Derivation of the String Tension Formalism from Inherent Parameters of a Holographic Anthropic Multiverse (HAM)

R.L. Amoroso* & E.A. Rauscher[#]

*Noetic Advanced Studies Institute, 608 Jean St, Oakland, CA 94619-1422 USA
[#]Tecnic *Research Labs, 3500 S. Tomahawk Rd, Bldg. 188, Apache Junction, AZ 85219 USA*
Email: cerebroscopic@mindspring.com

Abstract. In Holographic Anthropic Multiverse (HAM) cosmology observed temporal reality is a 3(4)D virtual subspace of an 11(12)D eternity in correspondence with the tenets of the F-Theory incarnation of M-Theory; 12D being the minimum number of dimensions (D) to signify causal separation from temporality. Succinctly HAM cosmology postulates an infinite number of nested Hubble spheres each with their own laws of physics; this and other details of the HAM will be discussed in detail. The HAM present is a dynamic instant, a continuous-state standing wave of the least cosmological unit of the 12D Superspace undergoing a Continuous Dimensional Reduction / Compactification Process (CDRCP) based on extensions of the Wheeler-Feynman-Cramer transactional models. This HAM dynamic entails an energy dependent spacetime metric as 1st proposed by Einstein. This means that HD properties of the CDRCP standing wave metric entail a form of future-past hysteresis loop. The energetics of this so-called hysteresis loop of the 12D least unit reveal a new action principle driving the evolution of the HAM which is itself a form of self-organized complex system. Since the HAM is scale invariant these energetics also apply to self-organized Autopoietic living systems. This new teleological or noetic action principle is shown to be associated with the unitary physical field and a form of 'super quantum potential' as postulated by de Broglie and Bohm. Using these parameters an alternate derivation of the string tension formalism is derived. It is anticipated that this form of the string tension formalism may shed light on recalculating Planck's constant and lead to a program for completing quantum theory. HAM cosmology is empirically testable and an experimental protocol for isolation of the new energy dynamics is presented.

1. Introduction – Relevant Cosmological and Superstring Context

The evolutionary search for the fundamental background independent string vacuum has been cast recently in a Twelve Dimensional (12D) form called F-Theory. Generally String Theory is still aligned with naturalistic Big Bang Cosmology not perceived as compatible with a covariant Dirac polarized vacuum essential for extended electromagnetic theory and finite photon mass m_g. A recently formulated highly symmetric continuous-state cosmology called the Holographic Anthropic Multiverse (HAM) utilizes a 12D energy dependent standing wave superspace based on extensions of the Wheeler-Feynman-Cramer transactional model providing a context where scale-invariant least cosmological units of the Superspace act as a complex self-organized system. These fundamental least-unit entail a form of incursive oscillator inherent in the continuous-state topology of HAM spacetime. Simulated application of the Incursive Oscillator (IO) is shown to produce a natural emergence of generalized F-Theory 2-branes from the superspace backcloth potentially bringing the IO program into closer alignment with mainstream physical cosmology which could be instrumental in solving the problem of deriving parameters of the fundamental string vacuum, especially emergence of a new action principle driving the evolution of its self-organization.

Over the last decade the cosmology of a continuous-state Holographic Anthropic Multiverse (HAM) has been developed [1-4]. The HAM cosmology is highly ordered and symmetric such that the Euclidian-Minkowski $E_3 - \hat{M}_4$ present is a form of a harmonic oscillator, that is a virtual standing-wave topology of Higher Dimensional (HD) future-past elements. This condition is based on an extension of the Transactional Interpretation of quantum theory [5] to the topology of spacetime itself [1-4]. The transactional Interpretation is based on the Wheeler-Feynman absorber theory of radiation where events are transactions based on the interaction of future-past elements. The HAM cosmology is a form of self-organized complex system, a supposition suggesting properties

generally attributed to such systems [4]. This context suggests the Incursive Oscillator (IO) [6-9] provides a basis for studying the harmonic properties of interest to the HAM model.

Superstring Theory, now known as M-Theory, is based essentially on one parameter, string tension T_S

$$T_S = e / l = (2\boldsymbol{pa}')^{-1} ; \tag{1}$$

where l is length of the string and $\boldsymbol{a}$ the fine structure constant. It is well known that the gauge condition is an approximation [10,11] suggesting Planck's constant $\hbar$ needs to be recalculated to satisfy the parameters of M-Theory [10-12]. Since HAM cosmology is aligned with an extension of Einstein's energy-dependent spacetime metric $\hat{M}_{3(4)}$, the Stoney e^2 / c, an electromagnetic precursor to Planck's constant, [13] is the choice for studying the recalculation. The factor added to $\hbar$ is string tension T_S, where T_0 can increase the size of $\hbar$ the Larmour radius of the hydrogen atom in the small scale and lead to infinite size dimensionality cosmologically [1-4,10,11,14]. Equation (2) illustrates the basis for this distinction

$$l_P = \sqrt{\frac{\hbar}{mc} \cdot \frac{Gm}{c^2}} \qquad or \qquad l_S = \sqrt{\frac{e^2}{4\boldsymbol{pe}_0 mc^2} \cdot \frac{Gm}{c^2}} , \tag{2}$$

where $l_P \; and \; l_S$ are the length of the Planck and Stoney respectively.

The Bigbang is said to originate from an initial singularity. This is only an observational illusion in the HAM where the arrow of time arises from compactification.
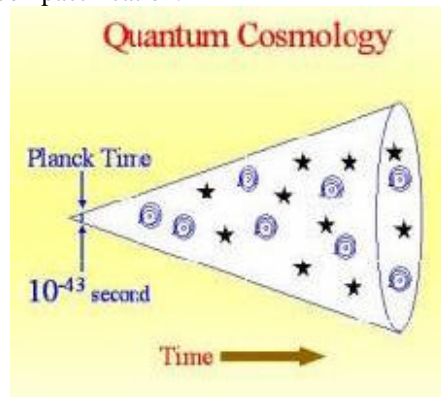
Figure 1. Symbolic view for origin of the universe from an initial singularity showing spatial inflation

2. The Holographic Anthropic Multiverse Cosmology (Ham)

WHAT IS THE HOLOGRAPHIC ANTHROPIC MULTIVERSE?

- There Is No Bigbang (temporal Singularity), Expansion Or Inflation.
- Redshift Is Non-Doppler Due To Periodic Photon Mass (Tired Light).
- CMBR Is Cavity QED Blackbody (BB) Radiation.
- Thus CMBR Is Emission & Redshift Absorption For BB Equilibrium.
- The HAM Is Closed & Finite In Time / Open And Infinite Eternally.
- This Relates To The Holographic Principle – A Multiverse With Potential For An Infinite Number Of Nested Hubble Spheres (H_R) Each With Their Own Laws Of Physics.
- Dark Energy Arises From The Rest Of The Multiverse Beyond H_R.
- Cosmological Constant Is Based On This Horizon - Fluctuating -, 0, +.
- The HAM Is Not Static Or Steady-State But A Continuous-State (CS).
- The CS Provides A Standing Wave Present From Future-Past Elements In A Spin Exchange Dimensional Reduction Compactification Process- i.e. The XD Can Be Infinitely Large > 4D And Planck Size < 3D.
- 3D Reality Is A 'Pocket Space' Or Temporal Subspace Of 12D Eternity.
- A Conscious Universe Requires an Additional Teleological (Noetic) Action Principle Guiding Evolution and Complex Self-Organization.

MANY PROCESSES DESCRIBE THE STANDING WAVE PRESENT INSTANT

- • 1. Dimensional reduction
- • 2. Continuous Compactification
- • 3. Spin exchange / Parallel Transport
- • 4. Continuous state
- • 5. Holographic Principle
- • 6. Future-Past Transaction
- • 7. Super Quantum Potential
- • 8. Noetic Action Principle – Teleological

3. Summary of Noetic Spacetime Parameters

The periodic symmetry of HAM cosmology contains an inherent beat frequency during the continuous state dimensional reduction spin-exchange compactification topological transformation which introduces energy by the holophote action of the Noetic Force F_N energy through every spacetime point into every atom during the process of dimensional transformation as $D_s \to D_t \to D_E$ [4,18,19] and as $R_U \to R_Q \to R_C$ where spatial dimensions, D_s continuously transform into temporal dimensions, D_t and into energy, D_E in a cyclical process of unitarity, R_U to quantum, R_Q to classical, R_C ; a relativistic process representing an additional set of Noetic transformations: Galilean $\to$ Lorentz-Poincairé $\to$ Noetic [4,20]. A deficit angle occurring in the parallel transport [21] around the noetic least-unit [4,22] leads to a new model for the arrow of time, offering an explanation for why the extra dimensions are not considered sub Planckian in HAM cosmology but still unobserved [23].

From generalized examples of spacetime topology possible conditions for string propagation are illustrated for the noetic stringy vacuum, considered a form of the covariant Dirac polarized vacuum [24] so that $S_N = S_0 + S_1 + S_2 \to S_{12} \to \hat{M}_4 \times K_8 \to \hat{M}_4 \times \pm C_4$ [1-4,18,19,25]. The 12D Noetic Superspace S_N is triune, comprised of the standing wave Minkowski present $\hat{M}_4$ and two complexified future-past elements $\pm C_4$, where for the intermediate subset $\hat{M}_4 \times K_6$ the $\hat{M}_4$ is a 4D energy dependent Minkowski space and K_6 a compactified 6D torus. A realistic example is given below. First points $z \approx z + 1 \approx z + e^{2ip/3}$ admitting Z_3 symmetry are identified in the complex z plane and three tori T_i, $i = 1,2,3$ are obtained whose product is a torus of six real dimension, three of which are complex [26], on which string propagation is considered.

From the well known symmetry groups rotations can generate discrete symmetry elements accompanied by various translation components t parallel to a spin axis A such that n translations t equal an integral number p of lattice translations t along the axis

$$nt = pt \tag{3}$$

where n and p are integers. When $p/n < 1/2$, the screw is right-handed, when $p/n \le 1/2$, left-handed and when $p/n = 1/2$ it is zero [27-29].
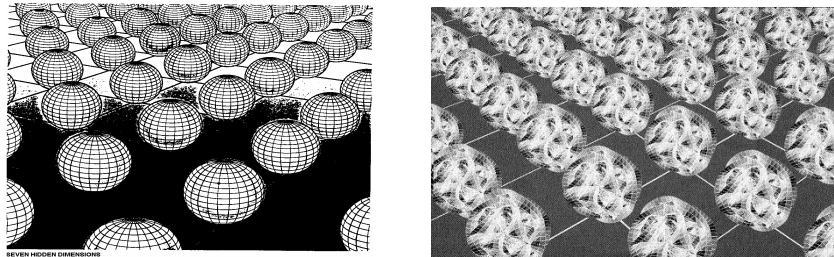
Figure 2. a) Extra dimensions microscopically curled up at each spacetime point. b) A more complex view 30 years later in terms of Calabi-Yau topology.
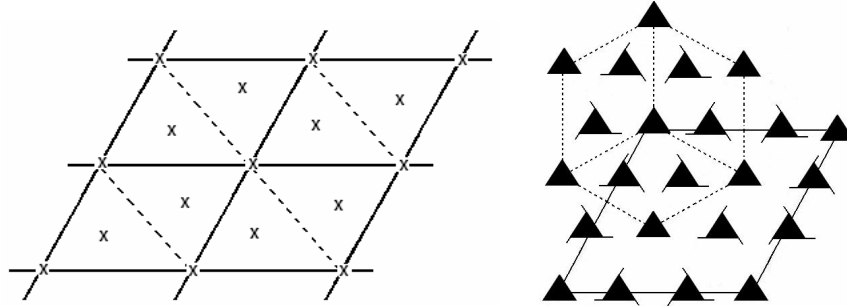
Figure 3. a) A triangular spacetime lattice in the complex plane for production of a torus T_0 with Z_3 symmetry utilized in the study of compactification in string theory. b) Elaboration of how a hexagon lattice in a) arises from the spin structure of the spacetime fabric. Solid triangles become fixed coordinates, while 'propellers' or screws have left/right handed spin axes representing field parameters for 'bumps and holes' in the Dirac sea. These spacetime structures in conjunction with Fig. 2 putatively supports the basis for F-brane emergence.

A translation *t'* normal to axis *A* of a screw produces a translation equivalent to *A'* as well as nonequivalent but equal screw operations about parallel axes *B* and *C* along the perpendicular bisector of *AA'* at a distance $t' \cot a / 2$ from *AA'*. These screw operations accumulate along axes *B* and *C* producing screw axes parallel to *A* [27-29]. The resulting sets of symmetry elements are repeated by the lattice translations to constitute infinite sets of parallel axes as extrapolated from Fig. 1b into Fig. 4.

Static to Steady State to Continuous State

We explore a new scaling hypothesis relating the speed of light *c* and the scale of the universe *R*. We then develop an axiomatic approach resulting in an *apparent* expanding universe, yielding the same successes as present big bang cosmology but without the need to postulate inflation, cold dark matter, or any artificialities of current theory. The "coincidences" of the Dirac (1937) and Eddington (1931) large numbers and ratios of fundamental constants are not to explained, rather they are accepted and in the process yield a fundamentally different view of the cosmos.

The speed of light is *identical* to the rate of change of the scale of the universe, we construct an axiomatic approach equivalent to the Hubble Law. This axiomatic approach can be considered as an alternative approach to the mysterious coincidences of Eddington and Dirac which Weinberg called "so far unexplained... a real though mysterious significance."

It can be further shown that all lengths, such as the Planck length, l*, the classical electron radius, re, etc., are also proportional to R. For example,

l* ~ (2-7/3 Np-1/3 c5/3p*c-2pp) R

Similar relations can be found for re and rp where re and rp be the electron and proton radii. Combining with we obtain

G = Np-2 c-2p* ~ 3.4 x 10-122 R2

A relationship linking the gravitational and Planck's constant to R and   holding for the current values of Np-2 X-2p* in the universe. Let us now set the following initial conditions, i.e.,

R goes to l* and   goes to l*/ t* = c

where l* and t* are the Planck length and Planck time, respectively.

Each mode of the field of a quantum harmonic oscillator is associated with the quantum cavity dynamics of the spacetime topology as it undergoes its continuous transitions.

$$E_n = (n + \frac{1}{2})\hbar \mathbf{w} \tag{4}$$

E is the state of energy for n photons. For $n = 0$ the oscillator is in the ground state, but a finite energy of the ground state, called the zero-point energy, is still present in the region of the cavity. According to equation 4 of the quantum harmonic oscillator the field energy of the photons undergo periodic annihilation and recreation in the periodic spacetime [34].

Physical Cosmology Of The Fundamental Least Unit

In the context of an advanced form of Einstein's model of a static universe, called the Continuous State Conscious Universe (CSCU) [1]. The new cosmology is based on principles of the Wheeler-Feynman absorber theory of radiation extended to the topology of a periodic 12D spacetime. The fundamental *least unit* is shown to be a scale invariant complex cosmological system. The translating boundary conditions of a spin exchange 'continuous state' dimensional reduction compactification process are inherent in the Dirac polarized vacuum. The topology is derived by coupling superluminal Lorentz boosts with noncompactified Kaluza-Klein theory in the context of an energy dependent spacetime metric.

EUCLIDIAN / MINKOWSKI GEOMETRY AS THE BASIS FOR REALITY

- The Euclidian line is assumed to be the real line [1] because it is what is observed. Logical reasons from supersymmetry and supergravity suggest there are a number of additional unobserved dimensions [2] leaving the issue of dimensionality as an open question. Euclidian space in classical Newtonian terms is a continuous 3D absolute space with time an independent parameter.
- Einstein's theories of relativity provided a discrete 3(4)D transmutable relational spacetime manifold. The debate between absolute space or substantivism and relational space still continues. Utilizing the standard definition of a straight line as the intersection of two rigid planes, measurements could be taken to observe whether the angles of a triangle add up to 180 degrees; but settling the question definitively would require astronomical scale measurements where it appears physically impossible to apply the concept of a rigid body or to define a straight line in terms of a light ray by stellar parallax because of the effects of general relativity. Therefore all physics knows with certainty at the present time is that observed space is approximately Euclidian as is Minkowski space [1, 36].
- According to the proof of Schoenflies theorem [10] there can be no topological knots in a plane. Therefore there can be no torsion in a 2D reality; thus the real line must be at least 3D Euclidian where the standard Pythagorean line element is:

$$ds^2 = dx_1^2 + dx_2^2 + dx_3^2$$

(5)

- This assumption that the Euclidian line is the real line is intuitive. Currently there is no known method of empirical proof; and since the Euclidian line is what the Human mind apprehends it remains the formal basis for all scientific fact [1, 23]. But this assumption remains profoundly problematical with issues stemming from both the foundations of mathematics and the nature of physical theory itself concerning the fundamental basis for sets, discreteness versus continuity, geometry and topology, and the relationship of real numbers to rational numbers for example [1].
- In general, the class of theories unifying gauge and gravitational fields by utilizing extra dimensions is called Kaluza-Klein theories. In these theories spontaneous symmetry breaking by coordinate transformation in five dimensions is a product of the standard four-dimensional transformation and a local U(1) gauge group arising in basic form in a general relativistic framework of five dimensions described according to the Einstein-Hilbert action

$$A = \int d^5 x \sqrt{g} \, R.$$

(6)

ENERGY DEPENDENT SPACETIME METRIC

Einstein originated the concept of an energy dependent spacetime for explaining temporal rate change in the presence of a gravitational field by generalizing the special relativistic line element

$$ds^2 = (1 + 2\boldsymbol{f}/c^2)c^2 dt^2 - dx^2 - dy^2 - dz^2$$

(7)

with the introduction of time curvature [14] where phi is the Newtonian gravitational potential. This utilizes the deformed Minkowski metric which is imbedded in the periodic HD Noetic space chosen axiomatically for HAM cosmology to take the form of a noncompactified Kaluza-Klein theory [2,3]. Sections 1.6 & 1.7 demonstrate the feasibility of an energy domain pervading HD spacetime with properties similar to Wheeler's Geon proposal discussed in section 1.6 below. In a generalized deformed spacetime metric , spacetime is fixed by the energy and has the metric

$$h(E) = diag.(a(E), -b(E), -c(E), -d(E)) \tag{8}$$

There is no need to develop the toy model further at present as it sufficiently illustrates pertinent aspects of the noetic transformation that show how boundary conditions transform the dimensionality of space and time along with the energy covering of the unified field by

$$D_S \rightarrow D_t \rightarrow D_e \tag{9}$$

The symmetry breaking during dimensional reduction of the continuous compactification of noetic superspace is a harmonic oscillation between the future and the past as space is transformed to time is transformed to energy .

$$S \rightarrow t \rightarrow E \tag{10}$$

- The ordered spin exchange structures alternate in a hysteresis cycle, the area of which represents the energy of the Noetic Field 'injected' into each spacetime point and atom. This energy is the élan vital and 'light of the mind'. Various stressors may alter the geodesic pathway of this life and mental energy. These changes are best described by catastrophe theory and provide a new basis for health, medicine and psychology.

THE FORMALISM FOR NOETIC HAM COSMOLOGY

$$S_N = S_0 + S_1 + S_2 \tag{11}$$

in the context of an extended Wheeler/Feynman absorber theory [15] where standard Minkowski space M_4 is a 'standing wave' of the future-past. Taking the general HAM form

$$R_{symM_4}^{S_{N0}} = \frac{1}{2} \left[R_{retC_4}^{S_{N_1}} + R_{advC_4}^{S_{N_2}} \right] \tag{12}$$

or simplistically 12D noetic superspace S_N represents a complex Minkowski metric combining the standard 4 *real* dimensions (D) plus eight imaginary D representing *retarded* and *advanced* complex hyperspace topology which adapts the complex (+) Minkowski metric from the standard stationary form to a periodic form. R represents the noetic 3(4)D 'standing wave' Minkowski 'present' spacetime; *adv* represents the past component and *ret* represents the future for complex correspondence to the standard four real dimensions utilizing eight imaginary dimensions. The eight complex imaginary dimensions, while not manifest (locally) on the Euclidean real line, are 'physical' in HAM and can be represented by complex coordinates.

In the Continuous State there is a complementarity between field and discretization similar to the Dirac spherical rotation for the electron, only here it applies to the topology of spacetime itself and the standing wave Euclidian grid of perceived reality.
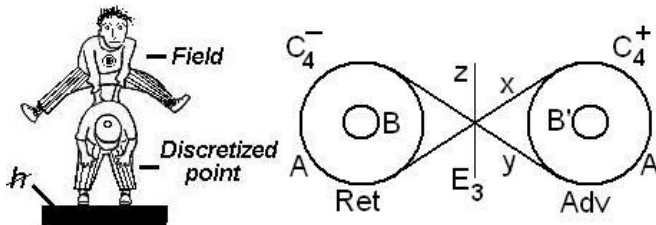
Figure 4. Illustration of leap-frog effect of future-past parameters

STRING TENSION

If nature is stringy, h is not a fundamental constant. Natural units for the string won't have $h = 1$, but $T = 1/$ pi. String tension, h and c can be combined to form a length. This means that h in string theory must be multiplied by T. New string theory suggests L can be the size of the Larmour radius of the Hydrogen atom or as suggested by Lisa Randall up to infinite size!

The unified field governing gravitation, and the quantum potential guides the action of translation along certain allowed pathways. For example if either l, w or h is removed from a cube the object collapses to a plane. Removing a dimension from the plane causes compactification to a line and so on. The released space is not initially empty. At the first stage of D reduction space transforms into time; and at the second stage into the energy that couples with the energy governing it as compactification is completed for that particular unit.

TRANSFORMATION OF SPACE INTO TIME

As well known Superluminal Lorentz Transformations (SLT) change real quantities into imaginary. Following Cole [22] & Rauscher [17] we illustrate the transformation of complex spatial dimensions into temporal dimensions by orthogonal superluminal boosts (SLB). For example a 4D SLB in the x direction with velocity   the SLT is

2. An Alternative Derivation of String Tension from HAM Cosmology

Recently an alternative derivation of T_S has been discovered in the context of HAM cosmology [12]. It is interesting to note that both the Schrödinger equation and Einstein's equation for geometrodynamics reduce to Newton's second Law of Motion. Newton's dimensionless second law of motion $F = ma$ is the starting point for deriving the noetic formalism. First by substituting Einstein's mass-energy relation $E = mc^2$ into Newton's second law we obtain: $F_N = E/c^2 a$ where F_N is the noetic force and E a form of self-organized energy. E is scale-invariant through all levels of HAM cosmology beginning at the highest level in the supralocal Multiverse as a hyperdimensional Wheeler Geon, a *ball* of photons of sufficient size to gravitationally self cohere [15]. At the micro level the Geon becomes synonymous with the de Broglie-Bohm quantum potential. Cosmologically this is like an 'ocean of light' [16], a super quantum potential synonymous with the unitary field. Next the derivation of the noetic equation is generalized for the holographic multiverse by taking an axiomatic approach, based in part on Eddington's large number hypothesis, to cosmological scaling that suggests all lengths in the universe are scale-invariant [17].

Beginning with the heuristic relation $c \equiv \dot{R}$ or $\dot{R} = L/t = c$ where $\dot{R}$ represents the rate of change of scale in the universe. This corresponds to the putative Hubble relation for Doppler expansion of the universe where $H_0 = \dot{R}/R$ and $a = \dot{R} \times H_o$. By substituting $\dot{R}^2/R$ for a in the original $F_N = E/c^2 a$, for final substitution we have $F_N = E/c^2 \times \dot{R}^2/R$. Since $c = \dot{R}$ the c^2 & $\dot{R}$ terms cancel and we are left with

$$F_N = E/R \tag{13}$$

which takes the same form as equation (1) for T_S.
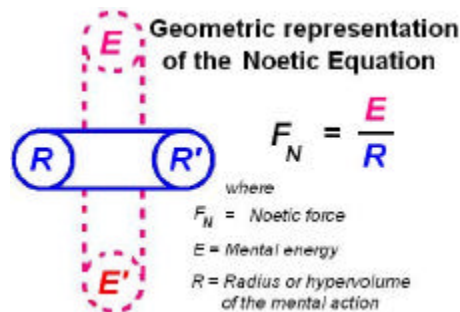
Figure 5. Geometry of the Noetic Field equation

Note that R is a complex relativistic rotational length with standing wave properties. It is scale-invariant and becomes associated with the radii of various HD hyperspheres in the continuous-state compactification process. Any temporal slice or cross section would be considered a Cavity-QED hysteresis loop suggesting pertinent localized volumes from which energy ranges and limits can be calculated. It should be emphatically noted that Hubble discovered a cosmological redshift not a Doppler expansion of the universe. The HAM cosmology provides an alternative interpretation for redshift suggesting the possibility of profound new applications. The HAM cosmology contains the same energy of motion perceived as expansion or inflation but operationally its action is an inherent component of the relativistic properties of the continuous-state dimensional reduction compactification process.

4. Parameters of the Incursive Oscillator (IO)

Motion of a one dimensional <u>classical</u> harmonic oscillator is given by $q = A\sin(\mathbf{w}t + \mathbf{j})$ and $p = m\mathbf{w}A\cos(\mathbf{w}t + \mathbf{j})$ where A is the amplitude and $\mathbf{j}$ is the phase constant for fixed energy $E = m\mathbf{w}^2 A^2 / 2$. For state $|n\rangle$, with $n = 0,1,2...\infty$ and with Hamiltonian $E_n = (n+1/2)\hbar\mathbf{w}$ the <u>quantum</u> harmonic oscillator becomes

$$\langle n|q^2|n\rangle = \hbar/2m\mathbf{w}\langle n|(a^\dagger a + aa^\dagger)|n\rangle = E_n/m\mathbf{w}^2 \qquad \text{and}$$

$\langle n|p^2|n\rangle = 1/2(m\hbar\mathbf{w})\langle n|a^\dagger a + aa^\dagger = mE_n$ where $a \,\&\, a^\dagger$ are the annihilation and creation operators, $q = \sqrt{\hbar/2m\mathbf{w}}(a^\dagger + a)$ and $p = i\sqrt{m\hbar\mathbf{w}/2}(a^\dagger a)$. For the 3D harmonic oscillator each equation is the same with energies $E_x = (n_x + 1/2)\hbar\mathbf{w}_x$, $E_y = (n_y + 1/2)\hbar\mathbf{w}_y$ and $E_z = (n_z + 1/2)\hbar\mathbf{w}_z$ [30,31].

In Dubois' notation the classical 1D harmonic oscillator according to Newton's second law in coordinates t and $x(t)$ for a mass m in a potential $U(x) = 1/2(kx^2)$ takes the differential form

$$\frac{d^2 x}{dt^2} + \mathbf{w}^2 x = 0 \qquad where \qquad \mathbf{w} = \sqrt{k/m} \tag{14}$$

which can be separated into the coupled equations [6-9]

$$\frac{dx(t)}{dt} - v(t) = 0 \qquad and \qquad \frac{dv(t)}{dt} + \mathbf{w}^2 x = 0. \tag{15}$$

From incursive discretization, Dubois creates two solutions $x(t + \Delta t)$ $v(t + \Delta t)$ providing a structural bifurcation of the system which together produce Hyperincursion. The effect of increasing the time interval discretizes the trajectory as in Fig. 6. This represents a background independent discretization of spacetime [7,8].
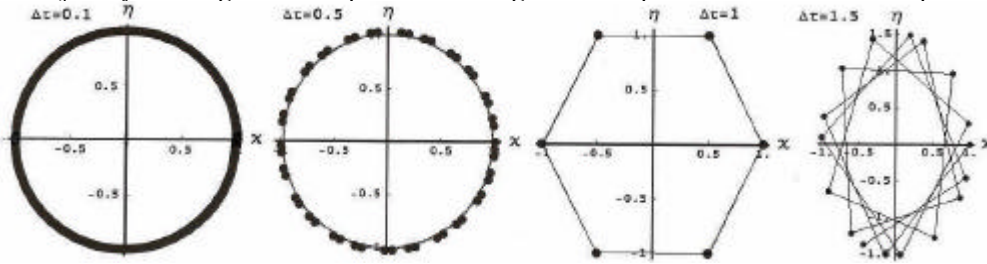
Figure 6. Numerical simulation of the phase space trajectory of the Dubois *superposed incursive oscillator* based on coordinates and velocities $x_n = 1/2[x_n(1) + x_n(2)]$ $v_n = 1/2[v_n(1) + v_n(2)]$ is shown in the figure for values of $\Delta t = \mathbf{w}t$ equal to 0.1, 0.5, 1.0 and 1.5. Initial conditions are $c_0 = 1, h_0 = 0 \,\&\, t_0 = 0$ with total simulation time $t = \mathbf{w}t = 8\mathbf{p}$. Figure adapted from [7,8].

Each mode of the field of a quantum harmonic oscillator is associated with the cavity-QED dynamics, hexagon lattices in Figs. 1 and 2, of spacetime topology as it undergoes its continuous transitions . E is the state of energy for

n photons. For *n* = 0 the oscillator is in the ground state, but a finite energy $1/2\hbar w$ of the ground state, called the zero-point energy, is still present in the region of the cavity. According to equation (16) of the quantum harmonic oscillator the field energy of the photons undergo periodic annihilation and recreation in the periodic spacetime [32].

$$E_n = (n + \frac{1}{2})\hbar w \qquad (16)$$

The simulation is meant to demonstrate generally how the inherent periodic holophote action, flashing metaphorically like a light house beacon, injects HD geon energy into each virtual moment of the present during the continuous transformation of the Cavity-QED topology of the 12D superspace of the noetic least-unit [4] to produce the natural emergence of F-Theory 2-branes [15,16,33,34]. As an example, we illustrate one of a number of possible models of how, at the semi-classical limit from the stochastic background of the vacuum zero-point field, this energy is harmonically injected into every point and atom in spacetime by a mechanism like a 'chaotic gun' [4,33,34]. This action and the geometric-topology of the polarized vacuum is putatively suggested to generate F-branes.

Possible quantum model for entry of the new quantum of action. A 3D rendering of the phase space where Bosons of the Noetic Field (noeons) are injected into each spacetime point (least unit) & every atom by a periodic 'gun effect' of the continuous holophote action of the continuous state dimensional reduction inherent in the topology of Noetic space. Figure courtesy N. Ciubotariu.
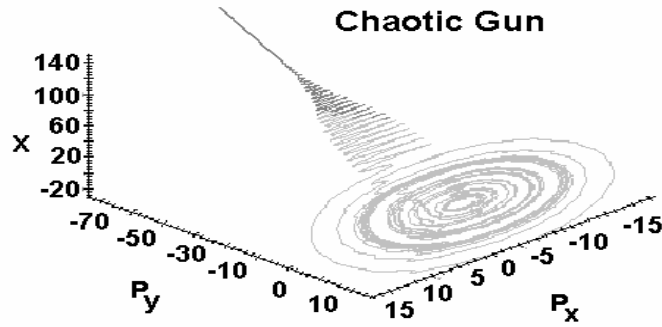
Figure 7. Ciubotariu's spacetime Chaotic Gun modelling energy injection into spacetime.

Ciubotariu's equations combine Maxwell's equations and relativistic equations of motion for the phase space where the additional {Omega} terms represent the cyclotron frequency of the *chaotic gun* effect. The noeon *Bosons* mediating the life force field are *emitted* from the spacetime cavities only in certain preferred directions allowed by the parallel transport conditions of dimensional reduction and compactification. This effect occurs in Noetic HAM Cosmology because in the energy dependent spacetime metric, just as the periodicity of wave and particle moments occur in the propagation of a photon, so does charge or energy arise in periodic moments in the hysteresis looping of the Noetic least unit. Because as Wheeler showed in 1962 'charge is topology'.

Using equations for a spacetime chaotic gun developed by the Ciubotariu's [33,34] the nonlinear dynamics of the model for injecting a charged noeon, defined as the quanta of the noetic unified field, into a spacetime cavity can putatively occur as follows:

$$\dot{X} = \frac{dX}{dT} = \frac{1}{\gamma} P_x = \frac{1}{(1 + P_x^2 + P_y^2)^{1/2}} P_x, \qquad (17)$$

$$\dot{P}_x = \frac{dP_x}{dT} = \Omega_c [\beta\cos(X - T) + 1]P_y, \qquad (18)$$

$$\dot{P}_y = \frac{dP_y}{dT} = -\Omega_c [\beta\cos(X - T) + 1]P_x + H\cos(X - T), \qquad (19)$$

Equations 17 to 19 illustrate a possible quantum model for entry of the new noetic action principle into the 3D phase space P_X, P_Y, X where unitary bosons of the Noetic field (noeons) are injected into each point or least-unit QED cavity in spacetime and every atom by a periodic 'gun-like effect' of the continuous holophote action. This process occurs in the context of continuous state spin-exchange dimensional reduction compactification inherent in the topology of Noetic Superspace which acts like a hysteresis loop [1-4]. Ciubotariu's equations combine Maxwell's equations and relativistic equations of motion for the phase space P_X, P_Y, X. The Ω terms represent the cyclotron resonant frequency of the chaotic gun effect. Infusion of the noeon Boson field, which mediates the action of self-organization and evolution, into spacetime cavities only occurs in certain preferred directions allowed by the symmetry conditions of what is called parallel transport [21] in the dimensional reduction compactification spin-exchange process [1-4].

The holophote effect appears in the Noetic cosmology because in its energy dependent spacetime metric $\hat{M}_4$, just as a periodicity of wave and particle moments occur in photon propagation through space, so does charge or energy arise in periodic moments of the Noetic least-unit transformation. Because as Wheeler demonstrated [35] 'charge is topology'. According to Wheeler lines of force in a wormhole can thread through a handle and emerge through each mouth to give the appearance of charge in an otherwise charge free spacetime [35]. Further discussion of a complex 12D space is given in [3,4,36].

5. Computer Simulated Production of the 2-Brane

From the proof of Schöenflies theorem [37] there can be no topological knots in a plane. Therefore there can be no topological torsion in a 2D reality. According to tenets of M-Theory 'matter remains on the 2-brane and gravity is free to pass between branes'. A simulated creation of an F-Theory 2-brane from the Dirac polarized vacuum [24] is demonstrated utilizing the Autodesk Chaos Software [38].

Figure 8. Two views of one form of computer simulated production of a 2-brane from parameters of the hexagonal geometry of the putative Dirac polarized vacuum. Hysteresis loop harmonic oscillation of the future-past dynamics produces branes by incursive resonance. The software simulation of 2-brane emergence from the geometry of spacetime least-units is achieved by applying a harmonic oscillator generated by the energy of the Noetic Action Principle. The oblique lines in each figure are the insertion angles and the two tiny points are the holophote injection points of noeon energy.

Table I. SPACETIME HARMONIC OSCILLATOR PARAMETERS
As Utilized in running the Autodesk Chaos Software

PARAMETER	VALUE USED	POSSIBLE RANGE
Charge	3	±500
Magnetic Capture Radius	5	0 to 20
Magnetic Field Radius	11	1 to 60
Pull Towards Center	27	±500
Frequency	33	2 to 10,000
Friction (STRING TENSION)	1.37	0 to 500

6. Conclusions

This alternative derivation of the string tension formalism suggests it could be insightful to finding the actual physical cosmology of our local reality. The approach presented is a work in progress, but it's initial success suggests that more comprehensive calculations and simulations will add further rigor to the results. If the theory indeed reveals a sound physical basis, a demonstration of the production of F-Theory 2-branes from more specific vacuum parameters of complexified HD space could shed light on determining the actual physical vacuum sought for M-Theory. Simulations with sufficient complexity could be developed to aid in determining the actual spin structures and geometric topology of actual matter which is one of the ultimate goals of string theory.

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