

Holoinformational Consciousness: An Extension of Interactive Dualism with Anticipatory Parameters

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Abstract

The authors propose a quantum-informational holographic model of brain-consciousness-universe interactions based on the holonomic neural networks of Karl Pribram, the holographic quantum theory of David Bohm, and the non-locality property of the quantum field described by Hiroomi Umezawa. We consider this model an extension of the interactive dualism of Sir John Eccles. His ideas of an interconnection between brain and spirit by means of quantum microsites (*dendrons and psychons*), has deeply influenced the development of our conception of consciousness. We propose a dynamic concept of consciousness, a holoinformational flux interconnecting holonomic informational quantum brain dynamics, with the quantum informational holographic nature of the universe.

Keywords: Consciousness, Holographic principle, Incursion, Mind-body problem

1. Introduction

Here we present a quantum-informational holographic model of brain-consciousness-universe interaction based on the holonomic neural network model of Karl Pribram [1-9] and relying on the ontological interpretation of quantum theory developed by David Bohm [10], with extended nonlocal properties of the quantum field as described by Hiroomi Umezawa [11]. We consider this model an extension of the interactive dualism developed by Sir John Eccles [12-16] and as extended by Richard Amoroso [17-20] and in this volume. Eccles' idea of an interconnection between brain and spirit by means of quantum microsites named *dendrons* (bundles of nerve dendrites) *that couple to psychons*, (Eccles philosophical construct of mind that interacted with or coupled to brain dendrons.) has deeply influenced the development of our conception of consciousness. We propose a dynamic concept of consciousness seen as a holoinformational flux interconnecting holonomic informational Quantum Brain Dynamics (QBD) [21-22], with the quantum informational holographic nature of the universe [23-25]. This self-organizing flux is generated by a holographic mode of neuronal information that can be optimized through practices of deep meditation, prayer, and other states of higher consciousness, the quantum potential (In Bohm's ontological interpretation of quantum theory a guidance principle (the de Broglie pilot wave) was introduced to 'steer' evolution of the wave function.) which may effect the coherence of cerebral waves [26].

Brain mapping studies performed during the occurrence of these harmonic states have shown a highly synchronized and perfectly ordered spectral array of brain waves

that form unique harmonic waves, as if all frequencies of all neurons from all cerebral centers played the same symphony. This highly coherent brain state generates the nonlocal holographic informational cortical field of consciousness interconnecting the human brain and the holographic cosmos [10,23-25]. The comprehension of this holonomic quantum informational nature of brain-consciousness-universe interconnect-edness allows us to solve the historic mind-matter Cartesian hard problem [27-30], unifying science, philosophy, and spiritual traditions in an expanded transdisciplinary, holistic, paradigm. In this new cosmovision, consciousness and transpersonal phenomena becomes parts of science and of the very holoinformational nature of the universe [30].

In this holoinformational cosmovision brain and universe are conceived as quantum-holographic-informational systems interconnected by an instantaneous universal nonlocal holoinformational flux. This instantaneous holoinformational brain-cosmos dynamics is based on three pillars of modern science:

- 1) The holographic neural network processing of brain systems described by neuroscientist Karl Pribram [1-9].
- 2) The quantum-holographic theory of the universe developed by physicist David Bohm [10].
- 3) The quantum principle of nonlocality developed by physicist Hiroomi Umezawa, in his theory of the quantum field [11].

For a more comprehensive exposition we define the terms nonlocality and holographic.

A) NONLOCALITY is a fundamental property of the universe, proved to exist at the quantum and macroscopic level, responsible for instantaneous interactions between all cosmic phenomena - a mathematical consequence of Umezawa's Quantum Field Theory [11] that unifies the electromagnetic, nuclear and gravitational fields in a subjacent indivisible totality.

Quantum Field Theory explains all subatomic, atomic, microscopic and even macroscopic phenomena, as well as superconductivity and lasers; and is considered the most fundamental physical theory of the universe. Besides being mathematically similar to the gravitational and electromagnetic fields, the quantum field doesn't exist physically in 3D spacetime giving rise to it's peculiar nonlocal property. As a nonlocal phenomenon it influences instantaneously all others regions of spacetime, without necessity of any change of energy.

According to classical and relativistic physics nonlocal phenomena do not exist. This theoretical impossibility generated the famous Einstein-Bohr controversy and the celebrated Einstein-Podolski-Rosen (EPR) Paradox. Einstein and his associates wouldn't admit that quanta or information could travel faster than light and created a thought experiment to demonstrate that quantum physics was therefore incomplete. But contrary to their initial proposition, the existence of nonlocality has been dramatically and convincingly proven to exist in modern physics experiments. According to Bohr, if an atom simultaneously emits two opposite spin particles, and if we alter the spin of one, even if they are separated by an enormous distance (for instance, one in a lab on

Earth and the second on the other side of the galaxy), the spin of the second is instantaneously modified..

In 1982 French physicist Alain Aspect [31], clearly demonstrated the existence of this instantaneous nonlocal action between two photons emitted by one atom. More recently Gisin [32] and coworkers proved the existence of instantaneous nonlocal quantum actions in macroscopic scale. This faster-than-light communication unveiled a holistic nonlocal quantum-informational interaction between all particles in the universe.

B) HOLOGRAPHIC systems are systems that can generate three-dimensional virtual images. The virtual image or hologram is created when a laser falls upon an object and reflects on a plate and a second laser or rectilinear reflected beam falls on this plate generating a mix of the waves from the two beams. This wave interference pattern stores all the information about the form and volume of the object, and when it is reflected it generates a three-dimensional image of the object in space. The relevancy for us is that we can prove mathematically and experimentally that in holographic systems information about the whole system is distributed in each part of the system. If we break the holographic plate, each part of it will display the entire three-dimensional image of the object in space, showing us that in holographic systems the whole is in the parts as each part is in the whole.

These holographic transformations form spacetime order in a spectral dimension of frequencies the description of which is dependent on the pioneering mathematical formulations first described by a concept called monads developed by Leibniz. In the Twentieth Century Dennis Gabor described the mathematical principles of holography, winning him a Nobel Prize. The mathematical formulations that describe the harmonic curve resulting from the interference pattern of waves are called Fourier transformations, after the 18th century French mathematician that described it. Gabor applied Fourier transformations to the creation of the hologram showing how Fourier transforms of the interference pattern can be used to rebuild the virtual image of the object by the application of the inverse process. Gabor showed that from a dimension of frequencies objects in spacetime can be rebuilt in a virtual form!!

2. Holographic Neural Networks

Karl Pribram has demonstrated with his holonomic theory of brain dynamics that the cerebral cortex is the site of a holographic information process he calls a multiplex neural hologram that is dependent on local circuits of neurons without long fibers that do not transmit ordinary nervous impulses. "These neurons function in the undulatory mode and are above all responsible by the horizontal layer connections of the neural tissue where holographic interference patterns can be built" [3].

The neural hologram is build by the interaction of the electromagnetic fields of the neurons similarly to the interaction of sound waves in a piano. When a piano is played the keys strike the strings generating a vibrational standing wave between the two ends of the string, creating an interference pattern (This interference can be destructive or

constructive). Nodes of constructive interference, of these sound frequencies, create the harmony or harmonics that are the notes making up the music we listen to. Pribram has demonstrated that a similar process is continuously occurring in the cerebral cortex by means of the interpenetration of the electromagnetic fields of the adjacent cortical neurons, generating a harmonic field. According to Pribram's model his harmonic electromagnetic field distributed in the cerebral cortex, holographically stores and encodes a huge information field responsible for the emergence of memory and consciousness. As the music is not in the piano but in the resonating field that surrounds it, so our memories and consciousness are not in the brain, but in the holographic information field that surrounds it.

Pribram's *neural wave equation*, [3] describing holographic neural network processing is similar to the Schrödinger wave equation of quantum theory with the addition of the de Broglie-Bohm Quantum Potential. This is not coincidental and opens the possibility of holographic interaction between receptive fields in the cortex with the holographic quantum universe described by David Bohm. This new holographic paradigm allows us to rethink the manner in which information processing occurs in the nervous system. In this context, Pribram's quantum holonomic theory of brain function is one of the most brilliant and revolutionary contribution to neuroscience in the 100 years since the initial studies of Sherington!

3. The Holographic Conscious Multiiverse (HCM)

The mathematical formulations that describe the harmonic slope resulting from wave interference are Fourier transformations that Dennis Gabor applied to the development of the hologram, enriching it by the application of the inverse process, a model in which the interference pattern rebuilds the object in a virtual image. In other words, from the spectral dimension of frequency one can reconstruct mathematically and experimentally the object in spacetime dimensions!

This holographic organization mode is also what Bohm applied to quantum theory to develop his holographic quantum theory of the universe. In Bohm's universe model, space and time are mixed, "folded" into a dimension of frequencies that is an implicit hidden order without spacetime relations. In this field of frequencies dimensional fluctuations occur, more intense "*undulations*" like holographic patterns, to build a spacetime dimension. This explicit order is our manifest universe. According to Bohm [15]:

In the implicate order everything is folded into everything. But it's important to note here that the whole universe, is in principle enfolded into each part actively through the holomovement, as well as the parts. Now this means that the dynamic activity-internal and external- which is fundamental for what each part is, is based on its enfoldment of all the rest, including the whole universe. But of course, each part may unfold others in different degrees and ways. That is, they are not all enfolded equally in each part. But the basic principle of enfoldment in the whole, is not thereby denied.

4. Towards a Holoinformational Theory of Consciousness

Experimental research developed by Pribram and other consciousness researchers like Hameroff [33] and Penrose [34], Jibu and Yassue, confirm the existence of a Quantum Brain Dynamics in neural microtubules, in synapses and in the molecular organization of the cerebrospinal fluid. This Quantum Brain Dynamics can generate Bose-Einstein condensates and the Fröhlich Effect. Bose-Einstein condensates consist of atomic particles, or in the case of the Fröhlich Effect biological molecules, that can assume a high level of coherent alignment, functioning as a highly ordered and unified informational state, as seen in lasers and superconductivity. These quantum dynamics show us that the interaction process between dendrons and psychons, described by Eccles, are not limited to the synaptic cleft, as stated by Eccles, but a much wider embodiment throughout the whole brain. Like Pribram and Amoroso, we see this not as a contradiction but as a natural extension of Eccles ideas.

We expanded our conjecture that the interconnectedness between brain and cosmos is an instantaneous nonlocal connection to the concept of a holoinformational flux, from which both mind and matter are in-formed. This resembles Bohm's holomovement. In this new concept, quantum holographic brain dynamic patterns are conceived as an active part of the universal quantum-holographic informational field, and capable of generating an informational field interconnection that is simultaneously nonlocal (quantum-holistic) and local (Newtonian-mechanistic), i.e., holoinformational. Taking yet in consideration the basic mathematical property of holographic systems in which the information of the whole system is distributed in each part of the system, plus Bohm's holographic quantum physics data, and the experimental data of the holonomic theory of Pribram, we propose that this universal interconnectedness could permit us to access all the information [35-37] codified in the wave interference patterns existing in all the universe since its origin. The quantum-holoinformational nature of the universe interconnects each part, each brain-consciousness, with all the information stored in the holographic patterns distributed in the whole cosmos, in an indivisible irreducible informational cosmic unity [38-40].

As a consciousness exercise, analogous to Einstein's thought experiments, we could compare this universal informational interconnectedness with the following metaphoric quotations from various spiritual traditions: *As above so below* (Alcheour). *All that is outside is inside* (Upanishads). *The father is inside us* (Christianity). *As in the earth so in the heavens* (Christianity). This universal interconnectedness could be perfectly understood as a Cosmic Holographic Consciousness.

Consciousness in this conception is the holoinformational flux that permits the interaction of the holonomic informational Quantum Brain Dynamics - that we can consider as extended dendrons - with the quantum-holographic nature of the universe, that we can view as an extended cosmic psychon.

As Pribram states, as sensory receptive fields dendrons can be mapped in terms of Gabor's Elementary Functions or wavelet-like patterns. Gabor called these unities

Quanta of Information, because he used the same mathematics to describe it as Heisenberg did in describing units of quantum physics. Yet Pribram shows:

They define the unit structure of processes occurring in the material brain. However, Gabor invented his function, not to describe brain processes, but to find the maximum compressibility of a telephone message that could be sent over the Atlantic Cable without destroying its intelligibility. The Gabor function thus describes both a unit of brain processing and a unit of communication. Brain is material, communication is mental. The same mathematical formulation describes both. The elementary structure of processing in Eccles material dendron is identical to the elementary structure of processing of a mental (communication) psychon. There is a structural identity to the dual interactive process [3].

Richard Amoroso, creator of Noetic Field Theory [17-20], tell us that "Consciousness pervades atoms, is the organizing power deeper than gravitation (unitary field), that frames the universe, causes gravitation, and the flux or *élan vital* which gives life and is the 'light of the mind'... this basic holistic framework incorporates the implicate and explicate order described by Bohm" [23-24]. This noetic definition of consciousness is as radical as our holoinformational consciousness, and wethink we are saying the same thing with different approaches.

5. Are Altered States of Consciousness Highly Synchronized Harmonic Brain States?

Through practices of deep meditation, prayer, and others states of higher consciousness that elevates the coherence of cerebral waves, this universal interconnectedness becomes expanded by synchronizing the functioning of the cerebral hemispheres and unleashing a highly coherent brain state that optimizes the holographic treatment of neuronal information. In brain mapping studies this highly synchronized harmonic state shows brain waves highly synchronized and perfectly ordered, in a unique harmonic wave, as if all frequencies of all neurons from all cerebral centers played the same symphony. In our concept this highly harmonic synchronized state generates a nonlocal holographic informational cortical field creating a holoinformational flux of consciousness interconnecting the human mind with the Holographic Cosmic Consciousness. A survey of these electroencephalographic and clinical studies can be found in our Portuguese books [41-45].

6. Noetic Anthropic Cosmology Summarized

Biological Mechanism [46,47] states that physics and chemistry provide sufficient explanation for living-systems with no additional life principle required. The limits of this philosophy is surpassed by applying an advanced form of Wheeler-Feynman Absorber Theory [48-51] to an extended form of Einstein's original Static Universe

Model [52] in terms on a complex energy-dependent spacetime metric $f : M_4 \rightarrow \hat{M}_4$ [53] within a non-compactified Kaluza-Klein Theory of twelve dimensions 12D [54]. The formalism for this highly ordered harmonic superspace $S_N = S_0 + S_1 + S_2 \rightarrow S_{12} \rightarrow \hat{M}_4 \times K_8 \rightarrow \hat{M}_4 \times \pm C_4$ is a *continuous state* cosmology with an \hat{M}_4 standing-wave present created/recreated from the complex advanced/retarded suprastructure of the future-past [52,55,56] having the basic form

$$R_{sym\hat{M}_4}^{S_{N_0}} = \frac{1}{2} \left[R_{retC_4}^{S_{N_1}} + R_{advC_4}^{S_{N_2}} \right] \quad (1)$$

compatible with recent advances in 10(11)D Superstring Theory, now called M-Theory [57]. The least unit of this complex Noetic Superspace S_N represents the fundamental basis for awareness in a Continuous State Holographic Conscious Multiverse (HCM) [51,55,57].

A scale invariant form of Dirac Spherical Rotation (electron spin) [51,59,60] is inherent to HCM cosmology, i.e. applicable not only to the electron but aspects of human consciousness and cosmology itself. An integral component of the metric's transformation; provides a symmetry breaking leading to a new noetic action principle tantamount to the historic concept of *élan vital*, suggesting a Bohr-type complementarity of mind/body in the quantum brain [61,62] Cartesian dualism [63] and beyond [51,57,64]. An inherent beat frequency during the continuous state compactification dimensional reduction topological transformation introduces the *élan vital* by holophote action through every spacetime point into every atom during the process of dimensional transformation: $D_s \rightarrow D_t \rightarrow D_E$ and $R_U \rightarrow R_Q \rightarrow R_C$ where spatial dimensions D_s transform into temporal dimensions D_t and temporal dimensions D_t into energy D_E in a cyclical process of unitarity R_U to R_Q quantum to classical R_C . This process occurs by superluminal Lorentz boosts [56,65] and represents an additional set of Noetic transformations: Galilean \rightarrow Lorentz/Poincaré \rightarrow Noetic [49,51,].

7. Physical Self-Organized Basis of Qualia

Qualia, plural of *quale*, is 'the subjective quality of experience; a *qualitative feel* associated with an experience' [66,67]. The physical HCM cosmology of *élan vital* leads to a rigorous model for representing qualia [64,68] allowing immediate application on the mind-side to psychology and on the body-side to medicine. In 'What's it like to be a bat?' Nagel [67] states that current reductionist attempts fail by filtering out any basis for consciousness; becoming meaningless since they are logically compatible with its absence. He assumes if an organism has conscious experience, "there is something it is like to *be* that organism". This is the subjective character of

experience for any conscious entity whether a bat or a Martian. Every experience has a specific subjective nature [67].

To Nagel “there are facts which could not ever be represented or comprehended by human beings, simply because our structure does not permit us to operate with concepts of the requisite type”; because “to even form a *conception* of what it is like to be a bat one must take up the bat’s point of view”. If one removed the viewpoint of the subjective observer; what would be left? Nagel suggests the remaining properties might be those detectable by other beings, the physical processes themselves or states intrinsic to the experience of awareness. This changes the perspective of qualia to the form “there is something it is like to undergo certain physical processes”. “If our idea of the physical ever expands to include mental phenomena, it will have to assign them an objective character”. Nagel recognizes that:

Very little work has been done on the basic question (from which mention of the brain can be entirely omitted) whether any sense can be made of experiences having an objective character at all. Does it make sense ... to ask what our experiences are *really* like, as opposed to how they appear to me?...This question also lies at the heart of the problem of other minds ... If one understood how subjective experience could have an objective nature, one would understand the existence of subjects other than oneself [67].

These are questions an integrative Noetic Science can answer. Standard definitions of qualia are an inadequate philosophical construct describing only subjective character. In the physical sense of Noetic Field Theory (NFT) components describing qualia from the objective sense are introduced - i.e. distinguishing the phenomenology of qualia from the noumenon or physical existence of the *thing in itself*.

A comprehensive definition of qualia includes three forms considered to be physically real by NFT because the noetic fields of HCM cosmology on which the noetic model is based are all physically real. In this form of interactive dualism the mind is a physically real field. See [64,68].

Type I. The Subjective - The *what it feels like* basis of awareness. Phenomenological states of the qualia experience. (The current definition of qualia Q-1)

Type II. The Objective - Physical basis of qualia independent of the *subjective feel* that could be stored or transferred to another entity breaking the 1st person 3rd person barrier. The noumenal elements of qualia upon which the phenomenology is based.

Type III. The Universal - Living systems represent a Qualia substrate of the conscious universe, acting as a ‘blank slate’ carrier from within which Q-II are modulated into the Q- I of experience by a form of superradiance or hyper-holographic evanescence.

Cosmological Origin and Production of the Three Types of Qualia

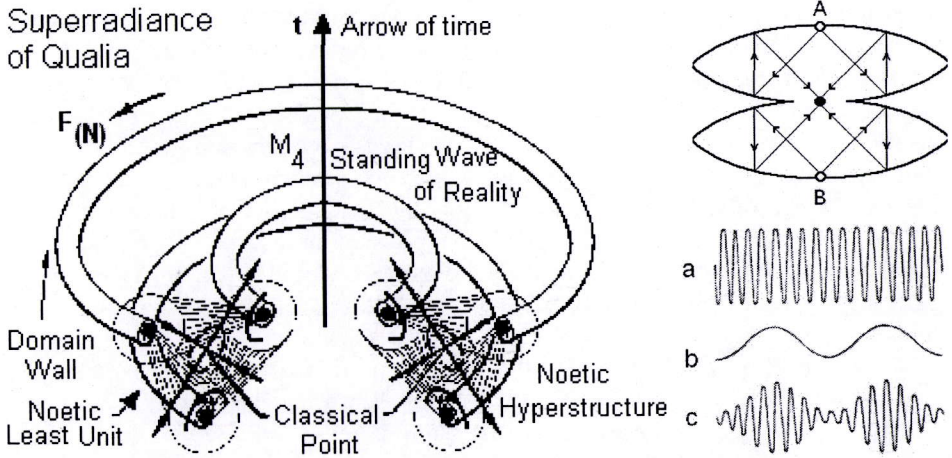


Figure 1. Metaphor for the emergence of qualia from the continuous action of the noetic least unit (1a), a microcosm of the HCM where past oriented compactification periodically produces a classical spacetime point. The standing-wave domain walls represent the lightcone singularities of Q-III propagation, the surfaces of which act structurally as Casimir-like plates, and phenomenologically as a carrier wave base for Q-I qualia evanescence by Q-II modulation. 1b represents two pairs of parabolic mirrors (the Q-III Casimir domain walls) whose foci overlap; this is the high frequency wave in 1c denoted as *a*. The longer wave *b* represents Q-II qualia which is modulated by the Q-III wave into the usual Q-I qualia *c*. Thus *a*, *b*, and *c* in 1c represents the three forms of qualia and how they work together to form Q-I by superradiance of the noetic field.

A standard image requires a screen or other reflective surface to be resolved; but if the foci of two parabolic mirrors (Casimir-like plates in our model) are made to coincide, the two images superpose into a real 3D image that does not need a screen. See Figure 1 above. A science toy called the 'magic mirage' is used to demonstrate this effect of parabolic mirrors. Objects placed in the bottom appear like solid objects at the top of the device.

The holophote action of *élan vital* energetics arises from the harmonic oscillation of least unit boundary conditions tiles the spacetime backcloth and pervades all self-organized living systems. The inherent beat frequency of this continuous action produces the Q-III carrier wave that is an *empty slate* modulating cognitive data of Q-II physical parameters into Q-I awareness states as a superposition of the two (Q-III and Q-II). This modulation of qualia occurs in the HD QED cavities of the cognitive domain. The QED cavities are a close-packed tiling of least unit noetic hyperspheres; the Casimir surfaces of which are able to reflect *quaneme* subelements. While the best reflectors of EM waves are polished metal mirrors, charged boundary conditions also reflect EM waves in the same way radio signals bounce off the ionized gases of the

Kennelly-Heaviside layers in the Earth's ionosphere. This reflective 'sheath' enclosing the cognitive domain is charged by the Noeon radiation (exchange particle of the noetic field) [69] of the *élan vital*, the phases of which are 'regulated' in the complex HD space of the least unit HCM cosmology.

How does noetic theory describe more complex qualia than the simple qualia of a light pencil? (The qualia-II of a light pencil is assumed to be *the* pencil of light [64,68]. Light quanta are microscopic in contrast to the macroscopic sphere of awareness. It thus seems reasonable to assume that scale invariant properties of the HCM least unit of awareness would apply. Like phonemes as fundamental sound elements for audible language there are qualia-nemes or *quanemes* for awareness all based on the physical modulation of Q-II states by the geometric structural-phenomenology of the Q-III carrier base of living systems.

8. Catastrophe Theory & Anticipatory Effects of the Noetic Formalism

The structural-phenomenology of Double-Cusp Catastrophe (DCC) Theory in $\geq 9D$ appears homeomorphic to the Riemannian manifold of both 10(11) dimensional M-Theory and the topological geometry of the continuous state dimensional reduction spin exchange compactification process inherent in the action of the corresponding scale invariant least unit of noetic superspace which because it is a complex self-organized system has inherent anticipatory properties mediating the the catastrophies. In this general framework the double-cusp *equilibrium surface* is analyzed in terms of a hierarchy of *jumps in state* providing a framework for expanding the basis of allopathic medicine and psychology. One can say FAPP that the noetic least-unit tiling [51] of the Planck backcloth is a complex HD catastrophe manifold mediated by the unitary noetic field .

The noetic action of consciousness $F_{(N)}$ is not a 5th fundamental force but an integration of the electromagnetic and gravitational force at the unitary level where it is confined to the Universal sea of consciousness embodying an 11(12)D Noetic spacetime metric $S_{(N)}$ [55]. The well known Schrödinger equations central to quantum theory make correspondence to Newton's second law of motion $F = ma$ which is also the starting point for deriving the noetic formalism. Newton's law of gravitation $F = Gm_1m_2 / r^2$ is not chosen because it is not the fundamental form of gravitation and also contains an undesirable constant of dimensionality. Whereas $F = ma$ is dimensionless. Likewise Einstein's gravity is also not chosen.

Substituting Einstein's mass-energy relation $E = mc^2$ into Newton's 2nd law we obtain: $F_{(n)} = E / c^2 a$ where $F_{(n)}$ is the noetic force and E becomes the self-organized autopoietic energy [70,71] related to ψ_e of the cosmology of mind defined in the fundamental dualistic interactionist relationship of noetic theory:

$$|\Psi_M\rangle = |B|\psi_b\rangle + (|\psi_e\rangle + |\psi_c\rangle) \tag{2}$$

i.e. the mind Ψ_M is not merely quantum brain dynamics $B\psi_b$, but a classical \rightarrow quantum \rightarrow unitary continuum of brain, élan vital ψ_e and HD elemental intelligence ψ_c . E is scale invariant through all levels of the HCM beginning at the highest level in the supralocal Megaverse as a hyperdimensional Wheeler Geon - a *ball* of photons of sufficient size to self cohere through gravity [72]. At the micro level the Geon becomes synonymous with the de Broglie wave-like mental energy of a conscious entity. The Prion [73], the infectious protein responsible for spongiform encephalopathies (mad cow disease) is designated the simplest known life form, if correct that the prion protein is 'animated' by the self-organizing properties of the *élan vital* of the noetic field [74]. The E unit is comprised of a factor of *Einstein's*, the fundamental physical quantity defined as a 'mole - Avogadro number (10^{23}) of photons'.

Next the derivation of the noetic equation is generalized for the conscious universe by taking an axiomatic approach to cosmological scaling from the work of Kafatos et al, [75] suggesting that all lengths in the universe are scale invariant. 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 Hubble relation for perceived Doppler expansion of the universe where $H_0 = \dot{R}/R$ and $a = \dot{R} \times H_0$. 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:

$$F_{(N)} = E/R \quad (3)$$

the unexpanded fundamental formalism for noetic action within a conscious entity in the HCM model. It should be noted that R is a complex rotational length with standing wave properties and could be derived in terms of angular momentum or spacetime spinors at HD levels in domains described by future developments in M-Theory.

When applied in concert with the fundamental noetic equation of consciousness [76] and the model of interactive computing [77,78] double-cusp catastrophe theory provides a mathematical basis for the noetic basis for medicine and psychology. The processes of metabolic homeostasis and intentional action are modulated by the ubiquitous flux of the unitary noetic field as described by the anticipatory effects of the $F_{(N)}$ formalism.

Equation (4) is a standard equation for the equilibrium surface of the DCC [81] as modeled in (Fig. 2); where $B \pm Q$ is the state variable and μ_d and ν_d are the control parameters.

$$(B+Q)^3 + (B+Q)\mu_d + \nu_d = 0 \quad (4)$$

The position of the two cusps is found at $\mu_d = 0$ and $\nu_d = 0$.

Noetic Action on the Equilibrium Plane of a Double-Cusp Catastrophe

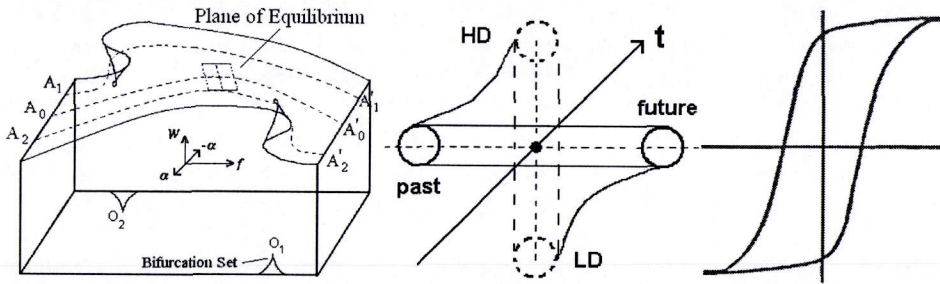


Figure 2. In 2a, the DCC is illustrated showing cusps at each end of the plane of equilibrium. The DCC is said to occur in ≥ 9 dimensions and thought to be the catastrophe form most compatible with NFT symmetry. The plane of equilibrium is a topological manifold tiled of noetic *least units*. The equilibrium manifold undergoes a 'conscious' quantum computation best described by interactive computation [77,78]. Fig. 2b graphically illustrates the fundamental scale invariant noetic equation $F_{(N)} = E/R$ of conscious action. Any internal or external stress or change in E is a nonlinear dynamic process producing stability or instability in the boundary conditions of R ; an instability in $E \rightarrow$ stress \rightarrow displacement \rightarrow catastrophe \rightarrow jump... whereas stable flux is homeostatic. 2b like noetic HCM cosmology is also a form of hysteresis loop generalized in 2c.

If the equilibrium plane in Fig. 2a is considered as a present moment; temporal permutations as the noetic catastrophe cycle evolves in time from future to past and higher to lower dimensions in the same manner as the HCM cosmology for the spaces: $R^{12} \supseteq \dots R^4 \supseteq R^3 \supseteq R^2 \supseteq R^1 \supseteq R^0$.

Table 1. Geometry of zero to 12D showing points and lines contained

N Space	Points	Lines	Squares	Cubes	Tesseracts	5T	6T	7T	8T	9T	10T	11T	12T
0	1												
1	2	1											
2	4	4	1										
3	8	12	6	1									
4	16	32	24	8	1								
5	32	80	80	40	10	1							
6	64	192	240	160	60	12	1						
7	128	448	672	560	280	84	14	1					
8	256	1,024	1,792	1,792	1,120	448	112	16	1				
9	512	2,304	4,608	5,376	4,032	2,016	672	144	18	1			
10	1,024	5,120	11,520	15,360	13,440	8,064	3,360	960	180	20	1		
11	2,048	11,264	28,160	42,240	42,240	29,568	14,784	5,280	1,320	220	22	1	
12	4,096	24,576	67,584	112,640	126,720	101,376	59,136	25,344	7,920	1,760	264	24	1

The putative significance of Tbl.1 for the application of double-cusp catastrophe theory to the noetic HCM formalism is that the structure of possible boundary conditions and the number of control points is revealed. For example, in this simplistic view, a 3D point in real spacetime might have 16 control photon-gravitons (noeons) covering it. Carrying the analogy all the way up to the 12D holoscape of the Megaverse, the same 3D point might be controlled or guided by a total of 8,176 photons. The number arrived at by summing the points of D4 to D12. No point in the universe is isolated; so this metaphor does not include the possible power factor by associated points in both the HD and LD HCM backcloth. Within the inherent continuous-state dimensional reduction compactification process, the LD domain (dimensions less than 3) might be coupled to orders of magnitude more photon-gravitons. This detail of Noetic Theory has not been completely worked out yet.

9. The Unified Field of Consciousness

The cosmos evolves through meaningful informational codes, order is transmitted through cosmic evolution that in-forms matter, life and consciousness. This ordered negentropic universe structured as a quantum field, plenum of meaningful local and nonlocal information, i.e., holoinformational, is an intelligent universe, a *Great Mind*, as Sir James Jeans had already noted. This Cosmic Mind, can be seen as a Plenum full of information, and be understood as a Universal Holographic Consciousness, or as a Cosmic Consciousness as proposed through the millennia by the various spiritual traditions of mankind. In this holoinformational vision of the mind and the universe, consciousness and intelligence are meaningful information, and in this way superimpose with each other, and are each other. So, we can state that this intelligence-information has been always present in all organizational levels of nature. In this context matter, life and consciousness are not separate entities, capable to be analyzed in a Cartesian analytic-reductionism conceptual framework, but a holistic indivisible unity, a self-organizing intelligent holoinformational field, unfolding in an infinite cosmic holarchy.

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