

- 1.. Spaces and Anti-Spaces are continuous and represent Real numbers as on line,  $\sqrt{1} = \pm 1$  A Continuous Function is a Static Completed Entity, while **ds** is a quality existing Entity conveyed through PNS as above. Equilibrium of Spaces exists with their Anti-Spaces.
- **2..** The Model of nature is not built on Complex numbers because Complex numbers *spring out* of Spaces, Anti-Spaces and Sub-Spaces of the FDU  $(\mathbf{ds} = \mathbf{0} \to \mathbf{AB} = [\mathbf{a} \pm \mathbf{b.i}] \to \infty)$  and represent reality. The roots of Monads are the *same Monads* in Space and Anti-Space as well as Imaginary Monads in Sub-Space.

Since Binomial  $ds^n = [a \pm b.i]^n = r^n.[cosn\phi + i.sin\phi]$  is a complex number and nth root of ds is also complex then, the Harmonic repetition of the roots (Principle of Equality) composes units with, no need to be Image or real dimensions.

Image or Real dimensions exist in Euclidean Geometry as the vertices of the Regular Polygons (and Anti-Polygons) on any First dimensional unit AB. The geometrical Visualization of Complex numbers, springs from formula  ${}^2\sqrt{1}=\pm 1$ ,  $\pm i$  (d) and since  $\pm 1$  is the one dimentional *real Space* (the straight line) the vertical axis is on (Harmonic repetition of Spaces) the other one dimentional *Imaginary Space* which is conveyed. Since dimension needs (N-1) points then (d) is representing the Space with the three dimensions (x, y, z) which is Natural, Real and Complex numbers and it is not four dimensional Space as it is in "Space-Time" theory. A point in [PNS] exist with three Spatial dimensions (x, y, z) and the infinite *Impulses*  $\partial Pi = \partial Wi/\partial Si$  of the Layers at this point existing from Infinite Spaces where  $i = 1 \rightarrow \infty$ . Position and Momentum are incompatible variables, because any determination of either

one of them, leaves the other completely undetermined, (Zero matrices) i.e. The Eingenvalues of Spation Position are Incompatible with the Eingenvalues of Momentum (motion), and so, any **ds** in PNS has a definite Position and Momentum simultaneously. This is the Relative motion of Spaces in PNS.

3.. Natural Numbers with their discrete nature Symbolize Discontinuity of Spaces , because Physical World is Continuous with Points (motion) and Discrete with Numbers = Monads = ds This is , The Dual property of Physical World , also in Physics , When Motion passes from every point of line AB , which is then as , passing from the starting point A , where ds = 0 then Velocity also is v(A) = ds/dt = 0. The same also happens for Motion at point B where Velocity v(B) = ds/dt = 0. On the contrary , Motion passing on points A , B which consist the dimensional Unit , ds , then velocity v(AB) = ds/dt > 0 i.e. For points A , B not coinciding are as below , [13]

Since in PNS,  $v = \infty$ , T = 0, meaning infinite velocity and Time not existing, then any length AB in [PNS] is constant because AB = ds = Constant =  $v \cdot 0 = \infty \cdot 0$ . Straight line AB is discontinuous (discrete) with dimensional Units ds = AB/n where  $n = 1 \rightarrow \infty$ , and continuous with points [ds = 0], (This is the Dual Nature of lines, geometry, discrete and continuous).

Spaces Anti-Spaces and Sub-Spaces are *Homogenous* because the Points of Monads are also. Since all Directions  $\tilde{A}B$ ,  $B\tilde{A}$  are equivalent, then PNS *is also Isotropic*, i.e all Relative Natural sizes and Laws remain Inalterable with Displacement and Rotation, [11]

Therefore, On any Unit AB = ds > 0 exists, an Inner Impulse ( $P = 0 \to \infty$ ) at edge points A, B where PA + PB = 0, for any price of  $P = 0 \to P \to \infty$  i.e. again, The Position and Dimension of all Points which are connected across the Universe and that of Spaces exists, because of this Equal Static Inner and opposite Impulse, on the contrary should be one point only (Primary Point A = Black Hole  $\to$  ds =  $0 \to P = \infty$ ). Monads = Quantum = ds = AB / (n =  $\infty \to 0$ ) = [a ± b.i] =  $0 \to \infty$  Impulse is  $\infty$  and may be Vacuum, Momentum, Thermal or Potential or Induced Potential and it is one Type of Effect, of Push nature (Impulse  $\to$  Motion = Energy)  $\leftarrow$  ]

This Equilibrium presupposes Homogenous Space and Symmetrical Anti-Space. For two points A, B which coincide, exists  $Principle\ of\ Superposition\ (\equiv)$  which is a Steady State containing Extrema for each point separately i.e. In three dimentional Space, the infinite points exist as Space because of the Equal and Opposite Impulses ( $Opposite\ Forces$ ) which is the  $Notion\ of\ Energy\ in\ AB\ distance$  (Points A, B are embodied with the Opposite Forces). The different Static Inner Impulses at points A, B is Energy (all types of change or moving) which has only one Property, that of motion. The only Mould in Space is distance (the first dimentional Unit AB), so Motion takes place and can exist only between Points A and B (this is Extrema for  $\tilde{A}B$ ). Without Space as it is today, Motion (Energy) does not exist.  $\rightarrow$  'The Non-existent, Exists when is done'. Moulds in Euclidean geometry is the way that points are connected. (Mould for two points A, B is straight line AB, for three points is the Plane of the three points, for four points is the Space of the four points etc). [16]

Analyzing Extrema Principle, there was found,  $The\ Six-Triple\ Concurrency\ Points-Line$ , which is proved to be the boundaries of Euclidean, Projective and Perspective geometries, [15] i.e. the boundaries of the Non-Orthogonal and Orthogonal Coordinate Systems. so,

Light for example is Impulse (Energy = Force = Conserved quantity on , ds = wavelength AiBi , ) which is applied on three perpendicular Space Spheres [The Magnetic Field (Plane) - the Electric Field (Plane) - and the Direction (Straight line)] which follows Pythagoras conservation law of , In Plane for Areas (The Sum of Areas of the two Changeable Squares is constant and equal to that of Hypotenuse) and In Space for Volumes (The Total Volume of Consultant Sphere, HO³, is Equal to the Sum of Volumes of the three Moving and Changeable Spheres of , the first three dimentional Units HP, HC, HJ, or HO³ = HP³ + HC³ + HJ³). It is easy to be seen here the reason of , why Conservation of Energy exists on the three Units and the , why Energy (the motion of Photons) moves as wave and as Particle, (the diffraction Patterns). Since total energy is conserved, so all interactions are mediated with energy (wave motion) [16]. Time exists in Relative Motion and it is the numerical order of material change in PNS - Space, and is not a fundamental entity of PNS.

Distance AB is the metric of a Space ( It is the mass of the Spaces AB with the bound State, PA + PB = 0). Since the first dimensional Unit  $\tilde{A}B$  is of two points A, B which is nothing and aren't coinciding, Time has nothing to do with this metric. In article [ 13 - P5 ] is shown that the

four dimensional Space is the  $4^{th}$  root of monad  $\tilde{A}B$  which is  $\pm 1$ ,  $\pm i$ , each one representing Real and Imaginary Spaces. Real Space is the Regular Shape of Monad (Triangle, Square, Pentagon, Hexagon, Heptagon etc) and Imaginary Space is Impulse P, (Vacuum, Gravity, Momentum etc). Since Particles (wave like) do not enter a Space smaller than their wave length, therefore light does not enter the "Gravity Space" which is a Space smaller than wave length of light.

Question 2: Where matter is placed since points is nothing and Space also is nothing . ?

Can we imagine of it as the vessel void of matter ? answer 4/4/2012

In [10], [Dipole AB = Matter] is the communicator of Impulse [P], with the Bounded Impulses (PA, PB) or [P]  $\leftrightarrow$  [FMD = AB - PA, PB]  $\rightarrow$  PA, PB. Every material Dipole is consisted of AB = [ds > 0] = matter, and as AB is the first dimentional Unit which create Spaces, Anti-Spaces and Sub-Spaces then Impulses PA, PB exist on their superposition. (A  $\equiv$  B).

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    Points A, B on Primary (+) Space is the Positive Dipole which creates matter.
    Points A, B on Primary (-) Anti-Space is the Negative Dipole which creates the Opposite of matter (mirror), or Anti-matter (the negative matter).
    Points A, B either be on one Space and Anti-Space alternatively, then is created (nm) the Neutral matter and Neutral Anti-matter.
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The Combination of the four types of matter creates all gauge magnitude (15), i.e. what is Mass and what is Energy and so all types of Particles and Fields in universe. or as ,

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C^{4}_{1} = 4 (m) - (Am) - (nAm) - (nAm) 

C^{4}_{2} = 6 (m),(Am) - (m),(nM) - (m),(nAm) - (Am),(nAm) - (Am),(nAm) - (nm),(nAm) 

C^{4}_{3} = 4 (m),(Am),(nm) - (m),(Am),(nAm) - (m),(nAm) - (Am),(nAm) - (Am),(nAm) 

C^{4}_{4} = 1 (m) , (Am) , (nm) , (nAm)
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**Bounded Impulses PA, PB** are not created because exist as a fixed state **on Dipole of Spaces. Since Neutral matter** is consisted of these two opposite elements (+, -), **therefore all derivatives in this bounded Neutral Space can alternatively exist itself**, as comprise both opposite elements. Let be dP = PB-PA.

Matter, Anti-matter and Neutral Matter, Neutral Anti-matter  $\rightarrow$  equilibrium, and annihilate when coexist (occupying the same ds).

When the difference of Impulses dP = PB - PA > 0 then Dipole AB is of + (deficit) charge When the difference of Impulses dP = PB - PA < 0 then Dipole AB is of - (deficit) charge

Since Matter (AB) is made up of *Electrons*, *Protons and Neutrons* i.e.  $[(-)(+)(\pm = 0)]$  and Anti-Matter is made up of *Anti-Electrons*, *Anti-Protons and Anti-Neutrons* i.e.  $-[(-)(+)(\pm = 0)] = [(+)(-)(\mp = 0)]$ , therefore any *Combination per two* for Matter and Anti-Matter is equal to 15 and for Neutral Matter  $C_2^4 = 6$ . [11]

In Mechanics exist 6 degrees of freedom , [dx, dy, dz, wx, wy, wz] which follow all interactions and all infinite Combinations of monads and their result is all infinite qualities. The Combinations of the Infinite < Dipole Points > create all qualities of matter . [A], [10] It is also valid the same for , Quarks [U-D which are massive and 1-dimensional oscillating lines] and Leptons [Electrons which are charged], which are for the moment the known smallest fundamental particles in Universe (ds =  $10^-$  21 m), exist ds =  $1x10^-$ N  $< \infty$ , where N is any number Light is radiated at a constant critical speed, in any region of Spaces, Anti-Spaces, Sub-Spaces, while M.ray (ds = 0) is inherently applicable to all points of [PNS] with infinite velocity and

zero frequency (A non-zero vacuum value penetrating to all points of PNS). Matter ( $\it Dipole AB$ ) is the sole real entity in nature, as it is everywhere and in any Region, i.e anything which is measured (ds), (dP) in the different Spaces, is matter (particle) in PNS.

PNS is an infinite universal medium in direct conduct with all 3D matter dipoles (Sub-Spaces) in nature under the compression of the inherently infinite Impulse (P) on points [  $ds = \partial W / \partial Ps$  ] Attraction occurs between Monads AB ( $dP = PB - PA = \pm charge$ ) and Action between points A and B which is the real universal entity interlinking all three dimentional Spaces. Extending or descending AB is simultaneously as gaining or loosing Impulse on points A, B which provides that Work cannot equated to motion since Work is bounded at points,  $W = \int P \cdot ds = 0$ ,  $ds = \partial W / \partial P$  Considering mass as the Inertial property of matter, a measure of its energy content, and since matter is any Dipole AB with its properties, then what is measured is the material Dipole in a different Space. (Electricity, Magnetism, Light, Temperature, Vacuum etc.), while Bounded Impulses (PA, PB) are not. Matter deduces the Laws of Nature at points A, B with (PA, PB) by the interconnection of these Sub-Spaces with them in Primary Neutral Space.

Light is of dual nature: It is of mass (Photon is corpuscular) associated with wave, the electromagnetic wave in Plane, and on straight line, as medium. All Phenomena of light can be explained by corpuscular because ds>0 and so Photon is of ultimate Speed of motion. Since in [PNS] exists [M.ray  $\rightarrow v = \infty$ , f=0, ds=0] then M.ray is the universal Homogenous and Isotropic medium for all interactions in all Spaces. [11-12-13], [16] Mechanical Stability of Monads in [PNS] exists on Spaces, Anti-Spaces, Sub-Spaces of each Monad by maintaining Entropy from the constant recycling of Impulses. Stability of Galaxies exists by their Electromagnetic interactions and is not needed Big Bang theory for this. Terrestrial magnetism is formed in PNS by the interaction of **M.ray** on the infinite Monads in Planets. This side of view allows the Spatial extend of all particles in a continuously quantum Space and the substructure all of them in lower and higher Layers (as this happens for layers on our PC).

It has been clarified in [11], [13] what is matter and what is Space. A simple logic follows, All matter is the same, because all matter is made of atoms [R =  $10^-9 - 10^-12$  m]. All atoms is the same, because all matter is made of smaller particles(Quarks and Leptons- $10^-21m$ ) All Quarks and Leptons is the same because all matter is made of smaller particles(Q1,L1- $10^-25m$ ) All Q1, L1 is the same because all matter is made of smaller particles Q 2,3,  $n \to \infty$ , L2,3, $n \to \infty$  All Q $\infty$ , L $\infty$ , is the same because all matter is made of Qn =  $0 \to \tilde{A}B \to \infty$  and L =  $(PA+PB=0) \to P \to \infty$ , i.e out of  $\tilde{A}B=0 \to \infty$  and  $(PA+PB=0) \to P \to \infty$  so, this is the first dimentional unit AB and Impulse P on it.

[ $\rightarrow$ 6. Any two Points A, B on Primary Space or Anti-Space, consist the first Dimentional Unit AB, so itself, using the same Principles of Equality (AB = BA) Inequality and Stability, creates all Spaces, Anti-Spaces and Sub-Spaces of Unit AB and Since are Property of this Unit only, therefore each of these bounded Spaces is a Restrained System of Unit AB. [10] Impulse PA, PB at points A, B is Property of these points only and since also Spaces, Anti-Spaces and Sub-Spaces of Unit AB is a Restrained System of this Unit AB, therefore, Impulses PA, PB at points A, B, and the Spaces, Anti-Spaces and Sub-Spaces of Unit AB is a New Restrained System.

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A New Unit with a quite different Quality . The FIRST MATERIAL UNIT [FMU] i.e. The [FMU] is a DIPOLE \rightarrow the First Material Dipole [FMD = ds = AB - PA , PB]. 
 Δηλαδή : < Η Πρώτη Υλική Μονάδα τού Σύμπαντος είναι τό Δίπολο AB > PÂ = PB A \rightarrow \dots \leftarrow B = [F.M.D]
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This Dipole AB may be created, by the opposite displacement ds  $\leftrightarrow$  of one central point O, or by the Rotation of Dipole AB through this point O. Since [ds.(PA+PB)=0], ds is self-created.

Central point O may be the *Prime Point* or *all infinite points* of Spaces. The position of points A, B *in Spaces and Anti-Spaces* fixes the type of Dipole [FMD] which can be created and is a Monad, (that which is one), and it is a part of the whole AB. Impulses PA, PB cannot be created because exist at points A, B and are of the same essence as that of Impulse P.

When the difference of Impulses dP = PB - PA > 0 then Dipole AB is of + charge When the difference of Impulses dP = PB - PA < 0 then Dipole AB is of - charge

A different manifestation of these Impulses are Natural forces. Gravitational manifestation of these Impulses is enormously stronger than other of their manifestations rooted in them. A Dipole AB may be Electric, Magnetic, Vacuum, Thermal etc. For greater distance, Electric Fields behave as Magnetic fields, and this because of the Tides (changes) on A,B. In this way Physical laws are equally applicable through the universe under all conditions and in all Spaces]

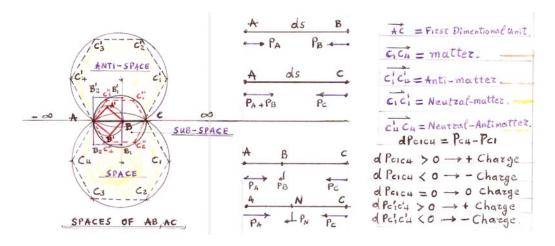
The Bounded Spaces, Anti-Spaces, Sub-Spaces, of the First dimensional Unit AB = a + b.i are composed of the two Elements that of [Dipole AB = matter] which is communicator AB, and the Impulse [P] of Primary Space, with the Bounded Impulses (PB, PA) of Dipole or [P]  $\leftrightarrow$  [FMD = AB - PA, PB]  $\rightarrow$  PA, PB] where dP = PB - PA is of  $\pm$  charge,

i.e. Space is simultaneously one Monad only , and also infinite monads , following Principle of Equality and Inequality , Principle of Virtual Displacements , Principle of Stability and Principle of Superposition (  $A \equiv B$  )  $\rightarrow$ 

or , the equations 
$$\mathbf{W} = \int P.ds = 0 \quad , \quad \mathbf{ds} = \partial W / \partial P$$
 
$$ds = 0 \rightarrow AB = [\mathbf{a} \pm \mathbf{b}.\mathbf{i}] \rightarrow \infty , \quad PA + PB = 0 \quad , \quad \mathbf{dP} = PB - PA < = > 0$$

## Higgs Particle.

Big Bang does not hold in Geometry, so Universe must be acknowledged in another cosmological Setting and Framework based on Geometry-Spaces, as the answers of the above questions. A compact presentation with  $ds = AB \rightarrow AC$  and from this all the other framework follows:



THE THREE SPACES [S-A.S-S.S] OF ANY ds = [First Dimentional Unit] Fg.(3)

A = A point which is nothing, with no Space and not any direction.

 $AB = ds > 0 \rightarrow AB = [a \pm b.i] \rightarrow \infty$ ,  $\rightarrow$  The first dimentional Unit [FDU].

ABB1B2 = The fourth Space of unit AB
ABB'1B'2 = The fourth Anti-Space of unit AB
AA'BB' = The fourth Sub-Space of unit AB

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ACC'1C'2C'3C'4
                   =
                       The Sixth
                                  Anti - Space
                                               of unit AC
                                  Sub - Space
AC"3C"1CC"2C"4
                       The Sixth
                                               of unit AC
                   =
                       inside Subspace
                                        AC"3C"1CC"2C"4
Subspace
          AA'BB'
                   is
AB' =
          [FDU]
                       in Spaces
                                        ABB1B2 -- ACC1C2C3C4
                   is
AA' =
          [FDU]
                    is
                        in Anti-Spaces
                                        ABB'1B'2 -- ACC'1C'2C'3C'4
                                                                             shortly,
```

of unit AC

Space

The Sixth

=

ACC1C2C3C4

- Primary point A, having not Position and consequently not any Space existing, therefore is the only space, and to exist at a second point B somewhere else, point A must move at point B, where then A ≡ B. Point B is the Primary Anti-Space which Equilibrium point A. [PNS] = [A ≡ B]. Since Primary point A is the only Space, then exists Principle of Virtual Displacements W = ∫P.ds = 0, or [ds.(PA+PB) = 0], i.e. for any ds > 0, Impulse P = (PA+PB) = 0. Points (PNS), may exist with P = 0 → and also with P ≠ 0, [PA+PB = 0 for all points in Spaces and Anti-Spaces], therefore [PNS] is self created, and because at each point may exist also P ≠ 0, then [PNS] is a Field with infinite points which have a ± Charge P = 0 → P → ∞. Primary Neutral-Space [PNS] exists with these infinite Points N with three Spatial dimensions (Xo, Yo, Zo) and the infinite Impulses P.
- 2. The Infinite points in [PNS] form Units AiBi = ds, which equilibrium by Primary Anti Space by an Inner Impulse (P) at edges Ai, Bi where PiA + PiB  $\neq$  0, (for PiA + PiB = 0 is the Absolute Primary Space) or as PiA = PiB =  $\pm$  0  $\rightarrow$  P  $\rightarrow \infty$  and also ds = 0  $\rightarrow$  N  $\rightarrow \infty$ .
- 3. Monads = Quantum = ds = AB / (n =  $\infty \rightarrow 0$ ) = [a  $\pm$  b.i] =  $0 \rightarrow \infty$ , are not purely spatial because are Complex numbers. The same exists also for all Spaces, since binomial ds<sup>n</sup> is a Complex number. Monads create Spaces (S) Anti-Spaces (A-S), and Sub-Spaces (S-S) of AB, which Sub-Spaces are Bounded Spaces Anti-Spaces and Sub-Spaces in PNS. [Nanotubes follow hexagon Space = Energy in a fixed state]
- 4. Monads ds (dipole AB), and according to their position in S, A-S, S-S, make the four types of matter, and the Combination of the four types of matter, creates all gauge magnitudes which is Mass and Energy and all types of Particles and Fields, 15 possible types, correspond to Visible, Invisible, Real and Imaginary Universes (The Visible and Invisible Dark matter and Dark Energy, etc). Dipole AB is composed of the two Elements → the [Dipole AB = matter ≡ is the communicator], and the Impulse [P] with the Bounded Impulses (PA, PB).
- 5. The difference of Impulses dP = PB PA > = < 0 of Dipole AB (mass), creates ± charge For very small ds (near zero) which happens at the boundaries of Spaces, ± charge may be point charge (Spaces form open Strings while Sub-Spaces form closed Strings). Cosmic rays is a Quantum field from a, near zero ds Sub-Space), and in very large scales ds, ± charge is the same Field, (This because Particles, wave like, do not enter a Space smaller than their wavelength).
- 6. M.ray interact on the infinite Monads of PNS with infinite velocity and zero frequency. Motion is Continuous and occurs on Dimensional Bounded Units, ds, and not on Points (this may happen only for very small ds near zero and at the boundaries of Spaces) which are dimensionless. The difference of Impulse dP = PB PA on points A, B and on points PiB, PiA is  $\pm$  charge Interaction. All particles act as wave and Particle (wave-particle duality) and this because of the Total Energy conservation law of Pythagoras in 2,3 Dim.
- 7. The four types of Interaction of particles occur either directly or Indirectly .

The order of magnitude in (m) for particles is approximately as:

```
diameter
Molecule
                          10-9 —
                                     10- 11
               diameter
                             2,5 \times 10^{-} 12
Hydrogen Atom
                                             m
                                    10- 14
Atom
               diameter
                          10^{-}11 —
Gamma Ray
               λ.dim
                              5 x
                                    10- 12
                                            m
               diameter
                          10 - 12 —
                                    10- 15
Protons
                                            m
Electrons
               diameter
                          10^{-}15 —
                                     10 17
Quarks
               diameter
                          10 - 18 —
                                     10- 21
                                            m
               diameter
                          10 - 21 —
                                     10- 24
Leptons
                                            m
Neutrinos
               diameter
                          10^{-}18 —
                                     10<sup>-</sup> NN
                          10^{-}22 —
Higgs
               diameter
                                     10- 24
                          10 - 24 —
                                     10<sup>-</sup>SS
Strings
               diameter
Dark matter
               diameter
                          10 - SS —
                                     10<sup>-</sup> DM
                                             m
Gravity
               diameter
                                     10<sup>-</sup>GP
                          10 <sup>-</sup>рм —
                                             m
P - ray
               \lambda.dim
                                     10<sup>-</sup> PP
                           10 GP —
                                             m
M- ray
               λ.dim
                           10 - ∞ —
                                             m
               Remarks
Taking Planck length Level, in S.Model, where upper speed is that of light, a case of matter is as,
For C^{4}1 = 4
               Using FMD [AB] =
                                       AB
                                                              PA, PB,
               Stable matter [ massive Quarks U+D ] [ Charged Leptons ( Electrons ) ]
  1. ......
For C^4 2 = 6
               Using FMD [AB] =
                                       AB
                                                              PA, PB,
              Stable matter [ massive Quarks U+D ] [ Charged Leptons ( Electrons ) ] [ Neutrons ]
     ......
For C^4 3 = 4
                                                              PA, PB,
               Using FMD [AB] =
                                        AB
     ...... Stable matter [ massive
                                                   [ Charged DM.Ions (Particle) ] [ Neutrinos ]
  3.
                                       DM
For C^4 = 1
               Using FMD [AB] =
                                       AB
                                                               PA, PB,
      ...... Stable matter [ massive
                                       PNS
                                                  [ Charged M.Ray (M.particle) ] [(nm)(nAm)]
Higgs Boson (particle) is placed in the second case .....
Dark Matter and Energy is placed in the third .....
Black Holes are placed in the fourth case ......
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Marcos Georgallides.

by