PLANCKS LENGTH AS THE GEOMETRICAL EXPONENT INTERPTETATION OF SPACES

The article shows ***the exponential form of*** *quantized Spaces , Anti-Spaces , Sub-Spaces and Energy in the Quaternion form and* ***Planck Meter*** **Lp** ***as logarithm on decimal base b*** *and the geometrical interpretation of them measured* ***on the three natural and constant numbers e , π ,*** **i** ***, as bases only .***

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1.. Introduction . This independent article is part of [29] , aiming to the connection with the prior ones . **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 is the only Space and to exist point* A *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].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 (x , y , z) and on the infinite points of the (i) Layers at these points , which exist from the other Layers of Primary Space Anti-Space and Sub-Space , and this is because Spaces = monads = quaternion [9] . **Since Primary point A** is the only Space , then on it *exists the Principle of Virtual Displacements* $W = \int P.ds = 0$ *or* [ds .(PA + P B) = 0] i.e. for any ds > 0 Impulse P = (PA + P B) = 0 . All *points may exist with* $P = 0 \rightarrow$ (PNS*) and also with* P ≠ 0 , (P A + P B = 0) *, for all points in Spaces and Anti – Spaces , therefore* [*PNS*] is self created *, and because at each point may exist also with* P ≠ 0 *, then* [PNS] *is a* (***perfectly elastic***) *Field with infinite points which have a* ± *Charge with* P = 0 → P = Λ → ∞ .
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 AiBi = ds̄ , which equilibrium by the Primary Anti-Space by an Inner Impulse (P) at edges A , B where P i A + P i B ≠ 0 , and ds = 0 → N → ∞ **.**
Monads = Quantum = ds = AB/**(** n = ∞ → 0) = [a ± b.i] = 0 → ∞ 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 it* and are not purely spatial because are Complex numbers which exist for all Spaces , since ds **ⁿ** is Complex number also , (Binomial Nature) .
Monad **ĀB** is the ENTITY and [**A , B – P**A**⁻ , P** B**⁻]** is the LAW , so Entities are embodied with the Laws .
Entity is **quaternion** A̅B , and law |AB| = length of points A , B and imaginary part forces PA⁻, P B⁻ .
Dipole A̅ B = [λ , Λ] in [PNS] are composed of the two elements λ , Λ which are created from points A,B only where *Real* part **|AB| = λ** = wavelength (*dipoles*) and from the embodied Work the *Imaginary* part **W** = W = ∫ *P.ds* =(r.dP) = r̄xp̄ = I.w = [λ.p] = **λ.Λ = k2** , where momentum **Λ = p** and Forces **dP =** P⁻ B –P⁻A are the stationary sources of the Space Energy field [22-25] . **Euler**'**s rotation** in 3D space is represented by an axis (vector) and an angle of rotation , which is a property of complex numbers and defined as **z = [s ± v̄.i]** where **s ,** |**v̄**| are real numbers and **i** the imaginary part such that $i^2 = -1$. Extending imaginary part to three dimensions v̄1 i ,v̄2 j ,v̄3 k → **v̄.∇i** then becomes **quaternion**. In [24] monad [0 , Λ] = Energy, is dissipated on points and on the quantized tiny Spaces of the Perfectly Elastic Field [$0 < AB = \lambda < 10^{-35}$ m] and to the greater to Planck scale . Beyond Planck scale **Energy is dissipated as Temperature** in the Perfectly Elastic Configuration and in the individual particles with $ds <= 10^{-35}$ m following the ideal Gas equation [Λ = n.RT / V] of Entropy in Thermodynamics (***perfectly elastic***) and in a specific number of ***independent moles*** called ***Fermions*** and ***Bosons*** with quite different properties .Then the moving charges *is velocity* **v̄** *created from the rotating Kinetic Energy momentum vector* [Λ =Ω= (λ.P) = ± Spin] which creates on monad **ds** the Centrifugal force (**F**f) , the equal and opposite to it Centripetal force (**F**p) and acceleration **ā** *mapped* **[*****and because of the viscous (semi-elastic medium) is damped*****]** *on the perpendicular to* Λ *plane as* → **v̄** E||dP and **v̄** B ⊥ dP) *following* ***Kirchhoff 's circuit*** **R, L ,C *rules*** *with circuits , the Sub-spaces of the tiny monads . The kinetic rotated energy in the semi-elastic viscously damped configuration (as a Lagrange's Ray light viscously damped system) is dissipated as Electromagnetism* . **Since** (dP⊥ ±Λ̅) work occurring from momentum p̄ = mv̄ = Λ acting on force **dP** is zero , so when **v̄** E⁻= 0 , *momentum* Λ̅ = mv̄ *only , is exerting the velocity vector* v̄ B *to the dipole vector* **,** *λ , and* kinetic energy is interchanged as velocity v̄ and the generalized mass **M** (*the reaction to the change of the velocity* **v̄)** creating component forces , **F**E||dP**⁻.** v̄ and **F**B ⊥ dP⁻**x** v̄ in the non-viscous damped monads (**the solids**) .[24] Space and Energy is quantized and measured on the two Constant and Natural numbers e , π **.**
Energy in a vibrating System is either ***dissipated (damped) into Heat*** which is another type of energy [*Energy ,momentum vector* **Λ.λ** *is then damped on the perpendicular to* Λ *plane ,* ***as this is a Spring-mass System , with viscous dumping ,*** *on co variants Energy* **E** *, mass* **M** *, velocity* **v̄** *,] or* ***radiated away*** *.* Spin = **Λ** = **r̄**.m.**v̄**r is the rotating energy of the *oscillatory system .* ***Oscillatory motion is the simplest case of Energy dissipation of Work embodied in dipole . In any vibratory system , Energy*** **k = λΛ** ***is the Spin of Dipole*** **λ** ***, and is dissipated on perpendicular to*** **Λ** ***plane in the three quantized Planck Spaces*** $(10^{-35} < \lambda > 10^{35})$ ***and damped as the linear momentum vector*** **Λ = *M.v̄ in them ,* *i.e Space – Energy Configuration is a constant Sinusoidal Potential System . An extend analysis in*** [28] .

2..1.. Monads = Quantum = $\mathbf{d\bar{s} = \bar{A}B \ / (n = \infty \to 0) = [a \pm \bar{b}.i] = 0 \to \infty}$, 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 **dš** comprises any two edge points with Imaginary part then this property differs between the infinite points. Plank length is a Monad **ds = $\mathbf{1{,}62x10^{-}35}$,** 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. ..**|dš| = $\mathbf{1x10^{-}}$ N** $<\infty$, where N is any number and this because *quantized* dimensions [$d\bar{s}$,- P ,+ P] are the three Layers , where ***dš . dP = λ.p = constant k***1,2,3 **,** wavelength = **λ .∇**

(- i) ↔ (0) = - P → [$d\bar{s}$, - P ,] → Black Holes Scale = k 1 → ds 1. dP 1 = k 1
(-i) ↔ (+i) = ∓ P → [$d\bar{s}$, - P , + P] → Planck Scale Matter = k 2 → ds 2. dP 2 = k 2
(+i) ↔ (0) = + P → [$d\bar{s}$, + P ,] → Dark Matter Scale = k 3 → ds 3. dP 3 = k 3

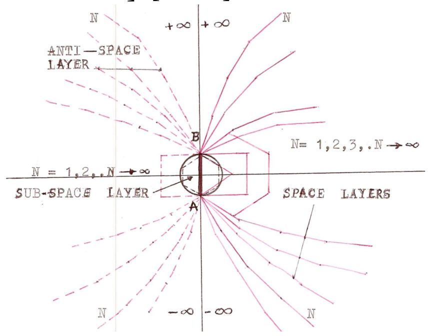
2..2.. Spaces of Unit ĀB are (in Plane) the Infinite (+) Regular Polygons inscribed in the circles ***with AB as Side*** , (repetition of Unit AB) , the Nth Space , the Nth Unit Tensor of the **N** equal finite Elements **dš=z̄** , and for the ∞ Spaces , the line AB ↔ dš = $|z_o|^w$ =[**λ** , ±**Λ**⁻.∇i]^w = | $\bar{z}_o$| ^{w}. $e^{u(w\theta)}$ = | $\bar{z}_o$| ^{w}. **[cos.w**θ + ū.sin.**w**θ] . The diameter of this circles extends to infinity (*it is of potential nature* dW/d$\bar{s}$ = P∇) . [22-23]

2..3.. Anti - Spaces of Unit ĀB 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 ∞ Spaces , the Plane through line BA ↔ dš = $|z_o|^w$ =-[**λ**,±**Λ**⁻.∇i]^w = -| $\bar{z}_o$| ^{w}. $e^{u(w\theta)}$ = -| $\bar{z}_o$| ^{w}. **[cos.w**θ + ū.sin.**w**θ]
.
The diameter of this Spheres extends to infinity (*it is of potential nature* dW/d$\bar{s}$ = **-** P∇) .

2..4.. Sub- Spaces of Unit ĀB 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 ∞ Elements are the points on the circle , *and for 3DSpace , the points on Sphere* AB) . The Superposition of Spaces , Anti - Spaces and Sub-Space Layers of Unit AB is shown in (F.1) . *Remark* : (+) Spaces , (-) Anti -Spaces , (±) Sub-Spaces , of a unit **ĀB** are between magnitude (Point = 0 = Nothing) , and the Infinite magnitude (↔ = ± ∞ = Infinite) which means that all Spaces are in one Space .Because in Spaces and Anti-Spaces , the ∞ Spaces of **Unit ĀB** is line AB ↔ and in Sub-Spaces the ∞ Sub-Spaces of **Unit ĀB** are the points on the circle with AB as diameter , then this ordered continuum *for points on the circle* of Unit **ĀB** and on *line AB* shows the correlation of Spaces in Unit **ĀB** . **Monads d$\bar{s}$ = 0 → ∞ are Simultaneously ,** ***actual infinity (because for n = ∞ then ds⁻ = [ĀB / n = ∞] = 0 i.e. a point) and , potential infinity , (because for n = 0 then ds⁻ = [ĀB / n = 0] = ∞ i.e. the straight line through AB . Infinity exists between all points which are not coinciding , and because Monads*** dš ***comprises any two edge points with Imaginary part then this property is between infinite points***↔ dš = $|z_o|^{1/w}$ = [**λ** , ±**Λ**⁻.∇i]$^{1/w}$ = | $\bar{z}_o|^{1/w}$. $e^{u(\theta.1/w)}$ = | $\bar{z}_o|^{1/w}$. **[cos.**θ/w + ū.sin.θ/w] .→ ***which is of wave nature .***

2..5..The Superposition of Plane Space , Anti-Space Layers and Sub-Space Layers (F.1) **:**

The simultaneously co-existence of Spaces , Anti-Spaces and Sub-Spaces of any unit **ĀB** , **Unit ĀB = 0 → ∞ ,** (A ≡ 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 as Unity of Opposites . This is also the *Quantized* property of Euclidean geometry < *all is one* > as it is , Discrete (for Monads ĀB) and Continuous (for Points A , B) . For Primary Point **Ā** , it is the only Space i.e. quaternion **[λ , ±Λ⁻**.∇i]^w $|z_o|^w$ = [**λ** , ±**Λ**⁻.∇i]^w = | **z̄ o**| ^{w}. $e^{u(w\theta)}$ = | **z̄ o**| ^{w}.**[cos.w**θ + ū.sin.**w**θ] [22-23]

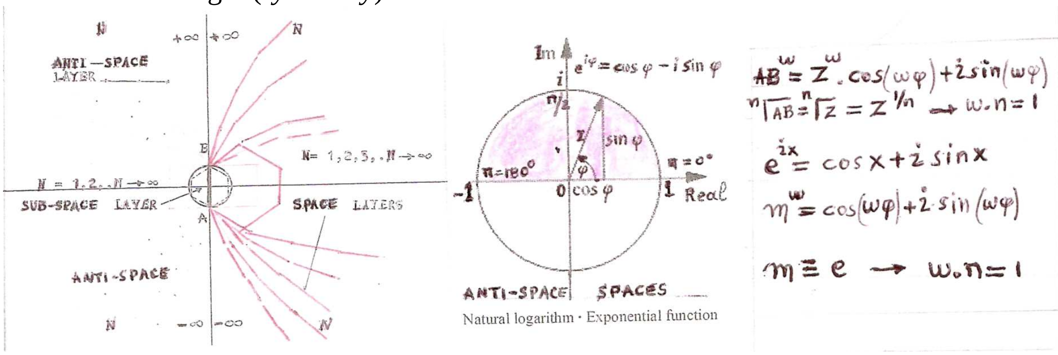


(F.1) *where*

$m = \lim(1+1/w)^{w}$ for $w = 1 \rightarrow \pm\infty$, $e = m$, $q = z = \pm(s + v\nabla i)$
$\mathbf{z_o} = [\, \mathbf{s} , \bar{v}n.\nabla i \,] = [\, \boldsymbol{\lambda} , \pm\bar{\Lambda}.\nabla i \,] = [\, \boldsymbol{\lambda} ,\pm \bar{L}.\nabla i \,] = |\, \bar{\mathbf{z}}\mathbf{o}\, |.\mathbf{e}\text{^} \,[\text{arc.cos}|\lambda/\bar{z}o|.[\bar{\Lambda}.\nabla i / |\Lambda| \,] = |\, \bar{z}o|.e\text{^}\theta.\ \bar{\Lambda}\, \nabla i \,]$
$|\mathbf{z_o}|^{w} = [\, \boldsymbol{\lambda} , \pm\bar{\Lambda}.\nabla i \,]^{w} = |\, \bar{z}_o|^{w}.\ e^{u\, w\, \theta} = |\, \bar{z}_o|^{w}.[\mathbf{cos.w}\theta + \bar{u}.\sin.\mathbf{w}\theta]$ and
$|\, \bar{z}\, \mathbf{o}| = [s^2+v1^2+v2^2+v3^2]$, $\cos.\theta = s / |\, \bar{z}_o|$, $\bar{\Lambda}\, \nabla i = [v1 + v2 + v3]\,.\nabla i = [v1.i + v2.j + v3.k\,]\,.\nabla i$
Unit quaternion $u = u(i+j+k) / |\bar{u}|$ where $|\bar{u}| = \sqrt{1+1+1} = \sqrt{3}$
The conjugate quaternion is $\bar{z}\,'o = (\lambda ,+ \bar{\Lambda}.\nabla i) (\lambda ,- \bar{\Lambda}.\nabla i) = [\, \lambda^2 - |\Lambda|^2 \,]$

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 = **dš** anywhere existing is motionless . **dš = [AB / n] > 0** = *quantum* and for infinite continuous **n** , **dš** convergence to **0** [10] . Physical world is scale-variant and infinitely divisible consisted of finite indivisible entities dš = AB > 0 → and infinite points |dš| = 0 i.e is Continuous with points and Discontinuous with |dš| > 0 . [13] . In PNS dt = 0 , so motion cannot exist at all .

A.. Complex numbers :
De Moivre´s formula for complex numbers states that the multiplication of any two complex numbers say z1,z2, or [z1=x1+i.y1 , z2=x2+i.y2] where x=Re[z] the real part and y=Im[z] the Imaginary part of z , is the multiplication of their moduli r1,r2 , where moduli ,r, is the magnitude $[r=|r|=\sqrt{x^2+y^2}]$ and the addition of their angles ,φ1,φ2, where φ=argz=atan2(y,x) and so , z1.z2 = (x1+i.y1).(x2+i.y2) = r1..r2[cos(φ1+φ2)+i.sin(φ1+φ2)] and when z1=z2=z and φ1=φ2=φ then z=x+iy and $z.z = z^2 = r^2(\cos 2\varphi+i.\sin 2\varphi)$ and for , w , complex numbers $z^{w}= r^{w}.\ [\cos(w\varphi)+i\sin(w\varphi)]$….(3) , and so for r=1 then → $z^{w}= 1^{w}.\ [\cos\varphi+i\sin\varphi]^{w} = [\, \cos.w\varphi+i.\sin.w\varphi \,]$ …......(3.a)
The n.th root of any number z is a number b ($\sqrt[n]{z}=b$) such that $b^n =z$ and when z is a point on the unit circle, for r =1 , the first vertex of the polygon where φ=0 , is then $[b=(\cos\varphi+i\sin\varphi)]^n = b^n = z = \cos(n\varphi)+i.\sin(n\varphi) = [\cos(360/n)+i.\sin(360/n)]^n = \cos 360^o + i.\sin 360^o = 1+0.i = 1$ .. (3.b) , i.e.
the w spaces which are the repetition of any unit complex number z (multiplication by itself) is equivalent to the addition of their angle and the mapping of the regular polygons on circles with unit sides , while the n spaces which are the different roots of unit 1 and are represented by the unit circle and have the points z=1 as one of their vertices are mapped as these regular polygons inscribed the unit circle. Remarks : (F.2). Since $z^{w}= z^{-n}$ and $z^{-n} = z^{-1/w} = z^{+n}$ therefore complex numbers are even and odd functions , i.e. symmetrical about y axis (*mirror*) and about the origin (*symmetry*).



Spaces Anti-Spaces on Monad AB Natural logarithm – Exponential function ……..(F.2)

Complex number , z , the first dimentional unit AB = z , is such that either repeated by itself as monad (z^{w} = z.z.z.z. w-times) or repeated by itself in monad ($\sqrt[n]{z} = z^{1/n} = z^{w}$, $z^{1/n}.z^{1/n}.z^{1/n}$….w = 1/n-times , or the nth roots of z equal to w = 1/n) remains unaltered forming Spaces Anti-spaces {z^{w}, $-z^{w}$} and the inversing Sub-spaces {$\sqrt[n]{z}$ }, meaning that ,unit circle is mapped on itself simultaneously on the two bases , 1 and n=1/w , where w.n = 1. Let us see how this coexistence is happening by the operation of exponentiation . The logarithm of a number x with respect to base b is the exponent by which b must be raised to yield x . In other words , the logarithm of x to base b is the solution w to the equation b^{w} = x ,{eg.→ Log2(8) = 3 , since 2^3=2x2x2=8} and in case of the reciprocal (1/x) then b^{w} = (1/x) ,{eg. → Log3(1/3) = -1, since 3^{-1} = 1/3 } . If w or n , is any natural and real number then we refer to natural logarithm else to logarithm .
This duality of coexistance on AB {*the w.th power and the n.th root of z where w.n =1*} presupposes a common base ,m, which creates this unit polynomial exponentiation on all these Spaces and Anti-Spaces for which happens $m^{w}= r^{w}.[\cos(w\varphi)+i.\sin(w\varphi)]= r^{1/n}.[\cos.(\varphi+2\lambda\pi)/n+i.\sin.(\varphi+2\lambda\pi)/n]$ where λ is an integer from 0 to n-1 ,and for r =1 , $m^{w}= [\cos\varphi+i.\sin\varphi]^{w}$ or $m^{w}= [\cos(\varphi+2\lambda\pi)/n+i.\sin(\varphi+2\lambda\pi)/n = m^{1/n} = [\cos.(\varphi+2\lambda\pi)/n + i.\sin.(\varphi+2\lambda\pi)/n\,]$ . ..... (3.c) i.e.

Since Spaces are composed of monads (the entities ĀB) which are the harmonic repetition in them {{all the regular , for $w > 1$ polygons with monad ĀB as side limit to straight line AB for $w = \pm\infty$, the (+) Space and the equilibrium (-) anti-Space of AB , to the complex plane for $w = 2$, and to the circle with diameter AB for $w=1$,where on it exist all the roots of monad ĀB and are the circumscribed regular polygons in this Sub-Space}} and since monads are composed of purely real , |AB| , and purely Imaginary parts , ±d.∇i , therefore , all these to exist as regular polygons must be maped (sited) with natural and real numbers only and thus all Spaces , anti-Spaces and Subspaces of unit monad AB are represented , as the polygonal exponentiation , on this common base m . Since Spaces , anti-Spaces $\{z^w, -z^w\}$ and Subspaces $\{\sqrt[n]{z}\}$, which are the similar regular polygons , on and in unit monad AB = z , are both simultaneously created by the Summation of the exponentially unified in monad ĀB complex exponential dualities w, n where w. n= 1 ,so the repetition of monads AB exist as this constant Summation on this common base m , which is according to one of the four basic properties of logs as → log.w(1= w.n) = log.w(w)+log.w(n =1/w) = 1+1/w = 1+ n ………… …......(3.d)
which is the base of natural logarithms e and since 1 = w.n then $(1+n)^w = (1+1/w)^w$ = constant = m= e (3.e) which is independent of any Space and coordinate system that may be used , meaning also that Spaces , anti-Spaces (the conjugates) and Subspaces , all as regular polygons represent the mapping (to any natural real and complex number as power w = 1/n) of any unit ĀB which is a complex number z , on the constant base m , where then is m^ ± (s+v̄.i) = $(x+i.y)^w = |z|^w.[\cos.w\varphi+i.\sin.w\varphi]$, a multi valued function where , $\sin\varphi = y/\sqrt{x^2+y^2}$, $\cos\varphi = x/\sqrt{x^2+y^2}$, $|z|= \sqrt{x^2+y^2}$. [***By changing any exponential base* b *on* e *base and since also for logarithms issues*** $e^w = (b^{\log_b(e)})^w = b^{w.\log_b(e)}$ ***and*** $\sqrt[w]{e} = e^{1/w} = e^{-w} = b^{1/w.\log_b(e)}$ ***which are monads , then equations represent the general interconnection of Spaces and Subspaces , on and in all monad units***] .
ĀB = [x+i.y] where (s+v̄.∇i) is the new exponent complex number ,*vector*, corresponding to the ,w, power.
For y = 0 then m^ ± (s+v̄.i) = $(x+i.y)^w = x^w$ and it is the Normal element – x – of base m .
For x = 0 then m^ ± (s+v̄.i) = $(x+i.y)^w = (i.y)^w= i.(y)^w$ and it is the Normal element – i.y – of base m.
In Euclidean spaces the Dot product of two vectors is simply the cosine of the angle between them and the Cross product of two orthogonal vectors is another vector , orthogonal to both of them . The same also for unit vectors .
For w > = ± 1 then we have the Spaces and Anti-spaces. For w = ± 1 then we have Spaces and Anti-spaces with unit circles r = ±1 and the Sub-Spaces on these circles .
For w = s ≠ 0 and v= 0 then m^ ±(s) = $(x+i.y)^w = |z|^w.[\cos.\varphi+ i.\sin.\varphi]^w = |z|^w. [\cos.(w\varphi) + i.\sin.(w\varphi)]$, and it is De Moivre´s formula for exponentiation .
For x=0 then m^ ±(s+v̄.i) = $(i.y)^w= |z|^w.[\cos.w\varphi+i.\sin.w\varphi]$ and on unit circle , $|z|^w= 1$, the common base
m^ ±(s+v.i) = [cos.wφ+i.sin.wφ] and for a=0 *the non-regular Polygons* , d.i ≡ d.∇i , then
m^± d.[∇i] = [cos.dφ+ i.sin.dφ] ……....(3.f) i.e.
is a quaternions exponentiation a system that extends Imaginary part of complex numbers which products of (i) is not commutative where the order of the variables follow the standard right hand rule , and for parallel vectors their quotient is scalar and tensor (| z̄o|) of a unit vector z is one, then, base m becomes m^ ± [∇i]v̄ = [cos.v̄ + i .sin.v̄] , which is for unit d .[∇i] = i , the Euler's formula which is [e^ (i.v̄) = cos.v̄ + i .sin.v̄] and thus , this is the geometrical interpretation of m and e .
For two complex numbers ,a, in polar coordinates (r,θ) and w , and by using the identity $[e\text{^}\ln(a)]^w = a^w$ then $a^w= [re\text{^}\theta i]^w = [e\text{^}(\ln.r+\theta i]^w = e\text{^}[(\ln.r+\theta i].w = r^w.[\cos\varphi +i.\sin\varphi]^w = r^w[\cos.w\varphi + i. \sin.w\varphi]$.
For φ =180° = π , cos.wφ = -1 , sin.wφ = 0 , (d2) becomes m^± v̄.[∇i] = -1 , which is Euler's identity in general form and for Ellipsoid of axes y1,y2,y3 m^ ± π.[y1+y2+y3]/√3 = -1 , and for (s=0) the known Euler's identity for quaternions . Complex numbers are a subfield of quaternions .
De Moivre´s formula for nth roots of a quaternion where q = k.[cos.φ+ [∇i].sin.φ] is for w =1/n ,
$q^w = k^w.[\cos.w\varphi + \varepsilon.\sin.w\varphi]$ where q = z = ± (x+y.i) , decomposed into its scalar (x) and vector part (y.i) and this because all inscribed regular polygons in the unit circle have this first vertex at points 1 or at -1 (for real part φ = 0, φ = 2π) and all others at imaginary part where , k = | z̄ o| = Tensor (the length) of vector z in Euclidean coordinates which is $k = | \bar{z}\, o| = \sqrt{x^2+y1^2+y2^2+ yn^2}$, and for imaginary unit vector ã (a1,a2,a3,a.n..w) , the unit vector ε of imaginary part is →
ε = (v̄.i/| z̄o|) = [v̄.∇ i]/| z̄o| = ±(v̄1.a1+v̄2.a2+v̄3.a3) / $(\sqrt{+y1^2+y2^2+yn^2})$ the rotation angle 0 < = φ < 2π , φ = ± $\sin^{-1}$ ū/| z̄o| , cosφ = x/ | z̄o|, which follow Pythagoras theorem for them and for all their reciprocal quaternions ã' (ã.ã' =1) . Since also the directional derivative of the scalar field y(y1 , y2 , yn ..) in the direction i is→ i (y1 , y2 , yn .) = i1.y1+ i2.y2 .+ i n .yn and defined as i.grad y = i1.(∂y/∂1) + i2.(∂y/∂2) +.. = [i.∇].y which gives the change of field y in the direction → i, and [i.∇] is the single coherent unit , so coexistance between Spaces Antispaces and Sub-Spaces of monads on m= $\lim(1+1/w)^w$= e , for w = 1→ ∞ and are ,

zo = [s , v̄n.∇i] = [λ , ± Λ̄.∇i] = [λ ,± L̄.∇i] = | z̄o |.e^ [arc.cos|λ/z̄o|.[Λ̄.∇i / |Λ|] = | z̄o|.e^θ. Λ̄ ∇i]
$|z_o|^w = [\lambda , \pm\bar{\Lambda}.\nabla i]^w = | \bar{z}\, o|^w. e^{u\,(w\,\theta)} = | \bar{z}_o|^w. [\cos.w\theta + \bar{u}.\sin.w\theta]$ = [s , v̄n.∇i] = AB where

$|\bar{z}_o| = [s^2+v1^2+v2^2+v3^2]$, $\cos.\theta = s / |\bar{z}_o|$, $\bar{\Lambda}\,\nabla i = [v1 + v2 + v3] .\nabla i = [v1.i + v2.j + v3.k] .\nabla i$
Unit quaternion $u = u(i+j+k) / |\bar{u}|$ where $|\bar{u}| = \sqrt{1+1+1} = \sqrt{3}$
The conjugate quaternion is $\bar{z}\,'_o = (\lambda , + \bar{\Lambda}.\nabla i) (\lambda ,- \bar{\Lambda}.\nabla i) = [\lambda^2 - |\Lambda|^2]$

$\bar{z} = s + \bar{v}.i = \bar{A}B$ is happening through the general equation (d) and (d1) as follows →
$m\wedge \pm (s + \bar{v}.\nabla i) = q^W = | \bar{z}o|^W.[\cos.w\varphi + \varepsilon.\sin.w\varphi]$.….(e) *where*
$m = \lim(1+1/w)^W = e$, for $w = 1\rightarrow \infty$, $q = z = \pm (x+y.i)$
$\sin\varphi = y/\sqrt{x^2+y^2}$, $\cos\varphi = s / \sqrt{|\bar{z}o|}$, $|z| = \sqrt{,| z\bar{z}\, o|}$
$|\bar{z}o| = \sqrt{s^2+v1^2+v2^2+ v3^2}$, $|\bar{u}| = \sqrt{v1^2+v2^2+ v3^2}$
$\varepsilon = (\bar{v}.i /| \bar{z}o|) = [\bar{v}.\nabla i] / | \bar{z}o| = (v1.a1+ v2.a2+ v3.a3.) / (\sqrt{v1^2 + v2^2 + v3^2})$

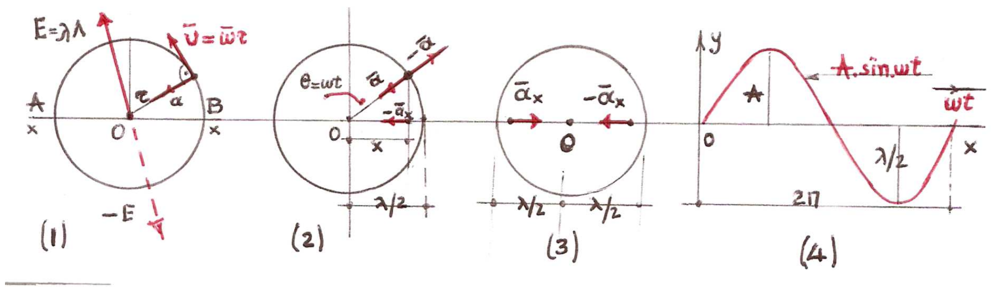
It is shown in quaternion that if *any unit vector* $\bar{u} =1$ and $\bar{v}$ *any vector* then $e\wedge(\bar{u}\varphi).(\bar{v}).e\wedge(-\bar{u}\varphi) = e\wedge(2.\nabla i)$ which gives the resultant rotating $\bar{v}$ about the axis in the $\bar{w}$ direction by 2φ degrees .

B.. Quaternion :
Quaternion **:** $\bar{\mathbf{z}} = s + \bar{v} = [s + \bar{\mathbf{v}}.i] = s + [v1 + v2 + v3].\nabla i = [s + \bar{\mathbf{v}}\, \nabla i]$, where s is the Scalar part and $\bar{\mathbf{v}} = [v1 + v2 + v3]$ the Imaginary part of it , equal to $\bar{\mathbf{v}}\,\nabla i$.
Decomposition of $\bar{\mathbf{z}}$ into exponential form is $\bar{\mathbf{z}} =[s+\bar{\mathbf{v}}\, \nabla i] = | \bar{\mathbf{z}} |.\mathbf{e}\wedge(\theta/2).\bar{\mathbf{u}}\, \nabla i = \sqrt{\bar{z}'\bar{z}} .[\cos(\theta/2) – \bar{u}.\sin(\theta/2)]$
where $\boldsymbol{\theta} = \mathrm{ArcCos}(s / |\bar{z}|)$, is the rotation angle and $\bar{\mathbf{u}} = (\bar{v}. \nabla i)/| (\bar{z})|$ is the rotation unit axis ($\bar{u}= -1$) where Unit axis $\bar{\mathbf{u}} = \mathbf{e}\wedge(\theta/2) = \cos(\theta/2) – i.\sin(\theta/2)$ called also Rotor and $\bar{\mathbf{z}} = \mathbf{e}\wedge\bar{\mathbf{u}}\, .\nabla i$ the Translator.
If $\bar{\mathbf{u}}$ is Unit quaternion then $\bar{\mathbf{u}} = [s+\bar{\mathbf{v}}\, \nabla i] = \cos\varphi + \sin\varphi.\nabla i$ where $\boldsymbol{\varphi} = \mathrm{ArcCos}(\mathbf{s})$, $s^2+v1^2+v2^2+v3^2 = 1$ and vector $\bar{\mathbf{v}} = [v1 / \sin\varphi + v2 / \sin\varphi + v3 / \sin\varphi]$ and exponentially $\bar{\mathbf{u}} = \mathbf{e}\wedge[(\theta /2).\bar{\mathbf{u}}\, \nabla i] = \cos(\theta/2)+\sin(\theta/2)$
Euler's formula for complex numbers is $e\wedge(s + i.v) = e\wedge(s).e(iv) = e(s). [\cos.v + i.\cos.v]$.
Quaternion Conjugate **:** $\bar{\mathbf{z}}\,' = s – \bar{\mathbf{v}}.i = s - [v1 + v2 + v3]].\nabla i = s – \bar{\mathbf{v}}.\nabla i$, which is defined by negating the vector part of the quaternion . Quaternion Conjugation **:** $\bar{\mathbf{z}}.\bar{\mathbf{z}}\,' = (s + \bar{\mathbf{v}}).(s – \bar{\mathbf{v}}) = s^2 - \bar{\mathbf{v}}^{\,2}$
Quaternion magnitude : The magnitude (Norm) is defined by $|\bar{\mathbf{z}}| = \sqrt{\bar{z}.\bar{z}'} = \sqrt{s^2+|\bar{v}|^2} = \sqrt{s^2+|\bar{\mathbf{v}}\nabla i|^2}$,
and for two $\bar{z}1, \bar{z}2 \rightarrow | \bar{z}1, \bar{z}2 | = |\bar{z}1|.|\bar{z}2| = (\sqrt{\bar{z}1\, \bar{z}1'}).(\sqrt{\bar{z}2\, \bar{z}2'}) = (\sqrt{s1^2 + |\bar{v}1|^2}).(\sqrt{s2^2 + |\bar{v}2|^2}) =$
$(|s1|^2+|\bar{v}1|^2).(|s2|^2+|\bar{v}2|^2) = [\sqrt{s1^2 +|\bar{v}1\nabla i |^2}].[\sqrt{s2^2 +|\bar{v}2\nabla i |^2}]$
The Normalized (the versor) $\bar{\mathbf{z}}\mathbf{v} = \bar{\mathbf{z}} / |\bar{z}|$, and the Inverse is $\bar{\mathbf{z}}^{-1} = \bar{\mathbf{z}}' / |\bar{z}|^2 = \bar{\mathbf{z}}\,'/(s^2+\bar{v}^2) = \mathbf{z}'/ (s^2+|\bar{\mathbf{v}}\nabla i |^2)$
λ . Λ = constant for all dipole λ** , and since **λ is constant Λ is also constant** , and **from equivalent formula of $\boldsymbol{\Lambda} = \bar{\mathbf{L}} = \bar{r} \times p = I.w = [\lambda.p] = \bar{r}.(P.\sin\theta) = P.\bar{r} \sin\theta =$ constant → ***Spin of λ .***
so the infinite dipole $\bar{A}B,(\lambda.p) = \bar{A}B,(\lambda.\Lambda)$ in Primary Space [PNS] are quaternion as ,

$\bar{\mathbf{z}}\,\mathbf{o} = [\, \mathbf{s} , \bar{\mathbf{v}}n.\nabla i] = [\, \boldsymbol{\lambda} , \pm \bar{\boldsymbol{\Lambda}} .\nabla i] = [\, \boldsymbol{\lambda} , \pm \bar{\mathbf{L}}.\nabla i]$ which is the quaternion of the Primary Space-dipole ***where***

λ = the length of dipole (wavelength) which is a scalar magnitude ,
Λ = the spin (S) of dipole , equal to the angular momentum vector $p = \bar{\mathbf{L}}$ *and exponentially*
$\mathbf{z_o} = [\, \mathbf{s} , \bar{\mathbf{v}}n.\nabla i] = [\, \boldsymbol{\lambda} , \pm\bar{\boldsymbol{\Lambda}}.\nabla i] = [\, \boldsymbol{\lambda} ,\pm \bar{\mathbf{L}}.\nabla i] = |\, \bar{\mathbf{z}}\mathbf{o} |.\mathbf{e}\wedge [\mathrm{arc.cos}|\boldsymbol{\lambda}/\bar{\mathbf{z}}\mathbf{o}|.[\bar{\boldsymbol{\Lambda}}.\nabla i / |\boldsymbol{\Lambda}|] = |\, \bar{\mathbf{z}}\mathbf{o}|.\mathbf{e}\wedge\theta.\, \bar{\boldsymbol{\Lambda}}\, \nabla i]$
$|\mathbf{z_o}|^W = [\, \boldsymbol{\lambda} , \pm\bar{\boldsymbol{\Lambda}}.\nabla i]^W = |\, \bar{\mathbf{z}}\, \mathbf{o}|^W. \mathbf{e}^{u\, w\, \theta} = |\, \bar{\mathbf{z}}\, \mathbf{o}|^W.[\cos.\mathbf{w}\theta + \bar{u}.\sin.\mathbf{w}\theta]$
where $|\, \bar{\mathbf{z}}\,\mathbf{o}| = [s^2+v1^2+v2^2+v3^2]$, $\cos.\theta = s / |\, \bar{\mathbf{z}}\,\mathbf{o}|$, $\bar{\boldsymbol{\Lambda}}\, \nabla i = [v1 + v2 + v3] .\nabla i = [v1.i + v2.j + v3.k] .\nabla i$
Unit quaternion $u = u(i+j+k) / |\bar{u}|$, $|\bar{u}| =\sqrt{1+1+1} = \sqrt{3}$
The conjugate quaternion is $\bar{\mathbf{z}}\,'\mathbf{o} = (\lambda , + \bar{\Lambda}.\nabla i) (\lambda ,- \bar{\Lambda}.\nabla i) = [\, \boldsymbol{\lambda}^2 - |\boldsymbol{\Lambda}|^2]$
Repetition quaternion is $\bar{z}o1 = (\lambda , + \bar{\Lambda}.\nabla i) (\lambda ,+ \bar{\Lambda}.\nabla i) = [\lambda^2 + |\bar{\Lambda}|^2 + 2.\lambda x\Lambda.\nabla i] =$
$= [\lambda^2 + \Lambda^2] = [\lambda^2 + (i^2+ j^2+k^2) |\Lambda^2|]$ since $\lambda , \bar{\Lambda}$ are $\perp$ axially.
In Polar form $\bar{z}o1 = (\lambda , \bar{\Lambda}.\nabla i) =|\sqrt{\bar{z}\,'o}.\, \bar{z}o\, |e\wedge \{\mathrm{ArcCos} (\lambda / |\sqrt{\bar{z}'o.\bar{z}o1}|)\}. \bar{\Lambda}.\nabla i / \sqrt{\Lambda'\bar{\Lambda}}]$
Quaternion magnitude : Norm is defined by $|\bar{\mathbf{z}}| = \sqrt{\bar{z}.\bar{z}'} = \sqrt{s^2+|\bar{v}|^2} = \sqrt{s^2+|\bar{\mathbf{v}}\nabla i|^2}$,

3... The Wave nature of dipole (Monad) $\bar{A}$ B .



(F-3)

Monad $\bar{\mathbf{A}}\mathbf{B}$ is the ENTITY and [**A , B – PA⁻ , PB⁻**] is the content which is the LAW , so Entities are embodied with the Laws . Entity is quaternion $A^{-}B$, and law the *Real* part |AB| = The length between points A,B and *Imaginary* part the equal and opposite forces P_{A^-}, P_{B^-} such that $P_{A^-} + P_{B^-} = 0$. [18]

Dipole $A^{-}B$ = [λ ,Λ] in [PNS] are composed of the two elements λ , Λ which are created from points A ,B only where *Real* part **|AB| = λ** = wavelength (*dipoles*) and from the embodied work the *Imaginary* part W = (r.dP) = $\bar{r}x\bar{p}$ = I.w = [λ.p] = λ.Λ = k2 , where momentum $\mathbf{\Lambda} = \bar{\mathbf{p}}$ and Forces $\mathbf{dP} = P^{-}_{B} - P^{-}_{A}$ are the stationary sources (*the excitation sources*) of the Space Energy field . [22-25] .
The moving charges is velocity $\bar{v}$ *created from dipole momentum vector* $\pm\Lambda^{-}$ *when is mapped on the perpendicular to* Λ *plane as* → $\bar{\mathbf{v}}_E \parallel dP$ and $\bar{\mathbf{v}}_B \perp dP$) . Since ($dP \perp \pm\Lambda^{-}$) the work occurring from momentum $\bar{p} = m\bar{v} = \Lambda$ acting on force **dP** is zero , so ***momentum*** $\mathbf{\Lambda^{-} = m\bar{v}}$ ***only , is exerting the velocity vector*** $\bar{v}$ ***to the dipole , λ ,*** with the generalized mass **m** (*the reaction to the change of velocity* $\bar{v}$) which creates the component forces , $\mathbf{F}_E \parallel dP^{-}.\bar{v}$ and $\mathbf{F}_B \perp dP^{-}\mathbf{x}\,\bar{v}$. Dipole momentum { Ω = (λ .Λ) = Spin } is the rotating total Energy on dipole $\bar{A}B$ and mapped on the perpendicular to Λ plane as , *velocity* $\bar{v}$ *, mass* ***m*** *, on radius* ***r*** *to AB/2 =* ***λ/2 .*** From F.2-3 velocity $\bar{\mathbf{v}}$ only creates the Centrifugal force ($\mathbf{F}_f$) , and the equal and opposite to it Centripetal force ($\mathbf{F}_P$) with acceleration $\bar{\mathbf{a}}$, and the *mete*r of **x** component equal to **a**.sinθ = **a**.(x/A) = (a/A).x . The equation of motion is then , m.(d²x/dt²) = - (a/A). x with the general solution , **x** = C 1 sinθ + C 2 cosθ = C 1 sin.**w**t + C 2 cos.**w**t , *where* ,

$\mathbf{w}^2$ = (a/Am) ,, C1 , C2 constants ,, and for θ = 0 then ,
$\mathbf{v} = \mathbf{v}_o$ = w.r = w. λ / 2 = (**w**λ) / 2 and $\mathbf{x}_o$ = A = **λ/2**
A = The amplitude of oscillation , and when x = 0 then A = λ / 2 .

Considering motion from time t = 0 where motion passes through O , (x = 0) with velocity $\mathbf{v}_o$ // Ox ,

then *displacement* $\mathbf{x} = \mathbf{v}_o$ .sin **w**t = A.sin [√(a/Am).**t** + π/2] ……..… (3.1)
velocity $\dot{\mathbf{x}}$ = dx/dt = $\mathbf{v}_o.\mathbf{w}$.sin (**w**t + π/2) = A√(a/Am).sin [√(a/Am).**t** + π/2]
acceleration $\ddot{\mathbf{x}}$ = d²x/dt²= -$\mathbf{v}_o.\mathbf{w}^2$.sin(**w**t +π) = (a/m).sin [√(a/Am).**t**+π] = - (a/Am)**x** = - (2a/λm).**x**

The amplitude of oscillation (**x** max) is equal to the constant $\mathbf{v}_o$ / **w** while the period **T** of a complete oscillation to the constant 2π /w is as , w = 2π /T = 2π f = √(a/Am) where f = frequency and solving a , **a** = (2π /T)². (Am) = **w**².(Am) = **w**².(λm) / 2 , → i.e (3.2)
When the motion is repeated in equal intervals of time T , or multiple T, then distance **x** and velocity **dx/dt** have the same initial magnitudes and it is *a periodic motion* which is satisfied by the relationship **x**(t) = **x** (t +T) .The angular speed of line segment r (*or angular frequency*) is w = 2π / T = 2π.f = 2π.$\bar{v}$/λ where **f** is the frequency of the harmonic motion and equal to 1/T = 1/(λ/$\bar{v}$) = $\bar{v}$ / λ = f .
When velocity $\mathbf{v}_o$ is not parallel to Ox then motion is not linear and instead of Scalar magnitude **x** , vector magnitude $\bar{\mathbf{r}}$ is used and the equation of motion is then , m.(d²$\bar{r}$/dt²) = - (a/A). $\bar{r}$ with general solution $\bar{\mathbf{r}}$ = C 1 sinθ + C 2 cosθ = C 1 sin.**w**t + C 2 cos.**w**t , $\bar{\mathbf{v}} = \bar{\mathbf{v}}_o$ = w.$\bar{\mathbf{r}}_o$ = w.λ /2 = (**w**λ) /2 and $\bar{\mathbf{r}}_o$ = A = **λ/2** and for t = 0 where vector $\bar{\mathbf{r}} = \bar{\mathbf{r}}_o$ and velocity $\bar{\mathbf{v}} = \mathbf{v}_o$, and then equations of motion are ,

$\bar{\mathbf{r}}$ = [$\bar{\mathbf{v}}_o$ / w] . sin.**w**t + $\bar{\mathbf{r}}_o$ **w**.cos.**w**t , $\bar{\mathbf{v}}$ = d$\bar{r}$/dt = $\bar{\mathbf{v}}_o$. cos.**w**t - $\bar{\mathbf{r}}_o$ **w**.sin.**w**t or ,

$$\bar{\mathbf{r}} = \frac{(\bar{\mathbf{v}}_o)}{[\sqrt{(a/Am)}]} \cdot \sin[\sqrt{(a/Am)}.t] + A \cdot [\sqrt{(a/Am)}] \cdot \cos[\sqrt{(a/Am)}.t]$$

$$\dot{\mathbf{r}} = \frac{(\bar{\mathbf{v}}_o)}{[\sqrt{(a/Am)}]} \cdot \cos[\sqrt{(a/Am)}.t] - A \cdot [\sqrt{(a/Am)}] \cdot \sin[\sqrt{(a/Am)}.t] \qquad \ldots\ldots\ldots\ldots (3.3)$$

where

$$\ddot{\mathbf{r}} = -\frac{(\bar{\mathbf{v}}_o)}{[(a/Am)]} \cdot \sin[\sqrt{(a/Am)}.t] - A \cdot [(a/Am)] \cdot \cos[\sqrt{(a/Am)}.t]$$

Because increasing of $\bar{\mathbf{r}}$ is perpendicular to $\bar{\mathbf{v}}$ (vector $\bar{\mathbf{v}}_o \perp \bar{\mathbf{r}}_o$) the harmonic components x , y are →

x = $\bar{\mathbf{r}}_o$ cos.**w**t , **y** = [$\bar{\mathbf{v}}_o$ /w].sin.**w**t and since also sin² θ + cos²θ = 1 then

$$\frac{\mathbf{x}^2}{\bar{\mathbf{r}}_o^2} + \frac{\mathbf{y}^2}{[\bar{\mathbf{v}}_o/w]^2} = \mathbf{1} = \frac{\mathbf{x}^2}{\mathbf{A}^2} + \frac{\mathbf{y}^2}{[\mathbf{v_o}.(\sqrt{Am/a})]^2} = \frac{\mathbf{x}^2}{[\lambda/2]^2} + \frac{\mathbf{y}^2}{[\mathbf{v_o}.\sqrt{\lambda m/2a}]^2} \rightarrow \ldots(2)$$

i.e. *an Ellipsoid with point O as centre.*

Motion of equal time repeats itself in **2π** radians with period T and angular frequency w = 2π f as →

$T = 2\pi / [\sqrt{\mathbf{a}/Am}] = 2\pi . [\sqrt{Am/\mathbf{a}}] = 2\pi . [\sqrt{\lambda m/2.\mathbf{a}}] = (\pi/2) . [\sqrt{\lambda m/\mathbf{a}}]$ and frequency $f = [\sqrt{a/Am}] / 2\pi$

What is measured as $|\bar{\Lambda}| = | k2 / \lambda |$ is the Total energy embedded in dipole $A\bar{B}$, *to Quaternions Extensive Configuration* , as ***New Quaternions*** (with Scalar λm and Vector $\bar{v}$ magnitudes) .
Points in Spaces carry A priori the work $W = \int A\text{-}B\ [\ P.ds\ ] = 0$, *as Spin on points* , where magnitudes **P** , $\mathbf{d\bar{s}}$ and **m , w , r̄** , *can be varied leaving work unaltered* which is ± Spin = $\Lambda = \lambda\ m\bar{v}/2 = (\lambda^2 m).w/4$.
The face Energy on Planck's horizon is $\mathbf{E} = k_2 = W_2 = (m.a).ds = (w^2\lambda/2).\lambda_2$ where $\lambda_2 = 8{,}906^{-35}$ m .
The ***Total Energy*** $\mathbf{E = k = \lambda_2\Lambda = \lambda_2(\lambda_2 m\bar{v}/2) = \lambda_2.\lambda_2.m(w.\lambda_2/4) = \pi.m.\lambda^3/2 = C_2.f = h.f}$ where quantities λ_2 , Λ are inextricably inter wined by the factor $\mathbf{C_2}$ showing that ,what is measured is magnitude (λm) as the gauge of what is called mass (*the reaction to the change of velocity* $\bar{v}$) which means that [PNS] is a twist field which has a North and a South pole on points (*the directional unit axis*) .

Energy E is initially absorbed , *in quantized region* $\boldsymbol{\lambda_2}$, with a constant momentum $\mathbf{\Lambda} = \lambda_2\, m_2 v_2/2 = \lambda_2.m_2(w\lambda_2/4) = \lambda_2^2 m_2(\pi f/2) = \pi\mathbf{m}_2.\boldsymbol{\lambda_2}^2/2\ (\mathbf{f}) = \mathbf{C_o.f_2}$, where $C_o = \pi\mathbf{m}_2.\boldsymbol{\lambda_2}^2/2$ *a constant for region k2* .
For monads in k2 region $E_T = [\Lambda\nabla + \Lambda \times \nabla] = [\Lambda.M + \Lambda \times M] = \sqrt{[m.v_{E}.^2]^2 + [\Lambda.v_B + \Lambda \times v_B]^2} = \sqrt{[m.v\bar{E}.^2]^2 + T^2}$ $= h.f = h/T = h.v/\lambda$, i.e. for every monad $\lambda mv/2 = hf = \boldsymbol{\lambda}\Lambda$ and $\Lambda = hf/\boldsymbol{\lambda} = C_o.f$ where constant $\mathbf{C_o = E/f_2}$ a gauge magnitude depended on the angular velocity $\mathbf{\bar{w}}$, the velocity $\mathbf{\bar{v}}$, and the wavelength $\boldsymbol{\lambda}$ and conserved as momentum ($m\bar{v}$) or angular momentum ($\Lambda = r.m\bar{v} = m.w\lambda^2/4$) or both .
Considering oscillatory motion as the simplest case of Energy dissipation then Work embodied in dipole *is a* < ***Spring-mass System with viscous dumping*** > with co variants , energy **E** , mass **m** , velocity $\mathbf{\bar{v} = \bar{v}_E}$, wavelength $\boldsymbol{\lambda}$ **,** and then Energy dissipation is the damping force equal $F_d = C\,\dot{x}$ where C = a constant and $\dot{x}$ the velocity . Following the steady-state of displacement and velocity then **,** $x = A.\sin(wt\text{-}\theta)$ and $\dot{x} = wA.\cos(wt\text{-}\theta)$ where the energy dissipated per cycle is work ,

$$\mathbf{W_d = F_d.dx = \oint C.\dot{x}.dx = \oint C\,\dot{x}^2.dt = \pi CwA^2 = (\pi/4)C.w\lambda^2 = (\pi^2/2)C.f.\lambda^2} \qquad \ldots\ldots\ldots(3)$$

The Energy dissipated per cycle $\mathbf{W_d}$, by the damping force $\mathbf{F_d}$, is mapped by writing velocity $\mathbf{\dot{x}}$ in the form -- $\dot{x} = wA.\cos(wt\text{-}\theta) = \pm\ wA.[\sqrt{1 - \sin^2(wt\text{-}\theta)}] = \pm w . [\sqrt{A^2 - x^2}]$ … (3.4)

where then the dumping force F_d is $F_d = C.\dot{x} = \pm\ C_o w.[\sqrt{A^2 - x^2}]$
and by rearranging $[\cos^2(wt\text{-}\theta) + \sin^2(wt\text{-}\theta) = 1]$ then becomes ,

$$\frac{F_d^{\,2}}{(C_o wA)^2} + \frac{x^2}{A^2} = 1 \qquad \ldots\ldots\ldots\ (7.5)\ .$$

i.e. an Ellipse with F_d , x mapped along the vertical and horizontal axes respectively and the energy dissipated Per cycle is the given by the area enclosed by the ellipse . i.e.

The total energy $E = \lambda_2.\Lambda$ which is embodied in monad $A\bar{B}$ is moving as an Ellipsoid in the Configuration of covariants $\boldsymbol{\lambda}$ ***, m , v*** $= \mathbf{\bar{v}_E}$ **,** as ***Kinetic*** (*Energy of motion* $\bar{\boldsymbol{\Omega}}$) and ***Potential*** (*Stored Energy in* $\boldsymbol{\lambda}$ ***, m , v***) ***energy by rotation and displacement*** , on the principal axis (*through center of monad*) , which is mapped out , as in Solid material configuration by the nib of vector ($\bar{\boldsymbol{\Omega}} = \delta\bar{rc}$) = [$\bar{v}c + \bar{w}.\bar{r}\ n].\delta t$, as the Inertia ellipsoid [Poinsot's ellipsoid construction] in Absolute Frame which instantaneously rotates around vector axis $\bar{w},\theta$ with the constant polar distance $\bar{w}.F_d/|F_d|$ and the constant angles θ_s,θ_b, traced on, Reference (Body Frame) cone and on (Absolute Frame) cone ,which are rolling around the common axis of $\bar{w}$ vector , *without slipping*, and if $\bar{\boldsymbol{\Omega}} =$ Fe , is the Diagonal of the Energy Cuboid with dimensions a,b,c *which follow Pythagoras conservation law* ,then the three magnitudes (J,E,B) of Energy-state follow Cuboidal , Plane , or Linear Diagonal direction . [25-26].

Work (W) is quantized on points as ± (Λ) and passing through the tiny Planck-hole $L_p = 8{,}906.10^{-35}$ then this Diffraction is altered to monads , *Fermions and Bosons* .When the wavelength of the wave is smaller than the obstacle no noticeable diffraction occurs . From work $W_d = (\pi^2/2)C.\lambda_2^2\, f = (\pi^2\lambda_2^2.C/2)\, f = C_o.f = \pi^2\lambda^2 f/2$, then constant $C = 2C_o/(\pi^2\lambda_2^2)$. Wave nature of Dipole AiBi , is following the Boolean logic and distorting momentum Λ as energy , *on the intrinsic orientation position of points . Mapping (graph) of Even function f(Λ) , is always symmetrical about Λ axis (i.e. a mirror) and of Odd symmetrical about the Origin and this is the interpretation of* ***, the Wave Nature of Dipole*** **,** in [PNS] *i.e. The Infinite dipole* AiBi *of the Physical Universe behave as a simple harmonic oscillator.* ***Accelerations are the changes in velocities*** , either by changing in magnitude (*change in speed*) or by changing in direction (b*y turning*) and mapped on , the perpendicular to **E** vector , plane as momentum $p = \Lambda = m\mathbf{\bar{v}} = m\,(w.A) = m(w.\lambda/2) = \lambda m(w/2)$ *therefore* all alterations in λ ,w, happen also in $m = [2E/w\lambda^2]$ following vector Properties for magnitudes and direction as ,

(1)	(2)	(3)	(4)	(5)
$\bar{v}$ $\bar{a}=0$ $\bar{v}$	$\bar{v}$ $\bar{a}$	$\bar{v}$ $\bar{a}$	$\bar{v}$ $\bar{a}$	$\bar{a}$ $\bar{v}$
$\rightarrow$ **0** $\rightarrow$	$\rightarrow$ $\rightarrow$	$\rightarrow$ $\uparrow$	$\rightarrow$ $\updownarrow$	$\rightarrow$ $\backslash$
$\bar{v}_F = \bar{v} + \bar{a} = \bar{v}$	$\bar{v}_F = \bar{v} + \bar{a}$	$\bar{v}_F = \bar{v} + \bar{a}$	$\bar{v}_F = \bar{v} \pm \bar{a}$	$\bar{v}_F = -\bar{a} + \bar{v}$
$F = 0 \leftrightarrow$	$F = m.a \rightarrow$	$F = m.a \uparrow$	$F = m.a \updownarrow$	$F = m.a \ \backslash$

1 $\bar{v}$ = constant , acceleration $\bar{a}$, = 0 , Final velocity $\bar{v}_F$ = Initial $\bar{v} + 0 = \bar{v}$, Force $F = 0$
2 $\bar{v}$ changes to $\bar{v}_F$, acceleration $\bar{a} = \bar{a} \parallel \bar{v}$, Final velocity $\bar{v}_F$ = Initial $\bar{v} + \bar{a}$, Force $F = m.|\bar{a}|$
3 $\bar{v}$ changes to $\bar{v}_F$, acceleration $\bar{a}$, = $\bar{a} // \bar{v}$, Final velocity $\bar{v}_F$ = Initial $\bar{v} + \bar{a}$, Force $F = m.|\bar{a}|$
4 $\bar{v}$ changes to $\bar{v}_F$, acceleration $\bar{a}$, = $\bar{a}$ $\bar{v}$, Final velocity $\bar{v}_F$ = Initial $v \pm \bar{a}$, Force $F = m.|\bar{a}|$
5 $\bar{v}$ changes to $\bar{v}_F$, acceleration $\bar{a}$, = $\bar{a} \backslash \bar{v}$, Final velocity $\bar{v}_F$ = Initial $\bar{v} - \bar{a}$, Force $F = m.|\bar{a}|$

4.. The Binomial nature of Monad $A^{-}B$.

According to the Binomial theorem it is possible to expand on the power **w** or $^{w}\sqrt{}$ of monad AB = $(s + \bar{v}\nabla i)^{w}$ into a sum involving terms of the form as $\binom{w}{k}.(s)^{w-k}.(\bar{v}\nabla i)^{k}$ (*binomial formula*) and each $\binom{w}{k}$ is a specific positive integer known as *binomial coefficient* . On Monad AB with power w = 1 → ∞ are created infinite Spaces and infinite Anti-Spaces (monads) ***on and in the same monad .*** i.e Spaces , Anti-Spaces and Sub - Spaces *on and in the same monad* are differing *, on the binomial coefficient , the successive decrease of powers on* **s** *and increase of power on* **(**∇i) which are also the infinite monads in monads . Since also Sub-Spaces are of ***wave nature*** then infinite Spaces and infinite Anti-Spaces differ only in angular velocity $\bar{w}$ (frequency f), velocity $\bar{v}$ and the wavelength **λ** . [27-29] . Spaces and Sub-Spaces of monad AB = $(s + \bar{v}\nabla i)^{w}$. Since monad AB is expanded in any power (*Space or Anti-space*) into a sum form of infinite coefficients following Newton's binomial or Pascal's triangle , this is also the geometrical explanation of the Spaces which are as follows ,

$$(s + \bar{v}\nabla i)^{w} = \binom{w}{0}.(s)^{w}.(\bar{v}\nabla i)^{0} + \binom{w}{1}.(s)^{w-1}.(\bar{v}\nabla i)^{1} + ...\binom{w}{k}.(s)^{w-k}.(\bar{v}\nabla i)^{k} + \binom{w}{w-1}.(s)^{1}.(\bar{v}\nabla i)^{w-1} + \binom{w}{w} \text{ and}$$
$$(s + \bar{v}\nabla i)^{1/w} = \binom{w}{0}.(s)^{1/w}.(\bar{v}\nabla i)^{0} + \binom{1/w}{1}.(s)^{1/w-1}.(\bar{v}\nabla i)^{1} + ...\binom{1/w}{k}.(s)^{1/w-k}.(\bar{v}\nabla i)^{k} + \binom{1/w}{1/w-1}.(s)^{1}.(\bar{v}\nabla i)^{1/w-1} + \binom{w}{w}$$

i.e Spaces or Sub-Spaces of any monad AB maybe Scalar or Imaginary or both parts . [14]

QUESTION ??

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

Since monad (AB) = ***quaternion*** = **z** and the ,**w**, Spaces and ,**1/w = w⁻¹ ,** Sub-spaces are monads in ,**w**, power and , $\mathbf{w^{-1}}$, root which represent the Regular Circumscribed and Regular Inscribed Polygons in monad AB then quaternion $z^{w} = \bar{z} = s + \bar{v} = s + \bar{v}.i = s + [v1 + v2 + v3].\nabla i = s + \bar{v}\nabla i$, where **s** is the Scalar part and $\bar{v} = [v1 + v2 + v3]$ the Imaginary part of it , equal to $\bar{v}\nabla i$, [25] and then is

→ $z^{w} = (s + \bar{v}\nabla i)^{w} = [z_o.(\cos\varphi + i\sin\varphi)]^{w} = |z_o|^{w}.(\cos w\varphi + \varepsilon.\sin w\varphi) = |z_o|^{w}.e\wedge(i.(w\varphi)$ *where*
→ $|z_o| = \sqrt{s^2 + v1^2 + v2^2 + v3^2}$, $\varepsilon = [v1.i + v2.j + v3.k] / [\sqrt{v1^2 + v2^2 + v3^2}]$, $\cos\varphi = s / |z_o|$ and
→ $z^{1/w} = (s + \bar{v}\nabla i)^{1/w} = |z_o|^{-w}.[\cos(\varphi+2k\pi)/w + i.\sin(\varphi+2k\pi)/w] = |z_o|^{-w}.e\wedge i.(\varphi+2k\pi)/w$

Rotational Energy **E = k2 = Λ = (m$\bar{v}$).λ2/2 = (m.wλ2/2).λ2/2 = (mw).λ2²/4 = (m.2πf).λ2²/4 = f (mπ.λ2²/2).**
Total Energy **E** ***in*** **k2 = Λλ2 = (m$\bar{v}$).λ2²/2 = (m.wλ2²/2).λ2/2 = (mw).λ2³/4 = (m.2πf).λ2³/4 = f (mπ.λ2³/2 .**
From equation of Work = Energy $E = P.d\bar{s} = P.\bar{v}.dT = P.\bar{v}.(2\pi/w) = P.\bar{v}.(2\pi/2\pi.\lambda) = P.\bar{v} / \lambda = hf = h(\mathbf{v/L})$ i.e.

→ during diffraction ,$d\bar{s}$, frequency ,f, doesn't change and only the velocity ,$\bar{v}$, and wavelength ,λ, changes ←
→ Diffraction ,$d\bar{s}$, maybe on any Quantized Space monad (*quaternion*) ***as this is Planck Length*** $\mathbf{L_P}$ ***but how*** **?**

Work is embodied in the three regions k1 , k2 , k3 as the ***rotating Energy*** **Λ**. on dipole $A^{-}B = d\bar{s}1, d\bar{s}2, d\bar{s}3$ in the Configuration of co variants **Λ** , $\mathbf{d\bar{s}}$, with constant **C** = $4.\Lambda d\bar{s}/(\pi w\lambda^2)$ *which exists simultaneously as the Equation of Quaternion* = Space $d\bar{s} = \bar{z} = [s \pm \bar{v}.\nabla i] = [s \pm \bar{v}.i]$ = Work = Total Energy = $E_T = [\Lambda\nabla + \Lambda \times \nabla]$ = $\sqrt{[m.v_{\bar{E}}.^2]^2 + [\Lambda.v_B + \Lambda x\, v_B]^2} = \sqrt{[m.v_{\bar{E}}.^2]^2 + T^2} = \sqrt{[m.v_{\bar{E}}.^2]^2 + |\sqrt{p1}v_B1|^2 + |\sqrt{p2}v_B2|^2 + |\sqrt{p3}v_B3|^2} = (\bar{z}o)^{w}$ $= (\lambda, \Lambda.\nabla i)^{w} = |\bar{z}o|^{w} e\wedge[v^{-} w\theta] = |\bar{z}o|^{w}. e\wedge\{ [\Lambda^{-}\nabla i /\sqrt{\Lambda'\Lambda^{-}}] . [\mathrm{ArcCos}(\mathbf{w}|\lambda|/2\, |\sqrt{\bar{z}'o.\bar{z}o}|] \}$

Nature has not any < meter > to measure quantized quantities (of Space and Energy) except these of the Geometry constants , one of which is number π (Archimedes number π) so quantization of Points **(λ)** ***follows geometry constant*** **(** ***π*** **)** ***and for Energy*** **Wd** ***, which is the quantized Energy of the Quantity dissipated per cycle*** ,[*and this because monads follow sinusoidal oscillation on wavelength = monads as the* **w***.th power and the* **n***.th root of this monad where* **w.n =1** *as above* ***on*** *and in the same monad*] ***and which energy is*** → **Wd = (mw)λ2²/4 = (2mπf).λ2²/4 = (mπ.λ2²/2).f = C.f , i.e.**

From above monads (s+v̄ ∇i) $^{1/w}$ = |zo|$^{-w}$.e ^- i.(φ+2kπ) where cos.φ = s / |zo| , and for Rotated energy case where **s** = 0 , and also cos.φ = 0 exists for angle φ = π /2 , quaternion (s+v̄ ∇i) $^{1/w}$ ***as dimension power is***

e ^- i.(π/2+2kπ).1 = e ^ -i.(5π/2) .b = e ^ - i. (π/2+2kπ). b = e$^{i.(-5\pi/2).10}$ *where* [26]

Lp = **e$^{i.(-5\pi/2).10}$** is the basic Geometrical interpretation of the < ***Planck scale meter*** > based on the two ***Geometry constants*** **e , π** where **k = 1** , and ***base*** **b = 10** , and this from logarithm properties with different bases on the same base **e** as $e^w = (b^{\log_b(e)})^w = b^{w.\log_b(e)}$ and $\sqrt[w]{e} = e^{1/w} = e^{-w} = x^{1/w.\log_b(e)}$ *which are monads in monads* ***and is therefore of Wave motion*** *with angular velocity* **w= 4Wd/(π.Co.λ²),[5-4]**

i.e.

Space and Energy is quantized and measured on the two Constant and Natural numbers e , π . where *for base* the natural logarithm , e , *and exponent* the decimal base , b = 10 , then is →

For base e = 2,71828 and base b = 10 then e^ - (78,2879) = 1 . 10^{-34} m *The answer*
For base **e = 2,71828** and base **b = 10** then e^ - **(78,5398)** = **8,906 . 10^{-35} m** *to the above*
For base e = 2,71828 and base b = 10 then e^ - (80,5905) = 1 . 10^{-35} m ***question .***

Planck's Length **Lp = e^ -i.(5π/2) .b = e^- i . (π/2+2kπ) .b = e$^{i.(-5\pi/2).10}$** = e$^{-(78,5398)}$ = **8,906 . 10^{-35} m**

which is very close to the existing Planck's Length (*the Diffraction ds̄*) → L_p → l_p ≈ 8,906.10^{-35} m .
→*During Diffraction* ,ds̄ **,** ***frequency*** ,f, ***doesn't change and only the velocity*** ,v̄, ***and wavelength*** ,λ, ***changes ←***
i.e. The Wave nature of Even function **f(Λ)** ***and Odd*** **f(-Λ)**≡[0,-∇xΛ¯] ***creates on Planck-Length*** ds ***Fermions and Bosons***
Again → **z**$^{1/w}$ = **(s + v̄** ∇i **)** $^{1/w}$ = |zo|$^{-w}$. [cos.(φ+2kπ)/w + i.sin.(φ+2kπ)/w] = |zo|$^{-w}$.e ^ i.(φ+2kπ) / w
For cos.(φ+2kπ)/w = 0 then φ = π /2 or **z**$^{1/w}$ = |zo|$^{-w}$.e$^{i.(\varphi+2k\pi)/w\ =\ \pm\ i.(\pi/2).10}$ = and it is the Total Energy Tank for this Level which is only of the stored energy for quantized particles where **z**$^{1/w}$ = |zo|$^{-w}$.Ls = Monads

Extending quantization of Space and Energy according to exponential formula **Ls = e^ i.(π/2 ± 2kπ).b** on the decimal base b = 10 then for k = ± 0 → ± ∞ , **Ls = e^ - i. (π/2 ± 2kπ). b = e$^{-i.(\pi/2\pm2k\pi).10}$** *so*

For base e = 2,71828 and base b = 10 then e^ - (13,8155) = 1 .10^{-6} m *Cavity of Balanced*
For base **e = 2,71828** and k = 0 **Ls = e^i.(± π/2).b** then **e^(-15,7079)** = **1,78118 .10^{-7} m** *Energy Tank Length*
For base e = 2,71828 and base b = 10 then e^ - (16,1181) = 1 .10^{-7} m

For base e = 2,71828 and base b = 10 then e^ - (78,2879) = 1 .10^{-34} m
For base **e = 2,71828** and k = 1 **Ls = e^i.(- 5.π/2).b** then **e^(-78,5398)** = **8,906 .10^{-35} m** *Planck's Length*
For base e = 2,71828 and base b = 10 then e^ - (80,5905) = 1 .10^{-35} m

For base e = 2,71828 and base b = 10 then e^ - (140,457691) = 1 .10^{-61} m
For base **e = 2,71828** and k = 2 **Ls = e^i.(- 9.π/2).b** then **e^(-141,372)** = **3,969 .10^{-62} m** *Gravity Length*
For base e = 2,71828 and base b = 10 then e^ - (142,760276) = 1 .10^{-62} m

For base e = 2,71828 and base b = 10 then e^ - (202,627488) = 1 .10^{-88} m
For base **e = 2,71828** and k = 3 **Ls = e^i.(-13.π/2).b** then **e^(-204,204)** = **7,155 .10^{-89} m** *1st Layer Length*
For base e = 2,71828 and base b = 10 then e^ - (204,930073) = 1 .10^{-89} m

For base **e = 2,71828** and k = 4 **Ls = e^i.(-17.π/2).b** then **e^(-267,035)** = **2,245 .10^{-116} m** *2nd Layer Length*
For base **e = 2,71828** and k = 5 **Ls = e^i.(-21.π/2).b** then **e^(-329,867)** = **9,654 .10^{-143} m** *3rd Layer Length*
For base **e = 2,71828** and k = 6 **Ls = e^i.(-25.π/2).b** then **e^(-392,699)** = **4,375 .10^{-170} m** *4th Layer Length*

i.e. on the Natural base ,e, and decimal base* b = 10 *, the Total Energy* [z̄ $^{1/w}$ = |z̄o|$^{-w}$.Ls] *Stored in the quantized Space* Lo = 1,781.10^{-7}** m ***is quantized as* 18 *Particles (the Fermions and Bosons) in the Planck's length* Lp = 8,906 .10^{-35}** m. ***which create all others . On the same Sub-Spaces and on the same exponential base exist also the infinite Spaces Anti-spaces and Sub-spaces , i.e the infinite monads in one monad .

The rate of exponential increase of Layers length is the Spatial rate 3.3.3 = 27
Conservative Planck's constant L-Planck = 1,616.10^{-35} m = √ h.G /c ³ is consisted of the three compromising constants h,G,c, instead that of mine Lp = **e$^{i.(-5\pi/2).10}$** = 8,906.10^{-35} m which is based on the two natural constants **e , π** . Analyzing the Binomial and Exponential nature of Spaces as monads truth is shown .
Energy which is stored as Temperature in the ***Stabilizer Balance Tank cavity*** Lt = 1,781.10^{-7} m is then dissipated and damped in ***Planck's Tank cavity*** Lp = 8,906.10^{-35} m , following the ideal Gas equation [P = nRT/V] of Entropy in Thermodynamics and *Stefan-Boltzmann Black Body law* Wd = σ.T ^{4} / (π.L²/4).

4..1. The Outer Planck's Horizon :

In [24] monad [0, Λ] = Energy is dissipated on points and on quantized spaces smaller and greater to Planck scale. In Planck scale, **Energy is Temperature** in the individual particle with $L = ds = 8{,}906.10^{-35}$ m following the ideal Gas equation [**Λ = n.R.T / V**] of Entropy in Thermodynamics (***which is* perfectly elastic *and all the internal kinetic energy and any change in internal energy is accompanied by a change in* Temperature**) and in a specific number of independent **moles** called ***Fermions and Bosons*** with quite different properties where,

T = The absolute temperature (273,15 K = 0^o C) . The hottest region of the sun is 2.10^7 K
n = The number of moles (quantized units) , and according to [17] n = 18
R = The universal gas constant equal to 8,3145 J / mol K
V = The volume of Planck's mole = $\pi.L^3/6$ = 7,063957.10^$^{-103}$ m

Since also radiation intensity depends only on the temperature of the Black-body so the energy dissipated per circle Wd (*from Balance Tank energy*) follows Stefan-Boltzmann law **$W_d = \sigma.T^4$** where

$W_d = \sigma.T^4$ = Energy radiated per area per time .
σ = Stefan's constant = $5{,}67 . 10^{-8}$ (W/m².K ^{4}) = $1{,}38066.10^{-23}$ (J/K) = $8{,}617385.10^{-5}$ (eV/K) and also

$P = \Lambda = n.R.T / V \rightarrow n.R.T = P.(4\pi.L^3/24) = P.(\pi.L^2/4).(2L/3) = (P.A).(2L/3) = Wd.(2L/3)$ or
$n.R.T = \sigma.T^4.(2L/3)$ and $T^3 = 3n.R/(2\sigma.L) = 3.1.8{,}3145(J/K) /2.1{,}38066.10^{-23}.1{,}78118.10^{-7} = 9{,}667.10^{30}$

$T = \sqrt[3]{1{,}5.n.R./(\sigma.ds)} = 2{,}213 .10^{10}$ K → ***It is the Temperature in the Ideal Balance Tank which absorbs and emits all types of electromagnetic radiations (particles) , of Planck's region .***

The moving charges *is velocity* **$\bar{v}$** *created from the rotating Energy momentum vector* [**Λ** = **Ω** = (λ.P) = ± Spin] which creates the Centrifugal force (**F**f) , the equal and opposite to it Centripetal force (**F**p) and acceleration **$\bar{a}$** *mapped* , (***because of the semi-elastic medium , is damped***) *on the perpendicular to Λ plane as* → **$\bar{v}$** E || dP and **$\bar{v}$** B ⊥ dP) . Constant C of equation (3.4) , $F_d = C.\dot{x} = \pm C_o w.[\sqrt{A^2 - x^2}]$ is referred to the medium and C_o to the type of particle vibrated and also generalized mass **M** (*the reaction to the change of velocity* $\bar{v}$) creates the cross component forces ,**F**E||dP⁻.$\bar{v}$ and **F**B ⊥ dP⁻**x** $\bar{v}$. Gravity level Lg = **$3{,}969.10^{-62}$ m** is entering Tank's level.

The energy damped in Planck's scale volume is the energy density as ,
Λ = n.R.T /V or **Λ** /m³ = **n.RT / V** = 15**.** 8,3145 (J/mol.K).(2,213.10^{10} K)/6.[π.7,0639.10^{-103} m³] ≈ **2,073. 10^{113} J/m ³.**
Energy **Λ** = 2,073.10^{113} J / m ³.7,063957 10^{-103} m³ ≈ **2,934.10^{9} J**

This Energy is stored from the quantized , *Excitation Energy Tank , Supply Length ,* Le = 1,78118.10^{-7} m where dissipated Energy per area per second is $W_T = \sigma.T^4 = 1{,}38066.10^{-23}$ (JK³).23,984.10^{40} ≈ **3,3114.10^{18} J.K³** and the Black hole Tank temperature $T = \sqrt[3]{1{,}5.n.R./(\sigma.ds)}$ ≈ **2,213.10^{10} K** .

4..2. Planck's Horizon :

The oscillatory System in outer Planck horizon **(** λ , Λ) is damped on Planck length (L_p) and removes the dissipated energy from outer , on horizon as Heat , and the loss of energy **W_d** from the oscillatory System results in the decay of amplitudes (**A** = λ/2 = L_p /2) of this free vibration .In forced vibration , *the loss of energy* , is balanced by the energy that is supplied by the excitation . Energy dissipation is determined under cyclic conditions and depended on the Type (*Elasticity of the continuum*) of present damping (*constant* C_o). In all force-displacement relations a *hysteresis loop* is proportional to the energy lost per circle .
Horizon's energy is transformed as frequency in the known particles , *Fermions and Bosons* , and energy lost per cycle due to damping force **F_d** ,which is expressed from general work equation **$W_d = \oint F_d .ds = E$** ,where

→During Diffraction ,d$\bar{s}$ **,** ***frequency*** ,f, ***doesn't change and only the velocity*** ,$\bar{v}$, ***and wavelength*** ,λ, ***changes ← Diffraction*** ,d$\bar{s}$ **,** ***maybe on any Quantized Space monad (quaternion) as this happens on Planck Length*** **L_p** ***but how ?*** *The Dissipated energy from outer horizon as Heat is the loss of energy* **W_d** *from Oscillatory system.*

Rotational Energy **$E = k2 = \Lambda = (m\bar{v})\lambda_2/2 = (m.w\lambda_2/2)\lambda_2/2 = (mw).\lambda_2^2/4 = (m.2\pi f)\lambda_2^2/4 = f(m\pi.\lambda_2^2/2) = hf$**
Dissipated energy per cycle is work **$W_d = F_d .dx = C_o.\bar{x}.dx = C_o\bar{x}^2.dt = \pi C_o w A^2 = (\pi/4)C_o w\lambda^2 = (\pi^2/2)C_o\lambda^2.f$**

Since $W_d = E = (\pi^2/2).C_o f.\lambda^2 = h.f$ therefore solving in $C_o = 2h/\pi^2\lambda^2 = 2.6{,}63.10^{-34}/ (\pi^2.79{,}3168.10^{-70})$ i.e. constant **$C_o = 2.h / (\pi^2\lambda^2) = 1{,}6939. 10^{34}$** . and dissipated energy **$E_d = (\pi^2/2)C_o\lambda^2.f$** $= \pi^2.2h.\lambda^2.f / 2\pi^2\lambda^2$ = **hf**
From rotational energy $f.(m\pi.\lambda_2^2/2) = hf$ then **$m = 2h/\pi\lambda_2^2$** and $\Lambda = (m\bar{v})\lambda_2/2 = \bar{v}.(2h/ \pi.\lambda_2^2).\lambda_2 /2= \bar{v}.h/\pi\lambda_2$.

Relativity accepts as maximum energy $\Lambda = (m\bar{v})\lambda_2/2 = \bar{v}.h/\pi\lambda_2 = mc^2$ and maximum velocity that of light, $c \approx 3.10^8$ m/s where then velocity $\bar{\mathbf{v}}$ on Planck's horizon is $\bar{\mathbf{v}}_{\mathbf{p}} = \mathbf{2c^2/\lambda_2} = 2.9.10^{16}/8.906.10^{-35} \approx 2{,}02.10^{\mathbf{51}}$ m/s and excitation velocity $\Lambda = (m\bar{v})\lambda_2{}^2/2 = \bar{v}.h/\pi\lambda_2{}^2 = mc^2 \rightarrow \bar{\mathbf{v}}_{\mathbf{e}} = \mathbf{2c^2/\lambda_2{}^2} \approx 2{,}3.10^{\mathbf{85}}$ m/s >>> than that of **c** . i.e. is confined in these two quantized (*closed*) magnitudes (*monads*) v = c and $\Lambda = mc^2$. From work

$\mathbf{W_d = (\pi/4)C_o\, w\lambda^2 = (\pi/4).(2h/\pi^2\lambda^2).w.\lambda^2 = (h/2\pi).w = h.f}$ *and since also* $W_d = \mathbf{E_T} = \sqrt{[\,\mathbf{m\,.v_{\bar{E}}.^2}\,]^2 + \mathbf{T}^2} = \sqrt{[\,\mathbf{m\,.v_{\bar{E}}.^2}\,]^2 + [\,\mathbf{\Lambda.v_B + \Lambda \times v_{\bar{B}}}\,]^2} = (\pi/4).C_o.w\lambda^2$ then the angular frequency is $\mathbf{w = 4E_T/\pi C_o\lambda^2 = (2\pi/h).E_T = [\,2\pi/h\,]\,.\sqrt{[m.v_{\bar{E}}.^2]^2 + [\Lambda.v_B + \Lambda \times v_{\bar{B}}]^2}}$. i.e.

Relativity by equalizing energy as $\mathbf{mc^2}$, *is defining the constancy of velocity in Planck scale* , ***is leaving the outside Planck Space Energy with a velocity*** v ***equal to*** $\bar{\mathbf{v}}_{\mathbf{e}} = \mathbf{2.c^2/\lambda_2} = 2.9.10^{16}/8{,}9.10^{-35} \approx \mathbf{2{,}02.10^{51}\ m/s}$ a velocity **v** >>> **c** much greater than that of light where the corresponding time T , on horizon ,
$\mathbf{T} = l_p/v = 8{,}906.10^{-35}/2{,}02.10^{51} = \mathbf{4{,}4089.10^{-86}\ s}$ a time T much smaller <<< T_p [28] i.e.

Relativity is confined , in Space-time or Time , where Time is not existing but only the Space , so Time $\mathbf{T = ds/d\bar{v}}$ ***is the Meter*** **(ratio /)** ***of changes in Space*** **(ds)** ***to the change of velocity*** $\mathbf{(d\bar{v})}$ **, nothing else . so ,**

By using De-Broglie relationship between wavelength (λ) and Energy (mv) of a particle then $\mathbf{E = h\ /\ \lambda}$
$E = (\pi^2/2).Co.\lambda^2.f = (h/\lambda)$ and $\pi^2.Co.\lambda^3.f = 2h$ and frequency $f = (2.h)/(\pi^2.Co.\lambda^3) = 2.6{,}626.10^{-\mathbf{34}} / \pi^2.1{,}6939.10^{\mathbf{34}}\ \mathbf{.}\ 706{,}396.10^{-\mathbf{105}} = 1{,}122.10^{\mathbf{34}}$ H and $w = 2\pi.f = 7{,}049.10^{\mathbf{34}}$ H i.e.

Length	L	$\rightarrow$	$e \wedge i.(-5\pi/2).10 = e\wedge -(78{,}5398)$	$\approx \mathbf{8{,}906\ .10^{-35}\ m}$
Frequency	f	$\rightarrow$	$f = (2.h)/(\pi^2.Co.\lambda^3)$ Hz	$\approx \mathbf{1{,}122\ .10^{34}\ Hz}$
Angular velocity		$\rightarrow$	$w = 2\pi.f =$	$\approx \mathbf{7{,}049\ .10^{34}\ Hz}$
Velocity	**v**	$\rightarrow$	$v = 2.c^2/\lambda_2 = 2.9.10^{16}/8{,}90610^{-35}$	$\approx \mathbf{2{,}021\ .10^{51}\ m/s}$
Time	T	$\rightarrow$	$T = L/c = 8{,}906.10^{-35}/3{,}000.10^{8}$	$\approx \mathbf{2{,}969\ .10^{-43}\ s}$
Energy	E	$\rightarrow$	$\Lambda = 2{,}073.10^{113}$ J/m^3.$7{,}063957\ 10^{-103}$ m^3	$\approx \mathbf{2{,}934\ .10^{9}\ J}$
Work	W_d	$\rightarrow$	$E.\lambda_2 = 2{,}934.10^{9}.8{,}906.10^{-35}$	$\approx \mathbf{2{,}613\ .10^{25}\ Kgm}$
Mass	M	$\rightarrow$	$W/v = 2{,}613.10^{25}/2{,}021.10^{51}$	$\approx \mathbf{1{,}286\ .10^{-26}\ Kg}$
Energy density	U	=	$E/\lambda_2{}^3 = 2{,}934.10^{9}/706{,}396.10^{-105}$	$\approx \mathbf{4{,}153\ .10^{111}\ J/m^3}$
Mass density	ρ	=	$M/[V = \mathbf{(4/3)\,\pi.(\lambda_2{}^3/8)}] = 1{,}286.10^{-27}/706{,}4.10^{-105}$	$\approx \mathbf{1{,}821\ .10^{75}\ Kg/m^3}$

Energy density $U = E/\lambda 2^3 = T.[\,M/Vo]$ is Temperature and mass and
this because on Planck's horizon mass and energy are interchanged as Temperature $\rightarrow$ Energy.
Impedance = (*Elasticity*) and as in Elasticity , *Force = Stiffness . Distance* ($F = I\,.\,d\bar{s}$) then
Impedance $I = \text{Force}/ds = m.(v/T)/ds = 2{,}599.10^{25}/26{,}442.10^{-78} \approx 9{,}829.10^{101}$ J / m .
where limitations imposed by Relativity do not hold in this outer Planck's scale .

In quantum systems , rotated energy $\mathbf{\Lambda = \Omega}$ can be isolated as frequency (*in carbon monoxide molecule as integer multiples of 115 GHz = 115.(10^9 Hz) = 1,15 .10 ^11 Hz = cycles / second and λ=1,128.10 ^⁻10m*) and then using formula for angular frequency related to Planck constant **h** then $W_d = (\pi/4)C_o w\lambda^2 = (\pi/4).1{,}6939.10^{34}.(2\pi).1{,}15.10^{11}.1{,}4943.10^{-20} = \mathbf{1{,}249\ .10^{26}\ J}/1{,}602.10^{-19} = \mathbf{7{,}796.\ 10^{45}\ (eVs^2/m^2)}$.
Rotating Energy Λ is bounded (***flowing***) in the three Energy States k1 , k2 = the Plank Scale , k3 as below ,

$\mathbf{W} = \Lambda d\bar{s}1 = k2 = \mathbf{\Lambda.10^{-35}\,m} = E_T = \sqrt{[m\mathbf{v}_E.^2]^2 + [\Lambda \mathbf{v}_B + \mathbf{\Lambda} \mathrm{x} \mathbf{v}_B]^2} = (\pi/4).\mathbf{C}.w\lambda^2 = (h/\lambda).\lambda = h = E_T = \mathbf{\Lambda.10^{35}\,m} = k3 = \Lambda d\bar{s}3 = \mathbf{W}$

i.e. Work is embodied in the three regions k1 , k2 , k3 as the ***rotating Energy*** $\mathbf{\Lambda}$. on dipoles $\bar{A}\ B = d\bar{s}1$, $d\bar{s}2$, $d\bar{s}3$ in the Configuration of co variants $\mathbf{\Lambda}$, $\mathbf{d\bar{s}}$, with constant $\mathbf{C_o} = 4.\Lambda d\bar{s}/(\pi w\lambda^2)$ and $d\bar{s} = 10^{\wedge\mp 35}$ *and to exist simultaneously the Equation of Quaternion* = Space $d\bar{s} = 10^{\wedge\mp 35} = \bar{z} = [\,s \pm \bar{n}.\nabla i\,] = [\,s \pm \bar{n}.i\,]$ = Work = Total Energy = $E_T = [\,\Lambda\nabla + \Lambda \times \nabla\,] = [\Lambda.M + \Lambda \times M\,] = \sqrt{[m.v_E.^2]^2 + [\Lambda.v_B + \Lambda \times v_B]^2} = \sqrt{[m.v_{\bar{E}}.^2]^2 + T^2} = \sqrt{[m.v_E.^2]^2 + |\sqrt{p1 v_{B1}}|^2 + |\sqrt{p2 v_{B2}}|^2 + |\sqrt{p3 v_{B3}}|^2} = (\bar{z}_o)^{\mathbf{w}} = (\lambda, \Lambda.\nabla i)^{\mathbf{w}} = |\bar{z}_o|^{\mathbf{w}}\, e^\wedge[\,\bar{v}\ w\theta] = |\bar{z}_o|^{\mathbf{w}}.\ e^\wedge\{[\,\bar{\Lambda}\ \nabla i/\sqrt{\Lambda'\bar{\Lambda}}].[\mathrm{ArcCos}\,(\mathbf{w}|\lambda|/2\,|\sqrt{\bar{z}_o'.\bar{z}_o}|]\,\}$ ***is therefore of Wave motion and*** $\mathbf{w = 4.Wd/(\pi.C.\lambda^2)}$ *with velocity* $\bar{v}$ of the Energy Ellipsoid in the two perpendicular curled fields $\mathbf{E = \nabla.\ \Lambda}$ and $\mathbf{B = \nabla \times \Lambda}$.

The quantized energy $\mathbf{E_T}$ in the three quantized regions **k1,k2,k3** as Monads ↺↻ with the **h** boundaries is ,

k1 = [$\bar{A}$ B] = Work = Energy = [PNS] [$\mathbf{\lambda 1\ \Lambda}$] with $\lambda 1 = 0 \rightarrow 3{,}969.10^{-62}$ m < $8{,}906\,.\,10^{-35}$ m
k1$\rightarrow$k2 = $Co.\lambda 2^2 w\pi/4$ = $(h/2\pi)w = h.f$ = < $8{,}906.10^{-35}$ m
k2 = [$\bar{A}$ B] = Work = Energy = [PNS] [$\mathbf{\lambda 2\ \Lambda}$] = $\lambda\,\Lambda$ = Rotational Energy = $\lambda\,.(\bar{r}.M.w.|r|)$ = Spin = Ω
$8{,}906\,.10^{-35}$ m < $\mathbf{\lambda}$ > $8{,}906\,.\,10^{-35}$ m = Planck Scale
k3 = [$\bar{A}$ B] = Work = Energy = [PNS] [$\mathbf{\lambda 3\ \Lambda}$] with $\lambda 3 = 8{,}906\,.\,10^{-35}$ m < $1{,}78118.10^{-7}$ m < ∞

5.. The Flow Plan of the Space - Energy Universe .

1. [PNS] → [A,B – P_{A^-},P_{B^-}] ≡ Work W = |E_T| = [|Λ|.∇ + Λ x∇] → W = ∫ *P.ds* = 0 → **Time T = 0**

Cause is , because Primary **Point A** is nothing and ***is Quantized as*** → **Point B** (following *Principle of Virtual Displacements W = ∫ P.ds= 0*) = Force x Displacement = Energy x Space *and according to ancient Greek Philosopher* Anaximandros [**The non existent [Point A] , Exist when is Done , it occurs [Point B**] = [Το μή Ον , Ον γίγνεσθαι] = [Τό τίποτα υπάρχει Οταν γίνεται] .

2. [PNS] → [|Λ|.∇ + Λ x∇] ≡ z̄ = [λ , ± Λ x∇] = |z̄o| ^{w}. e^ **{** [Λ⁻∇I / √Λ'Λ⁻].[ArcCos (w|λ|/2 |√z̄'o.z̄o|] **}** which is the beyond gravity forced field . → No change of ds → **Time T = 0**

Cause is the moment Lever of Primary Forces and ***is Quantised as*** → **Spin** < The Spin modelling of microscopic description >

3.[PNS] → [λ,± Λ x∇] = zo = Λ = nRT/V(λ = C) → Gas equation → No change of ds → **Time T = 0**

Cause is the **Hea**t causing vibration on molecules and ***is Quantised as*** → **Intensity (** ***Pressure*** **)**

k1 z = |Λ|. **e** $^{-i.(\pi/2).10}$ = Black Hole *Temperature Balanced Tank* Energy length , *where* PV = n.R.T and (PA = Wd = σ.T^4) → No change of ds → **Time T = 0**

Cause is the **High Heat** Conservational Balanced Energy and ***is Quantised as*** →**The Fundamental particles** (Bosons and Fermions) .

4.↑↓→k2 z = |zo|. **e** $^{-i.(5\pi/2).10}$ = Energy in Planck length → ∞ changes of ds →**Time T = t**

Cause are the **Infinite changes of Space** and ***is Quantised as*** → **Matter , Energy** and Existent .

k3 z = |zo|. **e** $^{-i.(7\pi/2).10}$ = Energy Under Planck length , *Tank Cavity of Gravity* , *where* **v̄** $_E$ **= 0** and E_T = Λ.**v**$_B$.+ Λ x **v**$_B$ and is the *accelerating removing , rotating energy* Λ to **v**$_B$. m = **0** and E_T = Λ.**v**$_B$.+ Λ x **v**$_B$ and is the *linearly removing* , *energy* Λ towards **v**$_B$, → No change of ds → **Time T = 0**

Cause is the **Very high Heat** causing vibration on molecules and ***is Quantized as*** → **Intensity (** ***Pressure =*** F_d = C.ẋ = ± C_ow.[√ A² - x²] **)** i.e. ***Cause*** → (***Constant*** C_o) → ***Quantized New monad .***

i.e. ***The meter of Space-Energy changes*** **(** ***The time*** **= T)** ***exists only in k2 quantized region .***

6.1.. Force instantly exerted to velocity vector ≡ wavelength as < *by changing of speed* >
Using equation (2) for Force F = m.**ẍ** = m.d²x/dt² = - m.**v**o.**w²**.sin(**w**t +π) = - (2a/λ).**x̄** and from [27] Critical damping in Spaces happens when characteristic equation 2. [√(2a/λm) is in damping limits

1.. 2.[√(a/Am)] = (√λ²m/2a). 2√(a/Am) = 2.√λ and then 2a/ λm = 2λ → a = m.λ²
2.. 2.[√(a/Am)] = (√λm/2) . 2√(a/Am) = 2.√a and then 2a/ λm = 1 → m.λ = 1
3.. 2.[√(a/Am)] = (√λm²/2a). 2√(a/Am) = 2.√m and then 2a/ λm = 2m → a = λ.m²
and for compatibility a = λ , a = λ = m , a = m and **Fc = (2a/λ).x = 2(2λ/2) = 2.λ** i.e
The critical acceleration (**a**c) happens when Force velocity vector | **F | = 2.| λ |**

6..2. Force instantly exerted to velocity vector v, from 0 → **v̄** λ ↑ **v̄** $\xrightarrow{\quad}$ v

Using Newton's second law for accelerations the length λ is covered with initial velocity **v̄** i = 0 and final **v̄**$_F$ in time t so λ = (1/2).|ā|.t² , and if in same time |**v̄**i| =|**v̄**$_F$|= **v̄** then λ= |**v̄**|t. Substituting t = λ / |**v̄**| then λ = (|ā| /2).(λ²/|**v̄**²|) or 2= |ā| λ/ |**v̄**|² and for |**v̄**|= λ then 2 = |ā | /λ or **|ā| = 2.λ ,** i.e. in Electromagnetic Spectrum minimum acceleration is **|ā| = 2.λ** = 2 . 10^{-15} m/s² as before .

7..1. Higgs Boson and Gravity : (Preliminaries)
1nm = 1.10^{-9} m , **1T** = (T) = 1.10^{12} , **1Hz** = s^{-1}, 1N =Kgm/s² ,**1Pa** = N/m² , 1J = Kgm²/s² = Nm = Pa.m³ = Ws= CV = **1J** = 10^7 erg = 6,2425.10^18 eV.s = 0,239cal.s = 2,39.10^-4 Kcal.s = 9,478 .10^⁻4BTU = 2,7778.10^⁻ 7KW.h = 2,7778.10⁻4 **Wh** = 9,8692.10⁻3 atm = 11,1265 . mass-energy = 10^⁻ 44 Foe , **1W** = J/s = Kgm²/s³ 1C = sA , **1V** = W/A = Kgm²/As³ , **1Cal** = 4,184J = 2,611.10^19.Ev = 1,163. 10^{-6} KWh = 0,003964 BTU , **1eV** = 1,603.10^{-19} J , (1eV /c²) = 1,793.10^{-36} Kg , **1GeV/c²** = 1,793. 10^{-27} Kg , **1J** = N.m = Pa.m³ = W.s = C.V , W = Watt. ,V = Volt , (1V/m) = (m.Kg.s⁻ ³.A⁻ ') = (Kgm²/s²) = (1J/Ams) , C= Coulomb , **c** = 3.10^8 (m/s) , **λ** = 4,5.10^7 (m) , **h** = 4,1357.10^{15} (eV.s) = 6,626.10^{-34} (J) ,
E = 2,15eV = 3,44.10^19 (J) , **E** = hf = hc/λ = 1,2398/532 green (eV.nm) / (nm) = 2,33 eV .

In SI system : mass = **1eV/c²** = 1,78.10 ^{36} Kg , Temperature **(eV/kB)** = 11604,5[20C] K , Energy E , **E** = hf = hc/ **λ =** (4,135667233.10 ^{15} eV.s) . (2998.10^5 m/s) / (λ (nm)) = 1239,8 / λ [eV.nm/nm] , Momentum **Λ = p** = (1GeV/c) = [(1.10^9).(1,603.10 ^{19} C).V] / [2,998.10^8 m/s] = 5,347.10 ^{19} Kgm/s/c . **hc** = 1,99.10^{-25} Jm.1eV/1,602.10 ^{19} = 1,24.10^{-6} eV.m **, E** = 1,24. 10^{-6} eV.m.(0,6 / 10^{-6}) = 2,063 eV = 3,31. 10 ^{19} J = 6,626 . 10^{-34} Kg/s. , **WT** = kB.T where kB = Boltzmann's constant . 1 cal = 4,1868 Joules ,

Electromagnetic Spectrum regimes : Energy E= 10^{7} eV/c² = 1,6.10^{12} J , Frequency f = 10 ^{21} Hz , Wavelength λ = 10^{13} m .

Considering **Gravity** as the first particle entering Planck's length $L_p \approx$ 8,906.10^{-35} m then exponential power corresponding to this space is |zo|^{w}.e^ i.(φ+2kπ) w = |zo|^{w} .e ^ iw.[π/2 + 4π] .10 = |zo|^{w} .e ^ iw.[9π/2].10 and

For k = 0 then → w.[-π/2] = w.(- π/2) → it is the first Diffraction → *Tank of energy* .
For k = 1 then → w.[-2π -π/2] = w.(-5π/2) → it is the basic Diffraction L_p → *Planck length* .
For k = 2 then → w.[-π/2 -4π] = w.(-9π/2) → it is entering all monads of L_p → *Gravity length* **λ_g** *again*

Space and Energy is quantized and measured on the two Constant and Natural numbers e , π .
where *for base* the natural logarithm , e , *and exponent* the decimal base , b = 10 , then is →

Gravity's Length L_g = e^ -i.(9π/2) .b = $e^{-i.(9.\pi/2).10}$ = $e^{-(141,372)}$ = 3,969 . 10 $^{-62}$ m
and so Gravity is Incorporated into quantum mechanics . [29]
Using De-Broglie relationship between wavelength (λ) and energy (mv) of a particle then **E = h / λ**
E = 6,626. 10^{-34}/ 3,969.10^{-62} = 1,669. 10^{28} J and from E = (π/4) wλ² = (h/λ2) then **w = 4.E / π.λ²**
w = 4. 1,669.10 ^{28} / π.15,753.10^{-124} = 1,34897.10^{151} H and **f = 2E / π²λ²**

L_g = e^ -i.(9π/2) .b = $e^{-i.(9.\pi/2).10}$ = $e^{-(141,3716694)}$ = **3,9698.10^{-62} m**
E_g = h / λ = 1,669. 10^{28} J
w_g = 4.E / π.λ² = 1,349. 10^{151} H
f_g = 2E / π²hλ² = 2,147. 10^{-150} H
W_g = (E.λ_g) = 1,669.10 ^{28}. 3,969.10 $^{-62}$ = **6,629. 10 $^{-34}$ Jm** /1,603.10^{-19} = 4,135.10 $^{-15}$ eV
Λ_g = Wg / λg = 6,629 . 10 $^{-34}$ / 3,9698.10^{-62} = **1,669. 10^{28} Kg.m**
m_g = 2.E / w.λ = 2.1,669. 10 ^{28} / 1,349.10 ^{151}.3, 9698.10 $^{-62}$ = **6,234 . 10 $^{-60}$ Kg**
$\bar{v}_g$ = 2E / m.λ = 2.1,669. 10^{28}/ 6,234.10 $^{-54}$ .3,969.10 $^{-60}$ = **1,349 . 10 ^{143} m / s** .

7..2. The geometry of the (18**) Fundamental Particles , [*Fermions* , *Bosons*] :**

8.. Remarks .

It has been shown that all monads are dipole z = (a + i.v)^n=1/w , on the nth power and as → **z**¹/^{w} = **(**s + **v̄** ∇i**)**¹/^{w} = |zo|$^{-w}$.[cos.(φ+2kπ)/w+i.sin.(φ+2kπ)/w] = |zo|$^{-w}$ e^ i.(φ+2kπ)/w ← which are of wave and sinusoidal nature .
It is shown that for clearly , *Energy monads* ,**v**, *only* , then Space and Energy ***is quantized*** and measured on the three Constant and Natural numbers **e , π , i ,** and for base the natural logarithm ,**e**, and exponent the decimal base ,**b=10**, then energy is stored as Temperature in the ***Tank cavity*** Lt = 1,781.10 $^{-7}$ m from where is then dissipated and damped in ***Planck's Tank cavity*** Lp = 8,906.10 $^{-35}$ m , following the two ideal Gas equations [**Λ = n.R.T / V**] ***of Entropy in Thermodynamics*** **(***which is perfectly elastic and all internal kinetic energy and changes in internal energy are accompanied by a change in Temperature only* **)** and since also the radiation intensity depends only on the temperature of the Black-body which is the energy Wd dissipated per circle **(** *from Balance Tank energy*) ***then also follows Stefan - Boltzmann law* Wd = σ.T ^{4}** where then Temperature in the Ideal Tank T = ³√1,5.n.R./(σ.ds) = 2,213.10^{10} K absorbs and emits all types of electromagnetic radiations .
A parallel transmission of energy quantization is the Boltzmann's constant as → ***Cause* [*Physical Constant*] *Quantization* .**
Energy (***Heat***) causes Monads (***molecules***) to vibrate . More ***Heat*** creates ***higher frequency*** vibrations and increases also the ***Intensity*** (I = Intensity = W /m² = Power per unit area) of the radiation.
Boltzmann's constant is the quantization of ***Energy*** [***Vibration in magnitude* L< 3,9698.10 $^{-62}$*m* , *under Heat cause***] ***into*** a new monad , the ***Intensity*** [***The Pressure in*** L = 3,9698.10 $^{-62}$ m] or from **Λ.V = n.R.T → [PA].L = R.T**
i.e.
Energy = monad [T] = *Vibration in magnitude* L < 3,9698.10 $^{-62}$ *m* , *under Heat cause* ΔT *is quantized as*
Energy = An other monad as [PA] = *Intensity* = *The Pressure in* L = 3,9698.10 $^{-62}$ m . [29]

For a function u(x,y,z) of three spatial variables , and since Temperature makes molecules to vibrate , which means a sinusoidal motion as all other monads , then equation of motion is [∂ū/∂t] = a.∇ ² ū = aΔū and for the Stationary heat equation is [∂ū/∂t] = a.∇ ² ū = aΔū **= 0 .** Entropy S = Q/T= **σ.T** ^{3} , where a = a positive constant Q = Wd = quantity of heat , an index of the → Temperature = Energy = A quantized new monad .
Gravity in a level of L = 3,9698.10 $^{-62}$ *m is then Incorporated into Quantum mechanics.*

9.. Acknowledgment .

The reason of writing this scanty article is because *I am Engineer* , and my deep intuition contradicts to some very acceptable conceptions . By the way some accepted , instead of as below written , *which are for me disputable* , are altering as follows by placing the **[Answer] →** ***but ..so***

Time comes first and nothing changes without time **[Answer] →** *Time* ***is not existing*** *and it is a meter of changes in the movable Spaces and this springs from Primary Space creation ,* W = ∫ P.ds = 0 . *It was shown that time* ***exists only in k2 quantized region as the meter of Space-Energy changes*** **T= ds/dv̄** ***is the Meter*** **(ratio /)** ***of changes in Space*** **(ds)** ***to the change of velocity*** **(dv̄) , nothing else** .

Casually is the cause for every effect or observation → *Conservation of* ***the A priori work*** *on Points and on all Dipole between the infinite points in PNS is ,* ***gravity of Spaces*** *, the only effective cause* .

Laws of Physics exist before the entities involved → ***Laws are*** : A=B *The Principle of the Equality* . A ≠ B = *Principle of the Inequality* , A↔ B = ∞ *Principle of Virtual Displacements* W = ∫ P.ds = 0 , PA+ PB = 0 *Principle of Stability* , A≡B *Principle of infinite Superposition (extrema)* → ***and Entities*** (*Monads* A‾B ***) are embodied with the Laws*** (*A ,B - PA , P B*) because ***Entities = Monad*** $\bar{A}$***B*** **=** ***Quaternions*** [AB , P⁻A - P⁻ B] and all of them built on the Euclidean logic.

The natural Constants *in Physics become from the Laws* → *Geometry* ***constants are the meters of Laws*** . *Physical constants represent the quantization of Energy in the different levels of Spaces .*

Sequence that Space was created before matter → *Human mind , in front of this dilemma created the outlet in Religious and the myth of Big-Bang .*

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. by Markos Georgallides .