

Time?

RICHARD L. AMOROSO

*Noetic Advanced Studies Institute, Escalante Desert, UT 84714-5104 USA
amoroso@noeticadvancedstudies.us, www.noeticadvancedstudies.us*

The concept of time in the 'clockwork' Newtonian world was irrelevant; and has generally been ignored until recently by several generations of physicists since the implementation of quantum mechanics. We will set aside the utility of time as a property relating to physical calculations of events relating to a metrics line element or as an aspect of the transformation of a particles motion/interaction in a coordinate system or in relation to thermodynamics etc., i.e. we will discard all the usual uses of time as a concept used to circularly define physical parameters in terms of other physical parameters; concentrating instead on time as an aspect of the fundamental cosmic topology of our virtual reality especially as it inseparably relates to the nature and role of the observer in natural science.

Keywords: M-Theory, Multiverse, Observer, Quantum theory, Reality, Time, Unified field mechanics

“The distinction between past, present and future is an illusion...” - Einstein.

1. Introduction

This is a brief introductory exploration into the nature and place of time in what is cosmologically perceived as a virtual anthropic reality relative to 3D Euclidean space and the related matter of the role of the observer in natural science. A more rigorous development is being attempted in a joint monograph [1]. Time in physical science is one of seven fundamental quantities in the International System of Units used to define aspects of other quantities thus giving physical time a circularity keeping its fundamental basis elusive. There are two philosophical viewpoints on the nature of time:

- Time is a fundamental component or dimension of the universe in which events occur. This is called the realistic view and ascribed to Newtonian Mechanics.
- Time is not a 'bucket' or domain processing events or objects. Time is rather a fundamental property of the mind of the observer like number or space; time is not a thing that exists and can therefore not be measured or traveled. This position is taken by philosophers like Kant, Descartes or Leibniz.

These premises are also conjoined with arguments whether space is relational or absolute and the issue of whether space is finite and closed or open and infinite [2-5].

Our position seems aligned with the latter point of view above; however the work we propose to do is to lift the philosophical perspective into a form of anthropic physical cosmology with sufficient rigor to systematize the basis of the observer to a degree that is theoretically sound and thus empirically testable. In Newtonian mechanics time was considered irrelevant because of its mechanical nature and could thus be ignored. Einstein systematized a fundamental entity called spacetime with relativistic effects related to motion and matter and the quantization of energy such as the photon. Still time itself, if there was such a thing with real physical properties, remained a mystery essentially ignored for centuries. Recently however interest in the physics of time has increased because of its relevance to astrophysics, quantum field theory and especially the nature and role of the observer in the philosophy of measurement theory [6-8].

Here we attempt to make a definitive delineation of the concept of time in terms of Unified Field Theory, U_F . Our initial question is whether this can be done without taking into account not only the role of the observer but the nature of awareness and observer's very essence? It is well known that at the microscopic level the laws of physics are reversible; but at the local level (the level of the observer) an unexplained apparent arrow of time enters the world picture throwing causality and the nature of consciousness or awareness into the mix.

We know if by no other reason than the operation of quantum theory, that the 3D reality of the observer is

virtual. This makes the nature of reality and the fundamental basis and essence of the observer within that system a key or essential element to the degree that it seems a mandatory prerequisite to solve both the nature of reality and the observers place within it before one can consider a proper exploration of the ‘essence’ of time. That is the required context. Any attempt otherwise would be doomed to failure, and indeed this seems to be the salient reason why such an attempt has not occurred until now.

The literature has discussed five features of times arrow [5]:

- Thermodynamic time or entropic flow
- Cosmological time - Perceived expansion of a Big Bang universe
- Psychological time
- Clock time or electromagnetic arrow of time
- Kaon decay - Temporal asymmetry of the neutral kaon and its role in CP violation, generating the observed matter-antimatter asymmetry of the universe.

But we will ignore all these aspects here and continue with our discourse in a different arena.

2. Crux of the Matter: Anthropic Reality ↔ Observer

Time is not ultimately phenomenological or a ‘thing in itself’ (noumenon) but rather an aspect of anthropic cosmology - the geometric topology of the observer’s reality operationally organized (a complex system) to:

- 1) Partially isolate the observer’s frame of awareness (in an anthropic multiverse) from the totality of God’s eternity.
- 2) The geometric topology (of 3D virtual reality) operates so that ‘time’ ‘surfs’ on the face of that eternity (regime of the unified field, U_F).
- 3) Anthropic cosmology provides a gating mechanism for the teleological coherent action of the U_F to operate as a life principle.
- 4) Hides the function and operation of God’s ‘omnies’ (omniscience, omnipotence, omnipresence) from the observer’s ‘normal’ awareness. The mechanistic properties of the gating mechanism are profoundly efficient and elegant.
- 5) A form of continuous-state ‘subtractive interferometry’ isolates the observer’s awareness from the HD whole.
- 6) The additional dimensionality postulated by string theory is not invisible because it is curled up at the Planck scale. The unified field regime of large-scale additional dimensions (LSXD) is invisible by a

process of subtractive interferometry relative to the observer.

The continuous-state cyclical operation of the observer’s reality is a form of hypercycle. We will discuss this in more detail later. But for now this is the Continuous-State mantra of Holographic Anthropic Multiverse (HAM) Cosmology [5-8]: A ‘continuous-state spin-exchange dimensional reduction compactification process. In the conventional wisdom the Planck scale is the basement of reality. We can apply reductionism from 4D Minkowski space or 11D M-Theory and reduce to a 0D rigid barrier, stochastic quantum foam or singularity.

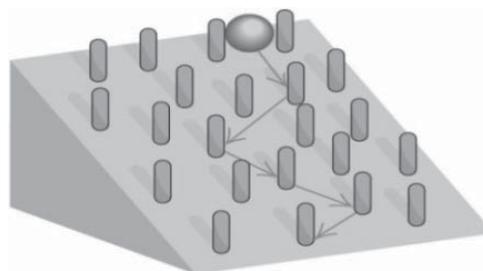


Figure 1. Conceptualizing the gravitational ‘free-fall’ flow property of the continuous-state process as the path of a fermion singularity (ball) embedded in a spacetime raster (not as shown but instead embedded in the Calabi-Yau topology of a 6D Riemann hypersphere) continuously rotating relativistically such that the fermion remains centralized like it was a stationary or standing wave.

Simplistically following a LSXD extension of Cramer’s Transactional Interpretation, a continuous-state present event is like a ‘standing-wave of the future-past’, not like a 1D string or a 2D drum but a 12D hyperstructure. This standing-wave process also operates in conjunction with an HD extension of the de Broglie-Bohm interpretation where ‘piloted’ spacetime and matter are created-annihilated and recreated as a wave-particle duality. In fact in terms of the continuous-state process we elevate wave-particle duality to a principle of anthropic cosmology.

Now finally in this simplistic rendering imagine a 3-sphere - a reduced least cosmological unit (LCU) bouncing down a pin raster but where the raster is continuously rotated such that the 3-sphere never reaches ground. This conceptualizes primitively the continuous-state process. This is quite detailed in both its parameters and derivation; such that the reader would have to invest sufficient time delving into it in order to sort it out [6-8]. But the salient point we wish to make here is that the ‘dimensional reduction compactification’ Calabi-Yau mirror symmetry process on the way down from 12D to asymptotically approached 0D is a smooth ‘cascade’ of odd even dimensional jumps. Calabi-Yau manifolds are Kahler forms of Riemann manifolds. The Riemann sphere

forms an extended complex plane or set of extended complex numbers consisting of the usual complex numbers, \mathbb{C} together with infinity. We write the extended complex numbers as, $\hat{\mathbb{C}} = \mathbb{C} \cup \{\infty\}$.

A directed infinity in our anthropic dimensional reduction process in the extended complex plane has a defined cascade angle, θ with an infinite absolute value, r . For the limit $1/x$ where x a positive numbered dimensionality approaching zero it is a directed infinity with angle 0; however, $1/0$ is not a directed infinity but a complex Riemann infinity. A directed infinity in direction z is an infinite numerical quantity that is a positive real multiple of the complex number z .

But when the continuously transforming topology of the Riemann sphere asymptotically approaches 0D, a catastrophic ‘jump’ back to infinity or in this case 12D occurs (actually 6D or 9D, as the other dimensions or degrees of freedom act as control factors. This is a property of the Hubble sphere being a self-organized complex system, closed and finite in ‘time’ but nested in an open and infinite LSXD. This ‘cascade-jump’ will be of prime importance later in discussing the subtractive interferometry within the observer’s reality.

Thus we begin to see the Holographic Anthropic Multiverse Cosmology (HAM), and its inherent continuous-state mirror symmetric synchronization backbone [6] wonderfully restricts the framework for delineating the nature of the concept of time. If it helps in any way; we have been working on this cosmological paradigm for about 18 years, and it is only now that we understand it sufficiently well to attempt a description of the nature of time. What we are saying is that the restrictions seem to give us no other choice in the path to take. Not that we don’t like it; rather why it might seem so ‘weird’ to the HAM novitiate.

The conundrum of the philosophical nomenclature is difficult. We mentioned earlier that we sit on the side of the fence where time is not considered a ‘thing’ but an aspect of the observer’s mind. It is probably best to let the sleeping dogs of categorization lie and instead proceed with a delineation of the framework.

We will begin with the unpleasantness of theology. The rigid and myopic ecumenisms of church authorities at the time of Copernicus and Galileo is no worse than the current disdain by for ‘metaphysical truth’ by physicists wielding an umbrella of rigorous pragmatism as an exclusionary defense shield against the slightest possibility of transcendent inroads [9-11]. It seems an obvious misinterpretation of Bible passages to insist that 1) for example - ‘The earth is the center of the universe, and 2) ‘The orbit of celestial spheres must be perfectly circular’. And to have Copernicus hide his 1543 *On the Revolutions of the Heavenly Spheres*, “after being buried among my papers and lying

concealed not merely until the ninth year but by now the fourth period of nine years” or bring Galileo to the brink of execution for a contrary opinion. This myopic ‘force’ was so strong that Hipparchus, 2000 years prior to Copernicus (who discovered the same heliocentric calculations) abandoned his work because of the perfect circularity issue. We make the trouble of mentioning this scenario because epistemologically an ‘empirical metaphysics’ is not only finally possible but we feel has now been demonstrated [10-12]. But worse for the tethered myopic the seemingly critical aspects of the observer and nature of reality are steeped in the teleology of an anthropic multiverse cosmology!

The continuous-state flux is not a temporal property but an aspect of the wave nature of reality itself. There are significant cosmological differences between Big Bang cosmology where protons were created and fixed from the original singularity as described by the Copenhagen interpretation of quantum theory and HAM cosmology. In HAM cosmology there is no wavefunction collapse but rather a continuous evolution guided by the pilot wave/quantum potential where the continuum of spacetime (duality of discrete-continuous by the exiplex gate of the LCU) is a wave-particle duality-like property (wave-particle duality elevated from quanta to a principle of reality itself) where the locus of spacetime is cyclically created - annihilated and recreated. Wave function collapse is phenomenological; the annihilation-creation locus of reality is different - it is an ontological or energyless exchange allowing continuous evolution. Within this continuous-state ‘harmonic oscillation’ a subtractive interferometry occurs (Figs. 6-8) that subtracts out the LSXD form the perceptual apparatus of the observer [6-8]. The cascade-jump of Riemann sphere rotational subtractive interferometry offers an explanation of why there is more matter than antimatter in the Hubble universe.

All quantum force interactions are mediated phenomenologically by the exchange of a particle. Electromagnetism is mediated by the photon, the strong nuclear force by eight gluons and the weak nuclear force by the W^+ and W^- boson and the Z boson. The graviton has not yet been detected, we believe as Feynman suggests [6] that gravity is not quantized. That gravity is not mediated phenomenologically by ontologically instead by ‘topological charge’ in HD brane dynamics. Our case is bolstered by the fact that one cannot easily bring another particle into the symmetry of the standard model without upsetting the logical implications, delicate balance or mathematics. The symmetry of the standard model qualifies it as a geometric model. The symmetry is all about spin. The *spin exchange dimensional reduction compactification process* contains a spin-spin coupling

that has an inherent ‘deficit angle’ in the gravitational Bianchi identities that allow an energyless topological switching 1D above (a topological cover) the regime of gravitational interaction, i.e. matter resides on the brane and gravity is free to pass between them’ [6]. This is like the Dirac spherical rotation of the Klein bottle (electron 360-720 spinor rotation) where the ‘baton passing’ (would be energy exchange) occurs outside the 4D regime of quantization!

3. Subtractive Interferometry - Limiting the Local Realm of Awareness

We have postulated a 12D HAM cosmology with the observer’s awareness limited to a 3D virtual subspace. Since the noumenon of the observer’s awareness is 12D, subtractive interferometry provides the mechanism for maintaining this limit. This scenario is a very rich complex topology [6-8]. The first new element beyond current thinking is the nature of the singularity or least cosmological unit (LCU) tessellating spacetime. Instead of a 0D or 3D vertex, it is 12D and provides a gating mechanism for control by and entry of the U_F .

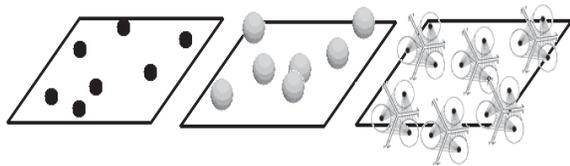


Figure 2. Evolution of the physical understanding of a point or singularity in spacetime. Each point in HAM cosmology is actually a multidimensional hyperstructure. While a) a 0D fermionic singularity and b) a 6D dual Calabi-Yau 3-torus are fixed, c) contains a central continuous flux Witten vertex giving it properties of a mini ‘wormhole’ able to gate information from higher to lower dimensions.

Spacetime is tessellated by a raster of LCUs. The stringy vertex is a quaternionic singularity representing the ‘tip of the iceberg’ in 3-space as it cycles through the LSXD of 12-space. The hidden or nonlocal HD portion requiring a topological raster of LCUs operates as a gating mechanism not only mediating the U_F but also supplying the mechanism for applying subtractive interferometry.

As we have said the observers 3D reality is virtual. Describing it in terms of Cramer’s transactional interpretation it (each point) is like a standing-wave of the future past. Reality beyond the awareness of the observer is a 12D nilpotent standing wave present where the dual complex nilpotent future-past, $\pm = 0$ or the Minkowski virtual present, $\mathbb{C}_4^- \leftrightarrow \hat{M}_4^0 \leftrightarrow \mathbb{C}_4^+$ is also nilpotent and also sums to zero totality.

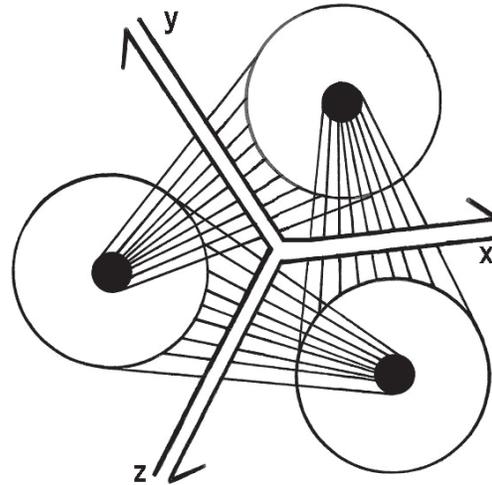


Figure 3. Topological geometry of a LCU tessellating spacetime revealing the triune structure of a conceptualized solitary LCU that like an isolated quark does not exist in nature. The central parallel lines are a 3D Witten string vertex with properties of a complex Riemann sphere able to continuously rotate from asymptotic 0D to infinity (12D). The field lines represent the ‘super quantum potential’ of the unified field, U_F . This LCU structure is the HAM extension of the Rowlands’ fermionic nilpotent singularity.

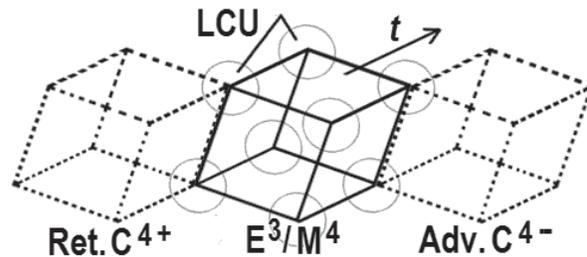


Figure 4. How observed (virtual) 3D reality (center) arises from the infinite potentia of 12D space (like a CI transaction). The ‘standing-wave-like’ (retarded-advanced future-past) mirror symmetric elements, C^4+ / C^4- (where C^4 signifies an 8D potentia of complex continuous-state space is distinguished from the locally realized visible 3D spacetime) produce the observed Euclidian, E_3 , Minkowski, M_4 space (center) as a closed resultant. Least Cosmological Units (LCU) governing evolution of the ‘points’ of 3D reality are represented by circles. The Advanced-Retarded future-past cubes in HD space guide the evolution of the central cube (our virtual reality) that emerges from potentia elements of HD U_F space.

In singularity form this is represented as a transaction.

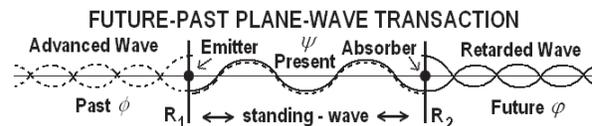


Figure 5. Conceptualized structure of a transaction (present quantum state or TI event) where the present (simplistically) is a standing-wave of future-past elements. A point is not a rigid singularity as in the classical sense, but has a complex structure like a mini-wormhole where R_1 & R_2 (like the frets holding the wire of a stringed instrument) represent opposite ends of its vibrational diameter.

However a NFT HAM singularity is only cyclically discrete as shown in the text below.

The tessellation of space by LCUs is complex.

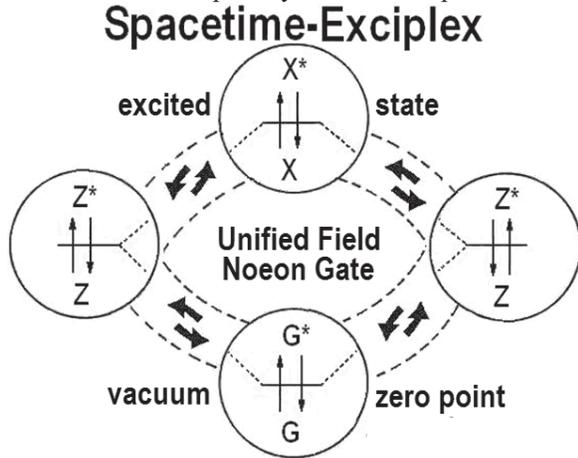


Figure 6. Least cosmological unit (LCU) exciplex complex tiling the spacetime backcloth of HAM cosmology. The array of LCUs acts as a gating mechanism for entry of the U_F into every point in Minkowski 4-space and all matter.

In this LCU continuous-state singularity context

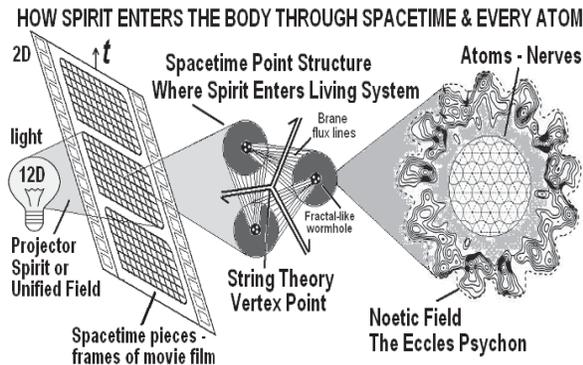


Figure 7. Microscopic details of transduction of the U_F through the complex exciplex spacetime raster LCU gate into every point, atom and thus molecule of self-organized living systems (SOLS) the propagation of which also produces a locus of spacetime points associated with the arrow of time because it is part of the structure and content of the observers mind.

When macroscopy is added to the microscopic details we can conceptually understand how subtractive interferometry occurs by modeling the process like a movie theater. Discrete 'frames of film'. i.e. the tessellation of LCUs pass through the projector - the standing-wave evanescing into 3D reality. In a movie projector the discrete frames of film pass over the lens at a few centimeters per second which since that is too fast for the observers perception allows the image to appear smooth or continuous on the screen. In reality LCUs are created and annihilated relativistically and

the observer is made out of and embedded in spacetime.

The Cartesian dualistic form of the observer is HD and triune. Descartes dualism postulated a mind stuff '*res cogitans*' and a body stuff '*res extensa*' as the basis for consciousness. That is an excellent beginning, but as a self-organized living system (SOLS) an additional component of 'elemental intelligence' is required to define the basis for the observer. Elemental intelligence is a boundary condition demarking the individuality of the observer and is 'co-eternal with God. This is why the observer's basis is 12D; and why subtractive interferometry may destructively interfere or cancel out the HD portion of the observer's reality or awareness.

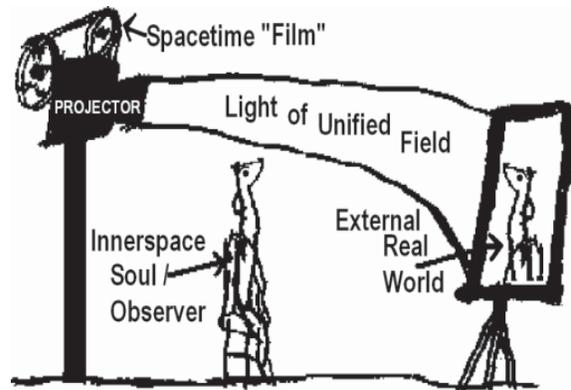


Figure 8. Macroscopic movie theatre model of the observers 3D virtual reality (like a hyperdimensional hologram) and the observer's place in the theatre. This is a 12D continuous-state structure but the HD are removed from the observer's awareness by 'subtractive interferometry'.

4. On the Cosmology of Mind - The Shape of Space

It seems reasonable to accept the postulate put forward by several authors that there is a 'wave function of the universe' satisfying the Wheeler-Dewitt equation which is a gravitational form of the Schrödinger equation taking the general unexpanded form, $H\Psi = 0$. HAM cosmology is willing to accept this premise if it is applied only to the Hubble, H_R portion of the universe which is perceived as a self-organized complex system closed and finite in time and not to the more extant multiverse open and infinite in eternity which does not have a quantization as suggested by the Wheeler-Dewitt equation.

The operation of reality depends on the geometric topology of space which can be radically different from local observation. WMAP satellite data has given preliminary evidence that we live inside a dodecahedron [3]. HAM cosmology utilizes a mix of three oscillating topologies: Dodecahedral - positively

curved, (if one looks 'far out' one will see the back of one's head etc.), Hyperbolic - negatively curved (like a saddle) and flat. Flat is interesting and locally observed. If one folds the opposite edges of a square seamlessly into a cylinder and then a torus (a torus looks curved because we embed it in 3-space). But here is the next point. Take a cube with opposite faces wrapped around which forms a 3D flat torus [3,4]. To denizens living in such a space it appears flat in every direction, which is what we see!

Astrophysicists doing this 'geometric cosmology' do so in a Big Bang universe ending at an impenetrable wall. Since we are doing Cartesian dualism, the 'wiggly room' (oscillating backcloth) utilizing an oscillatory mix of the three topologies provides a hole (cyclic) (into large scale extra dimensionality - infinity) for "God" to squirt a little spirit in to give life, excite mind, steer gravity etc. And this Multiverse is open into other Hubble Spheres, 'worlds without number have I created, like grains of sand at the seashore'.

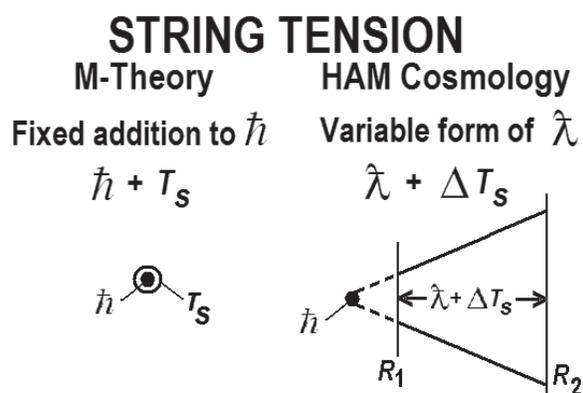


Figure 9. a) Fixed String Tension, T_S as defined in M-Theory as a small addition or correction to \hbar . b) In HAM cosmology (as in the original Hadronic form of String Theory, T_S is variable and based on the original Stoney, $\hat{\lambda}$ (precursor to \hbar) that oscillates from virtual \hbar (asymptote never reached in the continuous-state cycle) to the Larmor radius of the hydrogen atom.

The oscillation of T_S at the microscopic level operates (couples) in conjunction with a fluctuating, Λ at the cosmological level of H_R . This conformal scale-invariant duality is part of the gating mechanism of the U_F . It occurs because the Hubble sphere, H_R is a self-organized complex system closed and finite in time but nested in the multiverse that is open and infinite. It is the hierarchical and incursive properties of complex systems that allow subtractive interferometry to operate efficiently. Dark energy arises from the rest of the multiverse beyond our Hubble sphere.

We have left out the gravitational aspects of U_F dynamics as beyond the scope of this paper. Suffice it to mention here that parallel transport around the topology of the propagating LCU continuous-state

array produces a deficit angle. This means in the compactification process the rotation does not return precisely to the original starting point. This so-called deficit angle provides a 'grease' for subtractive interferometry, i.e. instead of coupling to the HD topology or remaining coupled, the Witten vertices may rotate or cascade down the ladder of dimensionality thus removing the 'vision of eternity' from the observer's awareness.

References and Notes

- [1] Amoroso, R. L., Kauffman, L.H., Rowlands, P. & Rauscher, E. A., The Basis of Unified Field Mechanics: Introduction to the 3rd Regime of Reality, in process.
- [2] Sklar, L. (1985). Philosophy and spacetime Physics, Berkeley: Univ of California Press.
- [3] Luminet, J-P (2008) The Wraparound Universe, Wellesley: AK Peters.
- [4] Stuart, I. (2001) Flatterland, Cambridge: Persius.
- [5] Amoroso, R. L. (2000) The parameters of temporal correspondence in a continuous-state conscious universe, in R. Buccheri, V. Di Gesu & M. Saniga (eds.) Studies on the Structure of Time: From Physics to Psycho(patho)logy, Dordrecht: Kluwer Academic.
- [6] Amoroso, R. L., & Rauscher, E. A. (2009) The Holographic Anthropic Multiverse: Formalizing the Geometry of Ultimate Reality, Singapore: World Scientific.
- [7] Rauscher, E. A. & Amoroso, R. L. (2011) Orbiting the Moons of Pluto, Hackensack: World Scientific.
- [8] Amoroso, R.L. (2010) (ed.) The Complementarity of Mind and Body: Realizing the Dream of Descartes, Einstein and Eccles, New York: Nova Science Publishers.
- [9] See Foreword, this volume for discussion on Transcendence.
- [10] Amoroso, R.L. (2009) in R.L. Amoroso (ed.) Complementarity of Mind and Body: Realizing the Dream of Descartes, Einstein and Eccles, New York: Nova Science.
- [11] Amoroso, R. L. (1995) Transcendent revelation or noetic Platonic insight (Voice heard), Oakland, CA "*Quantum mechanical uncertainty is the mystery, even the mystery of God*". Meaning 'behind' the virtual stochastic 4D barrier imposed by the Copenhagen interpretation of quantum theory, the closed and finite Hubble universe opens into an infinite multiverse which in certain higher dimensional modalities 'the hand of God can be observed to operate'.