Article

From Quantum Universe to Holographic Consciousness: The Spiritual Nature of Humankind

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Abstract

Recently, several people in Mexico have revealed their encounters with non-human intelligent beings. Many times, these encounters have the purpose of revealing information related to spirituality, consciousness and cosmology. The quantum consciousness paradigm explains that our consciousness is immortal, non-local and can work independently of the physical brain and supports a multidimensional view of the human mind. Experiments in altered states of consciousness have been conducted during decades to explore the quantum consciousness model paradigm mainly to induce states that distort time space perceptions to explore the multidimensional nature of consciousness. This article aims at showing how the teachings of the non-human intelligence contactee, Alberto Zecua, in Mexico support the idea of altered consciousness as way to alter our reality and several of the concepts of the quantum consciousness paradigm.

Keywords: Quantum information, holoinformation, consciousness, quantum entanglement, contactee, non-human intelligence, spirituality.

Introduction

We are living an extraordinary time in our civilization evolution, with the emergence of a fantastic holoinformational [24-31] quantum-holographic cosmovision wider than the quantum-relativistic paradigm of the beginning of the XX century [1-5]. Founded in Umesawa's **Quantum Field Theory** [69-70] and **non-local quantum information** that permeates all levels of the Cosmos, exhaustively and definitely proved in nowadays. The Second Quantum Physics Revolution of the last decade of the XX Century and the development of the **Physics of Information and Quantum Information Theory** [76,77,80] has demonstrated the quantum field is a ***Plenum***, the *"living void",* not a *vacuum,* full of quantum information and energy popping out of nothing, every billionth of trillionth of a second, self-organizing our universe, life and consciousness. It connects everything in the cosmos as a ***Unified Field of Consciousness*** [4,31] from quantum physics-chemistry, quantum biology and quantum mind, to quantum consciousness and quantum cosmology, all fine-tuned for the emergence of life and mind, showing that human evolution and the emergence of consciousness are the inevitable consequence of an intelligent holoinformational [24-25] universe.

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This holoinformational intelligent self-organizing field is continuously emerging from the *informational plenum,* that permeates all the Cosmos. In a metaphoric way, we can say this primordial quantum field, is a cosmic DNA, scattering ***"in-formation"* - active information with meaning -** through all the universe, creating galaxies, stars and supernovas generating by nuclear fusion atoms of carbon, nitrogen, oxygen, iron, phosphor *etc.*, that **in-form** life and intelligent beings astonished by all the beauty, elegance and harmony of this Cosmos. The fine-tuned biosignature, of this quantum non-local holoinformation field, is so evident and fundamental for the cosmic evolution and emergence of life, mind and consciousness, that it must be seen as a cosmic organizational principle with a *"status"* equal to matter, energy, space-time, and consciousness [68].

Paul Dirac, one of the fathers of quantum physics and discover of anti-matter describes it in these words:

> "*All matter is created out of some imperceptible substratum... the creation of matter leaves behind it a 'hole' in this substratum which appear as antimatter. Now, this substratum itself is not accurately described as material since it uniformly fills all space and is undetectable by any observation. But it is a peculiarly material form of nothingness, out of which matter is created".*
>
> In Grof [39], pg. 32

According to Capra [20] the quantum field is the fundamental physical entity, a continuous medium that permeates all space and takes the form of *quanta* or particles. it is responsable for the creation of all subatomic particles and its interrelations. Each particle is a different field and are condensations of energy that come and go and disapear in the subjacente field.

> *"The field exists always and everywhere; it can never removed. It is the carrier of material phenomena. It is the 'void' out of which the proton creates the pi-mesons. Being and fading of particles are merely forms of motion of the field" [20]*
>
> *"Matter is constituted by the regions of space in which the field is extremely intense. The field is the only reality"*
>
> Einstein *(apud Capra)*

According to David Kaiser [47] despite his many contributions to Quantum Mechanics, Albert Einstein accorded only *"transitory significance"* (pg 10*) t*o Quantum Physics, that he believed was incomplete *a cause* of being indeterministic, based in probabilities. Also, he couldn't accept the existence in the universe of an instantaneous quantum information, because in his Theory of Relativity of 1905, the fundamental limit of velocity in the universe was the velocity of light = 300.000 km/s. It is well known that he named quantum information non-locality "*spooky action at distance".*

In his surprising book *How the Hippies Saved Physics* [47], Kaiser wrote that Einstein told in a lecture at Oxford in 1933:

> *"I still believe in the possibility of given a model of reality, a theory, that is to say, which shall represent events themselves and not merely the probability of their occurrence".*

and in a letter to Born he was even more direct:

> *"Quantum Mechanics is certainly imposing. But an inner voice tells me that it is not yet the real thing. The theory says a lot but does not really bring us any closer to the secret of the 'Old One'. I at any rate, am convinced that He is not playing at dice".*

Kaisert tell us a fact not well known, that Einstein first inspired Schrodinger's about the entanglement idea:

> *"although it was not formally defined or called entanglement therein, the phenomenon of entanglement was first recognized by Einstein, Podolsky, and Rosen (1935), whose work inspired Schrodinger to investigate entanglement, and to give it its name. Einstein exchange a series of letters with Schrodinger in the summer of 1935 each egging the other on with his discontents over the direction quantum physics had taken. Building on suggestions from Einstein , Schrodinger crystallized their position through a thought experiment that came to be known as Schrodinger cat"[47, pg 11].*

In his book Kaiser reveals that Q*uantum Information Theory has a surprising psychedelic past,* showing*:*

> *"how a band of freewheeling physicists dubbing themselves the "Fundamental Fysiks Group" (organized by Elizabeth Rausher), defied the Cold War imperative to "shut up and calculate". Studying quantum entanglement and Bell's theorem through the lens of Eastern mysticism, psychic mind-reading, transcendental meditation, consciousness expansion and even using LSD to enhance their creativity, they helped to rejuvenate modern physics in the 1970's. ...The group's intense, unstructured brainstorming sessions planted seeds that would eventually flower into today's field of quantum information Science".*

Most known members of this "freewheeling" Fundamental Physics Group were Jack Safartti author of Cosmos, Elizabeth Rauscher co-author with Richard Amoroso, of *The Holographic Anthropic Multiverse*, Saul-Paul Sirag, autor of *Consciousness: A Hiperspace Theory,* Nick Herbert, author of *Quantum Reality*, Fred Alan Wolf, author of *Quantum Jump*, Fritjof Capra, best known by his best-seller *The Tao of Physics*, Gary Zukav, author of *The Dancing Wu Li Masters*, Henry Stapp, author of *Mindful Universe* and others.

> *"Their work instigated major breakthroughs that - with hind sight - we may now recognize as laying crucial ground work for quantum information theory"* [47]

Timeless Consciousness

Quantum Information Theory, the Physics of Information [76,77,80] and non-locality are proved in modern physics experiments in quantum and macroscopic world, showing instantaneous interactions between all phenomena in the universe. When a non-local phenomenon occurs it instantaneously influences another spacetime region without any energy exchange, because according to Umesawa [70], it is located out of spacetime. In 1982 French physicist Alan Aspect [7], proved experimentally and definitely the existence of non-local actions between two photons emitted by an atom, and in 1997 Nicholas Gisin [38] from the Department of Physics of the University of Geneva in Switzerland, proved the existence of non-locality in macroscopic scale between two localities in Switzerland.

There is a cosmological experiment envisioned by Wheeler, in with a quasar billions of light-years distant from Earth has its light bend by an intervenient galaxy massive enough to bend the light path acting as a gravitational lens. Some photons from that source would travel directly to Earth and others would travel another route starting in a direction away from the Earth but getting bent back toward the intervening galaxy. The researchers using the delayed-choice setup could decide to measure by which route an individual photon traversed the cosmos (direct or via the path-bending galaxy) or could decide to measure the quantum interference that comes by traversing both paths. "But the photon has already *passed* that galaxy billions of years before we made our decision. "It was as if we decide what the photon *shall have done* after it has *already* done it", Wheeler [77] emphasized: *"our decisions today can determine the past of a particle that was emitted long before there was even life on Earth"*. Also, China researchers claim in the media, to have proved entanglement between two lasers send to Earth from a satellite orbiting the moon.

I have been proposing since 1998, when I coined the term **holoinformation** that the informational entanglement of our quantum-holographic brain with the quantum holographic space-time is how consciousness acts through the universe. In 1998, during the **Symposium Science and the Primacy of Consciousness** [24] in Lisbon, Portugal, organized by Karl Pribram, Stanislav Grof, Amit Goswami and Ruppert Sheldrake, I first proposed that consciousness is non-local quantum information with a status equal to energy, matter, and space-time:

> **"*quantum information and consciousness are intrinsic, irreducible and non-local, properties of the universe, as energy, matter and spacetime, capable of generate order, self-organization and complexity*** [21]

Stonier [68] developed a simile perspective:

> "*Information is the cosmical organizational principle with a "status" equal to matter and energy"*

The comprehension of consciousness-universe interconnectedness [29-33,48] is the most important change of paradigm of all times about Human Nature and Consciousness in Western Philosophy and Science.

Contemporary New Physics and consciousness researchers also see information and consciousness as fundamental dimensions of the universe:

Nobel Laureate Eugene Wigner [in 76] nuclear physicist whose work was fundamental for quantum mechanics and for the development of atomic bomb, in 1967 created a mental experience that has come to be known as *Wigner's Friend* showing that only a conscious person can make a observation and "collapse" the wave function, an experimental fact today proved in quantum labs. Experimental data show that the observer, the process of observation and the observed are an indivisible unity. Surprisingly some thousand years ago this unity was already intuitively apprehended by means of meditation by the spiritual Vedanta philosophers of India that call it *Samhita*, sanskrit designation for the impossibility to separate the observer from the observed. According to Wheeler and Zureck, Wigner concluded that:

> *Consciousness enters the[quantum] theory unavoidably and unalterably* (Wigner, *"Remarks on the mind-body question*", reprinted in Wheeler and Zureck [76])

Wheeler [77] developed a brilliant and elegant information participatory universe model that connect quantum information theory to consciousness, expressed in his **"it from bit'** concept:

> *"...every it — every particle, every field of force, even the space-time continuum itself — derives its function, its very existence, entirely — even if in some contexts, indirectly — from the apparatus-elicited answers to yes–or–no questions, binary choices, bits... When a photon is detected by a photodetector we ask the yes–or–no question and we say 'a photon did it'. We know perfectly well that the photon existed neither before the emission nor after the detection… The yes or no that is recorded constitutes an unsplitable bit of information" ...* "*it from bit* is an idea that every item of the physical world *has an immaterial source and explanation. Reality arises in the last analysis from the yes–no question and the registering of equipment evoked responses and* ***all things physical are information-theoretic in its origin*** *and that this is a* ***participatory universe****".*

Studying quantum gravity in black holes, Wheeler could conclude that quantum information is more fundamental in the universe than energy, matter and space-time.

In Wheeler's ***Participatory Universe*** the **observer is co-creator of the universe:**

> *"Quantum mechanics has forced us to take seriously, and to explore the point of view, according to which the observer is as essential to the creation of the universe, as the universe is to the creation of the observer*."[77]

Wigner's and Wheeler's ideas that consciousness and information create reality, is proved in nowadays quantum lab experiments showing that quantum physics surprisingly can be reduced to Psychology [65]! This **Primacy of Consciousness** [24] reveled by our Scientific Era is confirming the ancient Vedic tradition of India from 6000 years ago that claim:

Consciousness is the ground of all being

This cosmovision of consciousness as a primary principle of existence is also seen in Philosophy, Medicine and Psychology, as Aldous Huxley show in his *Perennial Philosophy,* and Stanislav Grof [39], psychiatric and consciousness researcher, father of Transpersonal Psychology states:

> *"The findings of my research and contemporary consciousness research in general essentially confirm and support the position of ancient teachings like Vedanta, Hinayana and Mahayana Buddhism, Taoism, Sufism, Gnosticism, Christian mysticism, Cabala and many others sophisticated spiritual systems. They are thus in radical conflict with the most fundamental assumptions of materialistic science concerning consciousness, human nature, and the nature of reality. They clearly indicate that* ***consciousness is not a product of the brain, but a primary principle of existence,*** *and that it plays a critical role in the creation of the phenomenal world. This research also radically changes our conception of the human psyche. It shows that in its farthest reaches,* ***the psyche of each of us is essentially commensurate with all the existence and ultimately identical with the cosmic creative principle itself****.*

In the next paragraphs I will be showing the Cosmos as an intelligent quantum informational non-local holographic process, an entropic dissipating self-organizing energy order [43], fine tunned for the emergence of life and consciousness through a cosmic informational universal code.

The Cosmic Informational Code

What self-organizes significantly the cosmic evolution is the relationship between the universe's information quantum content, and the physical entropy, a process in which information and energy goes on dissipating as demonstrated by Prigogine`s self-organizing dissipative structures (below), creating higher levels of organizations until reach a complex self-consciousness order. This complexity process is continuously creating the

Self-Organizing Domains of Cosmic Evolution

Cosmosphere

In this domain Information complexity self-organizes galaxies, stars, and planets with q**uantum** I**nformation coded in atomic-nuclear structures.** It is the **Physical level** of the Cosmos evolution.

Biosphere

In this domain **c**omplexity intensifies with the emergence of self-organizing macromolecular systems of life. **Quantum Information is stored in DNA, RNA, and protein molecules controlled by a genetic memory code.** It is the **Biological and Biosocial level** of the Cosmic Intelligence.

Noosphere

The domain of ideas. Information reach a high negentropic state of complexity with the emergence of the **Brain-Mind Code** that interconnects continuously with the quantum-holographic information level. It is the conscious level of the self-organizing cosmos. **Information is stored in neural networks,** and neuronal dynamics depends on DNA, RNA, neurotransmitters, peptides and ions like Na K, Ca, Mg. It is the **Neuropsychological and Socio-Cultural level of human cosmic civilization.**

Technosphere

A sublevel of the Noosphere domain that is complexifying very rapidly in our times, with information computer technology, artificial intelligence systems, bioengineering, stem cells, molecular genetics, nanorobotics etc. It is mixing humans and information technology and will progressively transform us in a hybrid cyborg species. **Quantum Information is stored in artificial intelligence systems, hardware, software and internet.** It is the **Technological Level** of our civilization.

Consciousnessphere

The higher and more complex self-organizing level of the Cosmos.
It is a **quantum non-local holographic information field** interconnecting our mind to the self-organizing intelligent universe. It is the **holoinformational *plenum*** interconnecting the non-local quantum-holographic spectral dimension of frequencies (Bohm's *Implicit Order*- see below*)* with our holonomic brain-mind. **Information is stored in the quantum-holographic universe and in the non-local quantum-holographic neural fields web.** It is the **Spiritual Level** of the universe evolution that reconnect us with our cosmic source, as is claiming all world religions (from Latin *religio, religare)*. It is the Oneness of Mind described in the Upanishads.

Quantum Information, Entropy and Consciousness

In previous works [23-26,28] I put forward the ideas of Wiener (78,79], Shannon (apud Atlan [8]), Szilard and Brillouin [19], Schrodinger[66], Prigogine´(61-64) and Vedral (71) about entropy, order and information, as foundations for my quantum holoinformational model of consciousness. Leon Brillouin in 1953 demonstrated with a celebre equation the equivalence of information and negentropy showing that changing an information bit value requires at least kT ln(2) energy. He could offer a solution to the problem of the imaginary *Maxwell Demon,* proposed by the physicist James Clerk Maxwell in 1867, that Leo Szilard demonstrated produces energy that hypothetically violate the second law of thermodynamics. Landauer (apud Bennet [12]) erasing a bit of information, found the same energy quantity and further concluded that any change of a bit value (measurement, decision about a yes/no question, erasure, display, etc.) will require this same amount, kT ln(2), of energy.

Information about a system is associated with negentropy and therefore setting up a bit of information in a system results in a local entropy reduction. According to Brillouin there is no violation of the second law of thermodynamics, as a reduction of entropy in a system's results in increase in environment entropy . This relationship between energy negentropy and information formulated by Brillouin show also a connection between the amount of bits in the brain and the

energy it is processing during cognition and memory. Developments of ***"Information Physics"***, by physicist Wojciech Zurek [80], could demonstrated this with his concept of **algorithmic entropy**. He propose the physical entropy would be a combination of two magnitudes that compensate each other: the observer's ignorance, measured by Shannon's ***statistical entropy***, and the order degree of the observed system, measured by an ***algorithmic entropy*** the smallest number of bits needed to register it in memory. During measurement, the observer's ignorance decrease by the increase in bit numbers in his memory, remaining however, constant the sum of these two magnitudes, the ***physical entropy***.

Zureck could infer a ***Law of Conservation of Information***, more fundamental than the Law of Conservation of Energy. In this informational view of the universe, the quantum universe changes because the observer's mind unleashed a transfer of information at a subatomic level.

Shannon, apud Atlan [8] could demonstrate in his Theory of Information that his information equations is like Boltzman's Thermodynamics negative entropy, linking classical Informaton Theory to Thermodynamics.

Norbert Wiener [78,79] put this identity on the conceptual basis of cybernetics stating that:

"Information represents negative entropy",

and emphasizing that

"information is information, not matter or energy".

Erwin Schrodinger founding father of quantum mechanics in his seminal book *What is Life?* [66] based on lectures delivered in 1943 at the Dublin Institute of Advanced Studies, in Trinity College, established two diferent *'mechanisms'* by which orderly events can be produced:

> *"the 'statistical mechanism' which produces 'order from disorder' and a new one, producing 'order from order'"*

i.e., order from complex organization and information, that explains the living matter, and whose priority of explanation, according to him, must be give to Max Planck that in a little paper '*The Dynamical and the Statistical type of Law*' already stablished this distinction as Di Biase show in Auto-organização nos sistemas biológicos [23]. Schrodinger in another seminal lecture, The Tarner Lectures delivered at Trinity College, Cambridge, in october 1950, published together with What is Life? as Mind and Matter [66], affirm :

> *"the reason why our sentient percipiente and thinking ego met nowhere within our scientific world picture can easily be indicated in seven words cause it is itself that world picture. It is identical with the whole and therefore cannot be contained in it as a part of it. Here we knock against the aritmetical paradox; there appears to be a great multitude of conscious egos, the world however is only one... there is obviously only one alternative, namely the unification of minds or consciousness. This is the*

> *doctrine of the Upanishads. And not only of the Upanishads as we can see in The Perennial Philosophy of Aldous Huxley'.*

For Schrodinger this unification of consciousness is the ***Oneness* of Mind** we can see in the Vedic spiritual philosophy of the Upanishads.

Order, Negentropy, Information and the Order from Noise Principle

The equivalence between order, negentropy and information, is the natural way to understand the organic flow of information in the cosmos, organized in a meaningful and intelligent mode. In the classical thermodynamic theory, the definition of order is probabilistic and dependent on the entropy concept, that measure the disorder of a system, but this reduces to uncertainty the imense beauty of the natural meanings, uncertainty we can see also in Shannon's information theory.

Atlan [9] and Di Biase [24-28], since some years are proposing that:

> *"Entropy shouldn't be understood as a disorder measure, but much more as a measure of complexity"* [24].

We can consider information as the bit capacity of a physical system as in Shannon's theory, or the meaning content conducted by the bits. In Shannon`s information theory the meaning, the order, is the information that is missing, the uncertainty about the system. Atlan [9] relating this uncertainty to the variety and the non-homogeneity of the system could solve certain logical paradoxes of self-organization and complexity, defining organization in a quantitatively formal mode showing the system's order is a commitment between the maximum informational content, the maximum variety, and the maximum redundancy. In his bright book about the organization of the living systems, Atlan [9] describes order as a noise function, a "*hasard organisationnel", i.e.,* an "*organizational change"* as in Von Foerster's [72,73] celebre O*rder From Noise Principle.* Complex systems like organisms have necessity of a certain level of indeterminacy to adapt to a certain level of noise. Heinz Von Foerster [72] could demonstrate that

> *"In self-organizing systems with a suficient level of redundance and reliability, when we introduce a noise, it has an enriching caracter, not a disturbing or destructive one".*

This self-organizing systems property of incorporate noise in its structure without being destroyed by it, led the matematician John Von Neumann [74] to stablish that this capacity is consequence of a fundamental qualitative difference in the logic of the organization of the system. He could define the necessary conditions for the development of artificial self-organizing systems (or *self-reproducing automata*) with better reliability than its components:

1- Structural redundancy
2- Functional redundancy
3- Complexity of structure
4- Distribution of functions

Biological organisms are self-organizing systems with high structural redundancy, *i.e.*, repetition of structural componentes, and high functional redundancy, *i.e.*, the capacity for execution of a logical function in various levels of the system with mutual control. Systems like this, can function with exponential reliability, being capable of react to random environment disorder reducing its redundance and reliability without stop its functioning, and in some instances the noise and the disorder can be surprisingly enriching and regenerative. According to Schrodinger [66], living systems *"feed themselves with negative entropy", i.e.*, with order, organization. Heinz Von Foerster [72-73] add to Shrodinger's quotation :

"But they also found noise in its menu"

Jean Piaget [52] in the last paragraph of his book A*daptatioVitale et Psychologie de L'intelligence* makes a bright critique to Atlan's terminology of organizational change ("*hasard organisational"*) that he thinks must be named ***reorganized change* (*"hasard reorganize"*)** *by the living being, as it only provoque organizing compensations ("compensees or surcompensees").* He sumarizes his reorganized change idea in this paragraph:

> "*In a word, the apple that fall at the side of Newton a trivial accident for an observer, was not the source of the theories of this great man about gravitation: it becomes organizational in Newton's brain transmitions because of his anterior work and his powerfull assimilation*" (pg 108-109).

Vlatko Vedral [71] in his beautifull book *Decoding Reality* show also how Shannon`s entropy relates to physical entropy, information and quantum information:

> *"Physics presents a mathematical formulation of entropy by looking at all possible states that will occur with a certain probability that can be inferred from experiments or from some other . The logarithm of these probabilities is then taken and the total entropy of the system tells us its degree of disorder:*
>
> *S = k log W (Boltzman thermodynamic equation).*
>
> *Physicists recast the Second Law into the principle that the entropy of a closed system (such as the universe) always increases… Amazingly, this entropy derived by physicists has the same form as the information-theoretic entropy derived by Shannon. Shannon derived his entropy to convey the amount of information that any communication channel can carry. So we can look at the physicists' concept of entropy as quantifying the information content of a closed system. The Second Law then simply says that the system evolves to the state of maximal information, where no new information can be contained".*

Vedral could develop a **quantum informational theory** of the universe in which everything including us, are information. He retakes the profound correlation between entropy and the celebrated theorem of Brillouin that relates information to negentropy applying this correlation reformulated to the quantum universe.

Information self-organization and consciousness are connected at the level of meaning, not at the level of *"bit capacity"* :

> *"As the classical theory of information is situated at the level of 'bit capacity' it would seem unable to provide the proper connection to consciousness"...and "we can begin to move towards a more radical view of the fundamental nature of consciousness with a move towards a more radical view of information"*. (Seager [67])

In Di Biase`s [24-30] holoinformational model of consciousness what self-organizes in a meaningfull way the cosmic evolution, is the relationship between information-energy dissipation, negentropy,and the universe's quantum informational content. We see this in Prigogine's **self-organizing dissipative structures** that allows the emergence of novel structures from chaos.

Quantum Consciousness and Dissipative Structures

Ilya Prigogine, [61-64] Nobel Prize winner, developed an extension of thermodynamics that shows the second law can allow the emergence of novel self-organizing structures from chaos. This self-organization process generates ***dissipative structures*** created and maintained through the energy's exchanges with the environment in non-equilibrium conditions. It is dependent upon a new order, called by Prigogine ***"order from fluctuations"***, which corresponds to a *"giant fluctuation"* stabilized by the exchanges with the environment. The structure is maintained through an energy-information dissipation that displaces itself, simultaneously generating (*in-forming*) the structure through a continuous process. The more complex the dissipative structure, more information is needed to keep its interconnections, and more vulnerable it is to internal fluctuations. This means a higher instability potential and higher reorganization possibilities.

For Prigogine [64], *"the inclusion of dissipation leads to a drastic change in the concept of stability... When we drive a system far from equilibrium, the "atractor" which dominated the behaviour of the system near equilibrium may become unstable, as a result of the flow of matter and energy which we direct at the system. Nonequilibrium becomes a sourcre of order, new types of attractors my appear, and give to the system remarkable new space-time properties, be it classical or quantum"*]. Prigogine could develop a mathematical quantum theory showing that

> *"Irreversibility leads to a well defined form of non-locality", pg 207 [64]*.

In Prigogine's theory fluctuations generates disequilibrium and reorganizations:

> "*If fluctuations are small, the system adjustes to them and does not change its organizational structure. If the fluctuations reach a critical size, however, they cause disequilibrium in the system, generating new intra-systemic interactions and reorganization. The old patterns interact between themselves in new ways, and establish new connections. The parts reorganize themselves in a new whole. The system reaches a higher order"* [61].

Nature, Quantum-Holographic Information and Consciousness

Like Einstein I see the "*Old One"* intelligence expressed in Nature's harmony and self-organization. Pierre Weil rector of UNIPAZ- International Holistic University in Brasilia, in the preface of my book *O Homem Holistico,* from 1995*,* synthetizes Nature's intelligence with this bright affirmation*:*

"*The Intelligence of Nature is the nature of intelligence"*

I understand Consciousness as intelligent information at the moment of its generation, in a self-organizing universe. My Holoinformational Theory of Consciousness , integrating intelligence and human quantum-holographic consciousness to the non-local quantum-holographic informational tessitura of the universe, could solve Chalmers *hard problem* [21] of consciousness.

The universe is us and is taking conciousness of itself through our mind!

Carl Sagan, In *Cosmos: A Personal Voyage,* describes our relationship with the universe in a simile way:

We are a way for the Cosmos to know itself"

One of the pillars of the Holoinformational Theory of Consciousness is the quantum holographic theory of the holomovement developed by David Bohm and its relation with consciousness[14-18], I show bellow. It demonstrates the existence of a spectral, implicit order in the universe, a primary informational reality from which matter, life and consciousness originate.

The Quantum Holographic Information Universe

Bohm (14,15,16] Bohm and Peat [15]and Bohm & Hiley (18) show that in Bohm's Quantum-Holographic Theory the universe is a quantum holographic entangled reality, constituted by a dimension of frequencies, a ***implicit order***, continuously interconnected by a non-local information ***holomovement*** to a holographic ***explicit order***, our universe reality. Bohm developed this quantum -holographic model of the universe adding to the quantum field equations a new ***Quantum Potential*** that satisfies Schrödinger's equation, that depends on the form but not on the amplitude of the wave function. This quantum potential or *pilot wave* carries ***'active information'*** that ***'guides'*** the particle along its way. The global quantum field fluctuation originates the particle and the quantum potential carries information about the environment of the particle **in-forming** its motion. The *implicate order is* continuously unfolding in the *explicate order* (our space-time universe) and enfolding again in the implicate order by means of the *holomovement*. Later, Bohm proposed a ***superimplicate order,*** as he explained to Weber [75] in 1982:

> *"the implicate order is a wave function, and the superimplicate order or superior informational field, is a function of the wave function, i.e., a super wave function that makes the implicate order non-linear by organizing it in complex and relatively stable structures"... "The superimplicate order allows us to understanding* ***consciousness, energy and matter as expression varieties of a same informational order****".*

This interconnected and indivisible universe made of quantum-holographic entangled information is not limited by space-time. Umesawa [70] demonstrated in his Quantum Field Theory that this field of non-local information is situated out of space-time interpenetrating everything in the cosmos instantaneously! This q**uantum non-local in-formation field with meaning** originates the quantum-holographic universe, and self-organizes our **quantum-holographic consciousness.** They are fundamentals processes for the self-organizing fabric of Nature that through quantum entanglement is binding space-time togheter, as I show bellow.

Quantum Entanglement of Consciousness and Spacetime

Maldacena has demonstrated that spacetime is created through quantum entanglement (for more details see Di Biase[33]). I have been proposing since 1998 [24-33], that our quantum-holographic holoinformational consciousness is co-creator of the quantum holographic spacetime nature of the cosmos. Maldacena's mathematic calculations show that Einstein-Rosen's bridges (wormholes) are created through quantum information entanglement. As consciousness is quantum information this confirm my ideas, that consciousness creates spacetime through quantum information entanglement.

This universe seems to be functioning more as a Universal Mind, than as a clock mechanism as Sir James Jeans already perceived in the 50's. Brian Josephson [46], Nobel Prize in Physics, believes that David Bohm theory of the implicate order can even lead someday to the inclusion of God in the science network. Our holoinformational consciousness interpretation (see below) which has in Bohm's quantum theory one of its very foundations, implies the inclusion in science's framework of a Holoinformational Model of the Physical Observer (24-33) and a **Universal Unified Field of Consciousness** [31-32], that is a **Universal Intelligent Field** that originates, permeates and maintains life and mind in the universe.

According to Anil Ananthaswamy [6], Susskind discovered a relationship between entropy and area in black holes, as a consequence of entanglement showing that quantum entanglement is a form of information and space-time is a manifestation of quantum information. In this article he describes that in 1999 Jacobson developed an elegant argument showing that entropy multiplied by temperature is the energy of a system and a simple energy - entropy relationship can become Einstein's gravitational equation relating mass, energy, space-time, and quantum information theory. He also relates that In 2001 Juan Maldacena had a powerful insight revisiting a paper written in 1935 by Einstein and Rosen showing that black holes connected by a shortcut form wormholes, and could demonstrate that the wormhole would only form if the blackholes were quantum-entangled in the outsides:

> *"Space-time is really just some geometrical manifestation of entanglement, showing a very close connection between quantum mechanics and space-time, and the continuity of space-time which seems to be something very solid, could come from the ghostly properties of entanglement".* (Maldacena, apud [6])

This is a revolutionary conclusion that show **quantum entanglement is what binds space-time together!!**

I am talking about black holes, entropy and information because the physics theories of quantum gravity and quantum entanglement of space-time are theories of the organization of information and can be connected to quantum information consciousness, unifying matter and mind.

Doug Matzke[51], *s*tates that quantum information research supports consciousness as information:

> *Recent research in the unification of quantum gravity theories for black holes has proven that information is primary to the structure of quantum mechanics and therefore introduces an "It from Bit" perspective for the universe that has relevance for consciousness. This understanding of quantum information being more fundamental than energy/matter or even space/time, requires the adoption of an energy/information duality for quantum states and consciousness.*

Sir John Eccles Solution of the Mind-Brain Paradox

Nobel Prize winner Sir John Eccles [34-37] developed a **Interactionist-Dualist Theory** of mind and brain interaction that explain in a brilliant, beautiful and elegant synthesis, how through microsites called **dendrons** the physical brain interact with the mind side by way of quantum microsites he called **pychons.** In Eccles interactionist-dualist theory brain **dendrons** are made of fine fibers teledendrons that goes from the synaptic distal part of axons to connect to dendrites, making a dense polarized oscillatory web (teledendronsynaptic web) [35,58,59]. This oscillatory web interacts with the mind psychons.

Sir John Eccles could demonstrate these psychons operate on synapses through quantum processes, and with Beck [10] developed an elegant bright quantum interpretation of the synaptic function showing how mind intention can induce a probabilistic liberation of neurotransmitters (exocytosis) in the synaptic cleft vesicles. It functions in the same way as in quantum labs the observer mind intention induces a probabilistic collapse of the wave function during observation or measuring. Eccless describes how thousands of vesicles in each one of millions of dendrons in a concerted effect interconnect to psychons .

With physicist Beck[10], Eccles could demonstrate the **psychons are probability fields not physical particles** that according to Liu [50]:

> *"provide a mathematical structure in which the dendrons operate specifying for the physical brain the probabilistic expectations of the mind".*

According to Eccles, the extent of the mental event is only to select vesicles which already have a probabilistic profile of likelihood of firing and influence the probability of firing in the direction of mind`s intention. He developed with Beck a quantum interpretation of the synaptic function showing how a mental intention can induce a probabilistic concerted dendrons liberation of neurotransmitters in the synaptic cleft through a wave-function collapse.

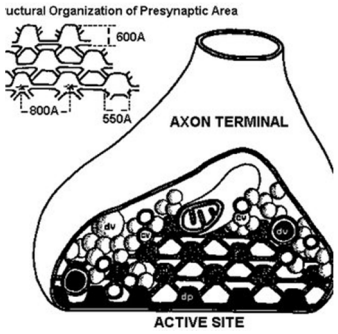

Figure 1. A representation of the synapse and synaptic grid where neurotransmitter vesicles are released by quantum tunneling of electron transmission. The tunneling mechanism is believed to be the trigger action of intentional mental activity or the site of the mind-body connection (from Eccles [35]).

According to Beck and Eccles [10] *"the trigger mechanism from which exocytosis can occur is modeled by the motion of a quasiparticle with 1 degree of freedom along a collective coordinate, and over an activation barrier. This motion sets in by a quantum mechanical tunneling process through the barrier (similar to radioactive decay). This estimate shows quite clearly that a quantum mechanical trigger for exocytosis must reside in an atomic processe.g., the movement of a hydrogen bridge by electronic rearrangement. To make the model quantitative, we attribute to the triggering process of exocytosis a continuous collective variable, q, for the quasiparticle... The time-dependent process of exocytosis is described by the one-dimensional Schrodinger equation for the wave function*"

As Psychons are not a physical entity but a mental unit manifested by probabilities fields [50], the liberation of neurotransmitters is a quantum tunneling process and can be calculated by Schrodinger`s quantum equation. **In this way, Eccles and Beck could solve the brain-mind interaction paradox without affect the thermodynamic energy conservation law**.

These quantum phenomena can be occurring in the wet brain at environment temperature in the same way the antenna protein protection of excitonic coherence dynamics occurs in photosynthesis and in the aqueous tunneling pathways between electron-transfer proteins [13-49]. Quantum coherence phenomena is a common process in Nature at elevated temperature.

Pribram`s Quantum-Holographic Brain

Karl Pribram[54-60] could demonstrate that the fields of distributed activity in the electromagnetic interference patterns around neurons (Eccles dendrons) are wave holographic patterns we can calculate by means of Gabor function. Gabor holographic function is based in the interference patterns of waves that can be calculated by an inverse Fourier equation. In this process each part of the information system contains the whole system information in a distributed mode, that can be instantiated as a holographic image.

Pribram's [56-60] holonomic neural network equation is simile to Schrödinger's wave equation, with the addition of Bohm's quantum potential [32], and this lead me to propose an elegant brain-mind-universe holoinformational quantum holographic entanglement. Pribram could calculated the holographic patterns in the interference fields of the oscillatory polarized dendrons of Eccles, showing that the information is holographically distributed in the whole brain cortex as a neural holographic network he could calculate. Pribram's neural wave equation is very simile to Schrodinger's quantum wave equation. Bellow I show Schrodinger's and Pribram's comparable equations :

Here is the simple Schrodinger equation:

$$i\hbar\frac{\partial}{\partial t}\psi = \hat{H}\psi$$

And here is the comparable Neural wave equation, from Pribram [55], in an apêndix at page 285.

$$i\nu\frac{d}{dt}\psi_r = K_r$$

K is the neural wave generator. And K is equal to

$$K = -\frac{\nu^2}{2}\Delta U_{ex}$$

U_{ex} is static potential from Kato (1964).

(From my chapter *The Holoinformational Foundations of Consciousness*, In Biophysics of Consciousness - A Foundational Approach, edited by Roman R. Posznanski, Jack A. Tuszynski, and Todd E. Feinberg [53]).

Pribram show Eccles' dendrons oscillatory receptive fields as forming ***"holoscapes"***

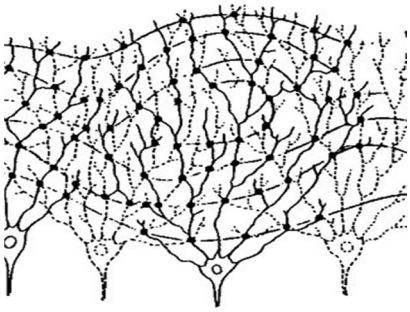

Figure 2. An idealized portrait of an Holoscape made of dendrons as conceived by Pribram [57]
"The contour forming such a holoiscape are embodied in the microprocess of polarization occurring in dendritic networks, consisting of a sub and transneuronal manifold" ..."receptive fields in cortical units are wavelet-like patterns as Gabor Elementary Functions. Gabor's Quanta of Information used the same mathematics as Heisenberg in quantum microphysics. Here they define processes in the material brain. Gabor invented his function, to find the maximum compressibility of a telephone message 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. ***There is an interactive mind/matter duality that is a "ground" from which both matter and mind are "formed" and the "dual" emerges"*** [60].

For Pribram (60) this common "ground" is a ***potential reality*** and when a potential is realized :

> *"**information (the form within)** becomes unfolded into ordinary space-time appearance; in the other direction, the transformation enfolds and distributes the information by the holographic process. Because work is involved in transforming, descriptions in terms of energy are suitable, and as the structure of information is what is transformed, descriptions in terms of entropy (and negentropy) are also suitable".*

We can affirm that the Fourier and Gabor relation ensemble quanta of information of neurodynamic functioning into a dynamic phase space.

Pribram's brain-mind holographic consciousness and, Bohm's quantum-holographic universe are entangled in a distributed quantum holographic non-local holoinformational universal mode. For Bohm, Wigner, Wheeler, Vedral, and Di Biase, we live in a cosmos made of quantum information and consciousness. **The foundation of consciousness is the very deep non-local informational organization of our quantum-holographic universe-brain-mind interconnectedness.**

Consciousness and quantum information are the fabric of reality

With Jibu and Yasue [44,45], Pribram also developed a model of brain function called **Quantum Brain Dynamics** (QBD) based in Stuart, Takahashi and Umesawa`s quantum physics of the brain [69}:

> *"brain dynamics consists of quantum brain dynamics (i.e. quantum mode) and classical brain dynamics (i.e. classical mode), and quantum brain dynamics is the fundamental process of the brain given by quantum field dynamics of the molecular vibrational fields of water molecules and biomolecules"*

According to Jibu and Yasue [44], Umesawa introduced in quantum brain dynamics the notion that the quanta of the molecular vibrational field of biomolecules are corticons, and the quanta of the molecular vibrational field of water molecules are exchange bósons.

Quantum coherence can propagate through these vibrational fields of biomolecules and water molecules by means of non-local information transfer tunneling [13], quantum coherence in brain microtubules [40-41], quantum entanglement, the Frolich Effect , Bose-Einstein condensates and superradiance. These biomolecular systems are self-organized systems, that have a huge structural and functional redundance, and also creates a quasi-crystalline médium that facilitates the interconnection of the molecular quantum networks dynamics with the neuronal classical network [42].

Putting all together, Umesawa's quantum field, Bohm's quantum holographic physics, Susskind and Maldacena's conclusion that space-time is a manifestation of entanglement, Eccles quantum mind and the experimental data of Pribram's holonomic brain theory, I propose an holoinformational universal quantum-holographic consciousness field. A universal entanglement in which each part of the universe, each brain-consciousness, interconnects with all the quantum information stored in the holographic patterns distributed in the whole cosmos, in an indivisible irreducible informational brain-cosmos unity.

A universe conceived as quantum-holographic non-local information with consciousness is a wider, holistic, non-dualist, spiritual cosmovision, that transcends the classic materialistic Cartesian-Newtonian paradigm. It reconnects our scientific knowledge to the wisdom of the ancient spiritual philosophies of mankind that saw man always interconnected with the cosmos.

The beautiful buddhist metephor for of Indra's Net [22] wrote some 2500 years ago, reflects in its poetry this holoinformational nature of the universe:

> *In the heavenly abode of the great god Indra, there is a wonderful net which stretches out indefinitely in all directions. There is a single glittering jewel at the net's every node, infinite in number. If we select one of these jewels and look closely at it, we will discover that in its polished surface there are reflected all the other jewels in the net, infinite in number. Each of the jewels reflected in this one jewel is also reflecting all the other jewels, so that the process of reflection is infinite.*

This metaphor show a Cosmos with an infinite network of holograms, in which each part of this holographic system contains the information about all the others, every one defining and maintaining all others.

> *The Cosmos is a self-referent self-maintaining and self-creator organism. It's also non-teleological, because don't exist a beginning of time, nor a concept of creator, nor a questioning about the purpose of all. The universe is conceived as a gift, without hierarchy: It has not a center, or maybe if exists one, it is in every place* (Cook[22])

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