

A BRIEF INTRODUCTION TO NOETIC FIELD THEORY: THE QUANTIZATION OF MIND

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Abstract. The orthodox Copenhagen interpretation of quantum mechanics, an epistemological model based on the phenomenology of measurement, and the statistical evolution of state, has been known from its inception to be incomplete. Consciousness is considered a hard problem by defining brain states of awareness as the fundamental property from which to formulate a science of consciousness. A deeper ontological model called noetic field theory includes the domain of Planck scale quantum gravity and a nonlocal noetic process enabling mind to be quantised and surmount uncertainty through the synchronicity of a delocalised noetic effect that provides the entry point of intentionality that phase regulates quantum brain dynamics. This occurs throughout the body; one pertinent level is provided by ordered water as a synchronization backbone. Quantum gravity is an essential factor in the dynamics of consciousness especially intentionality. In the spin exchange compactification model of gravity, gravitons turn out to be confined photons of the unified nonlocal field that curves spacetime. This has implications for the quantization of mind in that the phase regulation of intentionality is mediated by a nonlocal Boson called the noeon.

Keywords: *quantum gravity, ontological, noumenon, teleological, noetic effect.*

1 Introduction

The standard model does not describe biological systems, the large scale structure of the universe, or the high energy of the Planck scale. We have had to wait for a deeper ontological interpretation of Quantum Theory to couple consciousness to brain dynamics. *Noetic field theory - The Quantization of Mind*, in part an extension of Bohm's pilot wave model [1] and Cramer's transactional interpretation [2] into a nonlocal domain encompassing elemental intelligence, is such an ontological interpretation. In addition to solving Chalmers' hard problem [3] by showing that awareness is not a fundamental principle from which to formulate a theory of consciousness, because awareness in a field model is comprised of primary base states; Noetic Field Theory also removes Descartes error of relegating mind to immateriality by the bosonization of the Eccles' Psychon [4,5].

According to the noetic interpretation, individual intelligence is a teleological noumenon with triune parameters confined to a Psychosphere defined as the hyperstructure signifying the complete domain for events of consciousness. In this cosmology consciousness is a self organizing interaction of (1) the local matter field confined to the Heisenberg matrix of the brain holoscape described by Pribram [6], and (2) a complementary nonlocal noetic field originating in a noetic space encompassing singularities of elemental intelligence. This Psychosphere includes the dynamic raster of consciousness within which all conscious processes evolve; not in the manner often described by wave function collapse, but based on the density matrix of the matter wave [3,7,8]. The complementarity of these two domains is integrated by (3) a cosmological ordering principle, a quantum of action, that mediates cosmological and quantum gravity locally and at the Penrose twistor level. A taxic principle of consciousness called the Noetic Effect couples causally to Bohm's quantum potential to act as a phase regulator in the midst of pumped Frohlich-like coherent states for Pribram's holonomic formations of the dendritic microprocess [6].

$$k(x,t) = \nabla S(x,t) = \left(\frac{\partial S(x,t)}{\partial x^1}, \frac{\partial S(x,t)}{\partial x^2} \right) \quad (1)$$

This is an entry point of consciousness into quantum systems. Although Bohm's pilot wave model with its connection to classical dynamics has been criticized as bringing determinism back into quantum theory; the resultant causal connection of the Noetic Effect to the quantum potential does not make the system deterministic per se, for as generally known, the logic of human practical reason [9] is governed by nonlinear acausality leaving these nodes open to pertinent stochastic, chaotic, catastrophic, or tunneling influences. Because Noetic Field Theory contains a field like any other physical field, consciousness is quantifiable. Work in progress to detect the Psychon/Noeon through phase control laser interferometry and optical nutation is proceeding [10]. The measurement problem need only be applicable to

particles obeying Fermi-Dirac statistics. This is based on an ontological cosmology not limited to the standard model; but entails the pragmatic utility of a teleological nonlocal noetic process which has shown that mind is a quantised interacting noumenon not a brain phenomenology limited by the uncertainty principle, but through synchronicity maintains interaction free states of superposition. Apparently the universe is more conscious than physicists have recently wanted to admit. Noetic Field Theory thus provides a framework to formulate a comprehensive theory of consciousness [11-13].

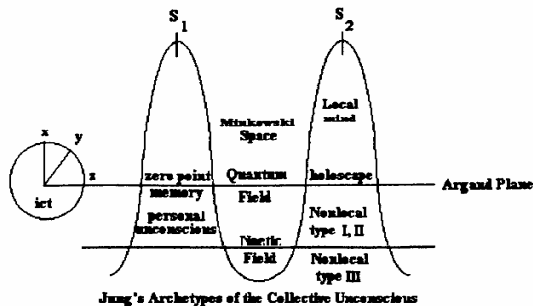


Figure 1 A simplified spacetime diagram representing the three known cosmological domains, and the physical basis for synchronicity and Jung's collective unconscious which nonlocally store racial archetypes.

2 Collective Modes of Ordered Water as a Synchronization Backbone for Consciousness

For over thirty years it has been suspected that collective modes of conformation in the dipole oscillations of neuromolecular systems are a key factor in the dynamics of consciousness. Until recently even though a brain cell is almost eighty percent water, the role of water in this process was dismissed as only a background filler within which to suspend biological species. This paper discusses the spin glass properties of ordered water as a vehicle essential for the synchronization backbone of the quantum dynamics of consciousness. The utility of ordered water as part of the synchronization backbone of the conscious process is in its dipole oscillations acting as (1) a buffer for phase transitions which supplies a switching mechanism, (2) directional quenching of periodic moments which acts as an aid in maintaining coherence effects, and (3) a medium to translate microscopically distinct Hamiltonian operators into macroscopically equivalent long range correlations. This water mechanism would operate in association with the quantum dynamics of microtubules and the tunneling trigger mechanism of vesicle release at the synapse to integrate the total quantum conscious field.

2.1 Ordered Water

Water is electrically neutral overall; but because of charge asymmetry in the geometry of the Hydrogen

and Oxygen bond the water molecule is polar. This allows adjacent water molecules to hydrogen bond into clusters that have been found binding to protein surfaces. A (20) water cluster is very stable due to strong Coulombic interactions and believed to be associated with microtubules [14,15].

2.2 Collective Modes

The water molecule has a constant electric dipole moment that coincides with its axis of symmetry. Several degrees of freedom apply to the water molecule; spatial motion, rotation, and molecular vibration. The most important being molecular rotation around the axis of symmetry. This 'spinning top' can be considered a quantum mechanical spinor field which couples to the collective modes of the electromagnetic vibration of biomolecules throughout the brain. Collective modes are the key to the dynamics of living systems. When the energy Eigenstates of oscillating dipole molecules become strongly correlated it is called quantum coherence. It is the propagation of these coherent states, Fröhlich waves of between 100 billion to a trillion hertz, exchanging energy with the electromagnetic field, that is believed to be the basis for consciousness [8,16].

$$\mu = -\sum_i q_i r_i \quad (2)$$

$$\Delta E = h\nu = \frac{hc}{\lambda} \quad (3)$$

A water molecule has a dipole moment resulting from the oscillation of van der Waals radii around the covalent bond. The dipole oscillation by incident photons or coherent waves in biological systems produces conformational change in optically active molecules. Eq. (2) is the vector potential of a dipole moment; which is the product of the charge q and the radius r . Eq. (3) shows the change in energy E depends on Plank's constant and either the frequency ν or the wavelength. Conformational variation can originate in the energy variance from the ground state by incident photons. In the case of the brain this would be by corticons and psychons or noeons.

2.3 Synchronization Backbone

Richard Feynman found nothing in the laws of physics to suggest that a quantum computer wasn't possible; and that the most feasible way to build a quantum computer was using a 'synchronization backbone' [17]. The synchronization backbone eliminates the time dependence of the systems Hamiltonian without which the quantum computer could not maintain data accurately and be useless. A conscious quantum computer simulating quantum brain dynamics has been designed [18,19]. The purpose of the synchronization backbone is to provide a buffer to support coherence effects. This accomplishes two things: (1) an amplification or memory effect, and (2) to ease transitions in wave propagation thus avoiding thermalization which would annihilate coherence. In

the conscious quantum computer laser phase control interferometry resonating at Fröhlich frequencies in heteroseric molecular crystals provides the synchronization backbone. Feynman's [17] synchronization backbone works by building the quantum computer on top of another quantum system. It is suggested in this paper that the human brain performs quantum computation and also contains a synchronization tier and that the synchronization backbone for consciousness is provided by the activity of ordered water and its coupling to microtubules and other dipole oscillations in the cortex. This provides the two tiered quantum system necessary to provide the synchronization backbone.

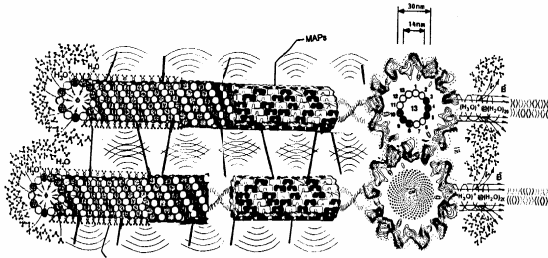


Figure 2 Ordered water as the synchronization backbone for nonlinear switching in quantum brain dynamics. A pair of microtubules with microtubule associated proteins (MAP'S) connecting them. Water is shown around the microtubule and coupled to the outer tubulin surface. The microtubules are also shown in cross section revealing the 13 protofilaments surrounded by electron density maps that shroud the length of the tubule. The electron density varies with the energy state of the dipole oscillations of the tubulin dimer and associated water molecules. Inside the microtubule is an energy field where water assembles into clusters along the inner surface. It is believed that coherence occurs in the core of microtubules through cyclotron resonance at Fröhlich frequencies. The Casimir radius inside a tubule is of sufficient diameter that this ordered state might Bose condense providing a basis for one aspect of consciousness. Ordered water also has spin glass properties and is postulated here to provide the synchronization backbone that makes this superradiance a possible aspect of consciousness information processing [14,17].

3 Quantum Brain Dynamics and the Noetic Field Theory of Consciousness

Quantum Field Theory has several branches, Quantum Electro Dynamics (QED) for electromagnetic interactions, and Quantum Chromo Dynamics (QCD) for strong interactions for example. Quantum Brain Dynamics (QBD) is the quantum field theory describing biological systems [8]. QBD is mediated by the corticon, a quantum of the water rotational field which interacts with the electric dipole oscillations along proteins. When synchronization of the water corticon and electromagnetic field occurs, nonlocal coherence is manifest giving rise to long range order and collective phenomena. Nonlocal coherence provides a much stronger correlation than a classical collective mode could describe.

QBD of the water rotational field and interacting electromagnetic field although providing an excellent model of neuromolecular computation is not sufficient to describe consciousness because free will or intentionality is still left out of the picture. For this we need an extension of the orthodox epistemology of the Copenhagen interpretation into the quantum ontology of Bohm and Cramer [1,2]. Bohm described the quantum potential as a nonlocal pilot wave effecting the probability matrix of the Schrodinger equation. Bohm's work was criticized for bringing causality back into the picture because the pilot wave makes a connection to classical mechanics. *Noetic Field Theory: The Quantization of Mind* completes Bohm's work. Intentionality is nonlinear and acausal, not linear and causal as the determinism of Newtonian mechanics was. So although the result of intentionality acts as a causal operator on the quantum potential; because of its nonlinear/acausal dynamics the probabilities inherent in the evolution of the Schrodinger equation are not violated. This is the entry point of mind into quantum theory and another key factor for in the operation of the synchronization backbone provided by the water corticon field. Neurocomputing models of the brain are linear closed systems; Once a computer is programmed there are no remaining degrees of freedom for rational input. The see saw action or harmonic oscillation of the synchronization backbone provides a switching mechanism called the noetic effect [12] for the entry of either intentionality or sensory phenomenology into the conscious process.

In summary water has been theorized to play two important roles in consciousness: (1) to provide a storage buffer to amplify or attenuate the corticon field, and (2) to allow switching between sensory computation and intentionality. Although the role of ordered water in the dynamics of consciousness remains a qualitative model at this point in time, a growing body of literature from both experimental and theoretical areas are converging to suggest an important role of water in the quantum physics and molecular biology consciousness.

4 The Noetic Effect: The Entry Point of Intentionality Phase Control

Quantum Brain Dynamics (QBD) the quantum field theory describing the fundamental mechanics of the brain consists of the corticon field of water rotation and the electromagnetic field extending throughout the brain. This is an open system interacting with the classical active manifold of entrained dendritic and neural processes called the holoscape that couples phenomenal information back to the phase space of the Heisenberg matrix of QBD below it. To provide an empirically testable model for the phase regulation of holoscape patterns, a radical framework of noetic psychotropism called the noetic effect is described in this paper: (1) formulating a

physical basis for Jung's synchronicity factor and archetypes of the collective unconscious, (2) introducing a multi-mode phase regulator into the pattern of charge carriers in the dendritic holoscape of Karl Pribram's seminal work on holonomic brain theory, and (3) describing an inherent action

$$\hbar \frac{\partial \theta}{\partial t} = -\frac{1^2}{2} |\nabla \Theta|^2 + V - \frac{\hbar^2}{2m} \frac{\nabla \cdot \nabla R}{R} \quad (4)$$

of the conscious process called the Noetic Effect. This is accomplished by applying the author's work on Noetic Field Theory (an extension of Bohm's ontological quantum theory into a teleology that includes a nonlocal conscious process) [11,12], to recent developments in the emerging science of Consciousness. This represents a first practical application of Holonomic Brain Theory.

The noetic psychotropism is based on a complementarity of mind and body [5]. The Eccles psychon is bosonized into a unified field theory to recast mind as a material entity [4], not immaterial as originally described in Cartesian dualism. Pauli and Jung [20] tried to formulate a quantum mechanical model for Jung's concepts of the collective unconscious and the synchronicity factor; but physical theory was not advanced enough at that time to accomplish the task. Now we suspect that memory operates with vacuum zero point fluctuations [21,22] by a type of neural holography [6]. There are two types of memory involved: (1) every day personal memory of learned facts and experienced events more or less under direct conscious mediation, and (2) a transpersonal 'memory of being', a dynamic Hilbert space storing archetypal forms of the personality or psyche. These forms can be compared to a dynamic backbone synchronization [17] in a quantum computer acting as a waveguide for the translation of the noetic field. Archetypal forms although they can be objects of subjective attention are generally occluded deeply in the Jamesian fringe because they provide more the bottle of rather than the experiential content of awareness.

According to *Noetic Field Theory - The Quantization of Mind*, the Psychosphere is defined as the hyperstructure signifying the domain of individual intelligence; a self organizing interaction of the local matter field confined to the Heisenberg matrix of the brain holoscape and a complementary nonlocal noetic field that includes cosmological factors of consciousness. This is the dynamic raster of consciousness within which all conscious processes evolve; not in the manner often described by wave function collapse, but based on the density matrix of the matter wave [7,8,12]. In this context action of the Noetic Effect can induce a trophic phase. In physical terms this syzygy would have active mediated moments of force. The noetic effect as mediator of the nonlocal conscious process, acts as a causal (including the acausal/nonlinear properties of rationality) operator on Bohm's quantum potential. This is a point

of entry of consciousness into quantum systems. This includes both conscious and subconscious nodes of entry. Driven by the Hamiltonian of the Conscious Potential, the resultant action of the Noetic Effect couples operators of the Noetic Field to specific loci of pumped Fröhlich-like coherent states. This is a phase regulator into the patterns of Pribram's holonomic formations [6]. The pumping mechanism for this process is inherent in the self organization of the system. The radiation pressure of the (Psychon) Bose state, Fermi-quasiparticle transitions, vacuum zero point fluctuations, and string dynamics etc (full gravitational circle - cosmological to quantum) are sufficient to drive this dynamic. This is the normal operation of energy flow by the nonlocal conscious ontology causally coupled to Bohm's quantum potential. Thus the current thinking on the involvement of wave collapse is a mathematical invention not a description of the actual logical cosmology of noetic consciousness [12,23].

The influence on development by significant others seems obvious; children are imprinted with many personality characteristics of their extended families. Under certain conditions a deeper psychotoxic noetic force causes prenatal inversion of the foundation of the psyche, providing an apparent genetic pre-disposition for attributes. The concept of noetic psychotropism applies physical theory somewhat ahead of its time. Experimental protocols being developed will rigorously quantify this model; but early application of noetic field theory to holonomic brain theory seems warranted. The noetic action of archetypes allows adjustment by self actualization or psychotherapy. Because operation of the noetic effect is deeper than current understanding at the psychosomatic level; noetic psychotropism will lead additionally to therapeutic methods for personality disorders and medical problems like colitis and Alzheimer's disease [24].

5 The Philosophical Foundations of Noetic Field Theory

John Bell stated that the division between classical and quantum is not one of size but a division between matter and mind [25]. He mistakenly thought that mind was immaterial; it has only seemed this way for the last three hundred years because the material aspects of the noumenon of consciousness have been hidden behind the nonlocal Planck barrier. If this were not so minds would not be safe from external influences and mental problems would be the norm rather than the exception and strong willed individuals would be easily able to harm weaker psyches. The noetic field of consciousness is mediated by Bosons, In the local brain these have been called corticons and psychons, the nonlocal Boson introduced by noetic field theory is called the noeon. This has been heretofore missed by the incompleteness of the standard model which is limited by the uncertainty

principle. Through a delineation of synchronicity by noetic field theory the noeton may be experimentally accessed through phase control laser interferometry [10]. In the past photons have been generally considered as arising from the electrodynamics of atomic structure. This is not the only topology able to release Bosons. Quantum cavity electrodynamics of the Planck scale vacuum backcloth also is mediated by photons - confined as gravitons in the case of matter [26,27], and noetons mediating nonlocal elemental intelligence with brain activity [4,11].

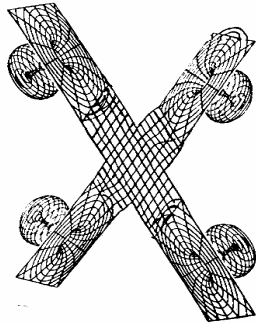


Figure 3 Snapshot or strobeshot of an x,y dimensional Planck scale string during compactification dynamics showing the rotational symmetry and spin exchange of confined gravitons (photons) producing spacetime curvature and noetons (photons) as they translate energy as simple harmonic oscillators, local time to nonlocal atemporality. Time and the z dimension are totally suppressed. The higher dimensions are not shown. This is a three dimensional diagram in two dimensions of a four dimensional object. Full discussion appears in [26,27].

Compactification was not fixed in an original big bang cosmology, but occurs outside of time. Time and Minkowski space are a product of our conscious reality. Local annihilation and recreation of all particles reveals the nonlocal propagation of the unified field as the quantum of action governs the flow of energy in all particle interactions and mediates time in the face of atemporality; this is the reason for the compactified dimensions. The extra degrees of freedom are needed to keep our perception of the external world smooth. Reality is like a standing wave composed of many dimensions. Plato's analogy of the cave [28] provides a good metaphor if applied to a movie theater. Reality is observed on the screen before us, but at the quantum level, the film in the projector is composed of discontinuous frames of celluloid. The discontinuity is not observed because it occurs at the Planck time of 10^{-40} seconds. Neither does reality fall apart because of the high order of magnitude the Planck energy.

Parting Gedankenexperimente: If it is assumed that consciousness is mediated by tensor noetons, the leading lightcone singularity is modulated by a phase of the twistor (or heterotic string) noeton field. Noetic field theory trivializes the hard problem and is the first theory to have practical applications for biosensors or sensory bypass transducers [19].

References

- [1] D. Bohm, A suggested interpretation of the quantum theory in terms of "hidden variables", I & II. *Phys. Rev.* 85 (1952), pp. 166-179 and 180-193.
- [2] J.G. Cramer, The transactional interpretation of quantum mechanics, *Rev. Mod. Phys.* 58 (1986), pp. 647-687.
- [3] D. Chalmers, Facing the hard problem of consciousness, *J. Consc. Stud.* 2 (1995), pp. 200-219.
- [4] R.L. Amoroso and B. Martin, Modeling the Heisenberg matrix: Quantum coherence & thought at the holoscape matrix and deeper complementarity, in J. King and K. H. Pribram eds., *Scale in Conscious Experience* (Lawrence Erlbaum, Mahwah 1995).
- [5] J.C. Eccles, Evolution of complexity of the brain with the emergence of consciousness, in K.H. Pribram, ed., *Rethinking Neural Networks: Quantum Fields and Biological Data* (Lawrence Erlbaum, Mahwah, 1993).
- [6] K.H. Pribram, *Brain & Perception* (Lawrence Erlbaum, New Jersey 1991).
- [7] D. Nanopoulos, *Rivista Del Nuovo Cimento* 17 (1994), pp. 1-53
- [8] M. Jibu and K. Yasue, *Quantum Brain Dynamics and Consciousness* (Benjamins, Philadelphia, 1995).
- [9] J. Searle, The problem of consciousness, in J. King and K.H. Pribrams, eds., *Scale in Conscious Experience* (Lawrence Erlbaum, Mahwah, 1995).
- [10] R.L. Amoroso, The production of Frohlich and Bose-Einstein coherent states in in vitro paracrystalline oligomers using phase control laser interferometry, *Bioelectrochemistry & Bioenergetics* 40 (1996), pp. 39-42.
- [11] R.L. Amoroso, Consciousness a radical definition: The hard problem made easy, *The Noetic Journal* 1 (1997), pp. 32-48.
- [12] R.L. Amoroso, *Noetic Field Theory: The Quantization of Mind*, book in progress.
- [13] R.L. Amoroso, The extracellular containment of natural intelligence: A new direction for strong AI, *Informatica* 19 (1995), pp. 585-90.
- [14] D. Koruga, Information physics: In search of a scientific basis of consciousness, in D. Rakovic and D. Koruga eds., *Consciousness: Scientific Challenge of the 21st Century* (ECPD, Belgrade 1986).
- [15] J.G. Watterson, A role for water in cell structure, *Biochem. J.* 248 (1987), pp. 615-617.
- [16] H. Fröhlich, Long-range coherence and energy storage in biological systems. *Int. J. Quant. Chem.* 2 (1968), pp. 641-649.
- [17] R. Feynman, Quantum mechanical computers, *Found. Phys.* 6 (1986), pp. 507-531.

- [18] R.L. Amoroso, Engineering a conscious computer, in T. Toffoli and M. Biafore, eds., *Proc. Fourth Workshop on Physics & Computation (Physcomp96)*, 1996, pp. 12-16.
- [19] R.L. Amoroso, The theoretical foundations for engineering a conscious quantum computer, in M. Gams, ed., *Mind Computer* (in Press).
- [20] C.G. Jung and W. Pauli, *The Interpretation of Nature and the Psyche* (Bollinger, 1955).
- [21] L.M. Ricciardi and H. Umezawa, *Kybernetik* 4 (1967), pp. 44-48.
- [22] C.I.J.M. Stuart, Y. Takahashi, and H. Umezawa, *J. Theor. Biol.* 71 (1978), pp. 605-618.
- [23] Y. Orlov, The logical origins of quantum mechanics, *Ann. of Physics* 234 (1994), pp. 245-259.
- [24] R.L. Amoroso, The psychogenic initiation of Alzheimer's disease, *Proc. WPA Conv.* (1992).
- [25] J. Bell, *Speakable and Unspeakable in Quantum Mechanics* (Cambridge Univ Press, Cambridge, 1987), p. 191.
- [26] R.L. Amoroso, The origin of cosmic microwave background radiation in the intrinsic fluctuation of vacuum compactification cavity electrodynamics, in G. Hunter and S. Jeffers, eds., *Causality and Locality in Modern Physics* (Kluwer Academic, Dordrecht, in press).
- [27] R.L. Amoroso, M. Kafatos, and P. Ecmovic, The origin of cosmological redshift in spin exchange between Planck scale vacuum compactification and nonzero rest mass photon anisotropy, in G. Hunter and S. Jeffers, eds., *Causality and Locality in Modern Physics* (Kluwer Academic, Dordrecht, in press).
- [28] Plato, *Plato: The Republic* (Penguin, 1955), p. 316.