

Conversations from the Edge: Quantum Consciousness

Monday, June 28, 2010 – *the catalyst...*

Quantum Entanglement Holds DNA Together, Say Physicists

A new theoretical model suggests that quantum entanglement helps prevent the molecules of life from breaking apart.

There was a time, not so long ago, when biologists swore black and blue that quantum mechanics could play no role in the hot, wet systems of life.

Since then, the discipline of quantum biology has emerged as one of the most exciting new fields in science. It's beginning to look as if quantum effects are crucial in a number of biological processes, such as photosynthesis and avian navigation which we've looked at here and here.

Now a group of physicists say that the weird laws of quantum mechanics may be more important for life than biologists could ever have imagined. Their new idea is that DNA is held together by quantum entanglement.

That's worth picking apart in more detail. Entanglement is the weird quantum process in which a single wavefunction describes two separate objects. When this happens, these objects effectively share the same existence, no matter how far apart they might be.

The question that Elisabeth Rieper at the National University of Singapore and a couple of buddies have asked is what role might entanglement play in DNA. To find out, they've constructed a simplified theoretical model of DNA in which each nucleotide consists of a cloud of electrons around a central positive nucleus. This negative cloud can move relative to the nucleus, creating a dipole. And the movement of the cloud back and forth is a harmonic oscillator.

When the nucleotides bond to form a base, these clouds must oscillate in opposite directions to ensure the stability of the structure.

Rieper and co ask what happens to these oscillations, or phonons as physicists call them, when the base pairs are stacked in a double helix.

Phonons are quantum objects, meaning they can exist in a superposition of states and become entangled, just like other quantum objects.

To start with, Rieper and co imagine the helix without any effect from outside heat.

"Clearly the chain of coupled harmonic oscillators is entangled at zero temperature," they say. They then go on to show that the entanglement can also exist at room temperature.

That's possible because phonons have a wavelength which is similar in size to a DNA helix and this allows standing waves to form, a phenomenon known as phonon trapping. When this happens, the phonons cannot easily escape. A similar kind of phonon trapping is known to cause problems in silicon structures of the same size.

That would be of little significance if it had no overall effect on the helix. But the model developed by Rieper and co suggests that the effect is profound.

Although each nucleotide in a base pair is oscillating in opposite directions, this occurs as a superposition of states, so that the overall movement of the helix is zero. In a purely classical model, however, this cannot happen, in which case the helix would vibrate and shake itself apart.

So in this sense, these quantum effects are responsible for holding DNA together.

The question of course is how to prove this. They say that one line of evidence is that a purely classical analysis of the energy required to hold DNA together does not add up. However, their quantum model plugs the gap. That's interesting but they'll need to come up with something experimentally convincing to persuade biologists of these ideas. One tantalizing suggestion at the end of their paper is that the entanglement may have an influence on the way that information is read off a strand of DNA and that it may be possible to exploit this experimentally. Just how, they don't say. Speculative but potentially explosive work.

Ref: arxiv.org/abs/1006.4053: The Relevance Of Continuous Variable Entanglement In DNA

<http://arxivblog.com/?p=370>

Now the ensuing fallout...

If we are to discuss quantum consciousness, something I would encourage, the following historical summary of it may be interesting reading:

<http://www.scaruffi.com/science/qc.html>

You might note that Calabi-Yau dimensions are discussed briefly in relation to consciousness. Also my String Cosmology supports the thinking of James Culbertson about spacetime consciousness.

Regarding: "Quantum Entanglement Holds DNA Together, Say Physicists
A new theoretical model suggests that quantum entanglement helps prevent the molecules of life from breaking apart" may I suggest in analogy to the EM consciousness of McFadden and Pickett's theory (see wiki-EM consciousness) that a new hypothesis called "Phonon Consciousness" may soon become available based on the collective coherent resonance of DNA phonons.

This of course would correspond to physical waking consciousness. There is also sleeping consciousness, ie., when the DNA phonons (probably for lack of energy as in Froelich's dipole theory of consciousness) do not resonate as in OBE/NDE and perhaps 2 or 3 higher levels of spiritual or cosmic consciousness.

Here is some earlier thinking on this subject:

<http://www.astronomy.net/forums/bigbang/messages/867.shtml>

-Alex-

“The following article shows recent endeavors by the Roger Penrose-Stuart Hameroff model to describe a scientific formulation for physical consciousness.

Quantum Relativity supports this model to a large extent in stipulating the fifth class of the heterotic superstring (the one based on the 8x8 lie group symmetry for brane attached superstrings) to represent a quantum holofractal magnification of the first class (comprised also of open strings).

The fifth class ends the superstring epoch of the inflationary universe, whilst the first class begins this pre Big Bang scenario in the quantum relativistic cosmology.

Quantum Relativity so differs from conventional brane theory in differentiating the energy spectra of the dynamical manifestations of the five conventional string classes; the first Planck string boson gauge activating at the Planck Energy level of 10 billion trillion GeV and the fifth class (Weyl) at the 12 million GeV resonance marker for the Planckian quantum geometry.

As can be analyzed and perused in related threads in this forum, physical consciousness derives indeed from the Platonic realm of the Ideal Forms as preferred and proposed by Roger Penrose.

Before the Inflationary Cosmology manifested at the so labeled Planck time; these 'ideal forms' became archetypically manifest in a so called 'sacred geometry' based on the Fibonacci-Lucas Series of relatively adjacent prime number series.

In gauged string-brane quantum mechanics then, this assumed the form of the five string classes embodying an inherent supersymmetry then represented in the bifurcation of the five fundamental gauge interactions of gravitation with electromagnetism (as the long range metric quantum entanglement) and the short range nuclear quantum interactions (strong and weak) and with their coupling agent becoming the consciousness gauge as a holographic fractal of the Weyl superstring class.

This consciousness gauge is termed the RMP or RestMassPhoton in Quantum Relativity, defining the fifth gauge elucidated upon in the following article by Penrose and Hameroff as being associated with the fivefolded symmetry inherent in the microtubules of biological and biochemically associativity, so allowing the 'sacred geometry' to resurface on the macroscales of the holographic universe.”

-Tony-

<http://www.sfgate.com/columns/chopra/>

Can science explain the soul?
Stuart Hameroff, Deepak Chopra

Monday, August 9, 2010

The soul has never lacked for believers, including around 90% of the American public, according to pollsters. But science has remained aloof, basically for two reasons. First, the soul has been assumed to be a matter of personal belief, not objective knowledge. Second, science deals in visible, concrete things using objective data. But since the era of quantum physics began over a century ago, invisible things and fleeting events have entered science, so subtle that the realm from which they emerge is almost a matter of faith.

Now some scientists are willing to venture into the once forbidden territory of the soul, attempting to extract a theory that will allow for its existence. Redefined by the new field of quantum biology, the soul could be the link that connects individuals to the universe, a dynamic connection that could explain how consciousness came about, and why the cosmos itself seems to mirror our own intelligence and creativity. Below are components of an argument for a secular soul based on quantum physics and biology.

Consciousness and the Soul

The concept of life after death, or more specifically conscious awareness after bodily death, is generally referred to in the context of the 'soul'; it is a staple of many religions and innumerable anecdotes over thousands of years. In addition, countless subjective reports of conscious awareness seemingly separated from the subject's brain and physical body occur in conjunction with so-called near death experiences (NDEs), whose phenomenology includes a white light, being in a tunnel, life review and, in some cases, floating out of the body. Somewhat similar experiences have been reported in various types of meditative and altered states. The drug ketamine, used as a 'dissociative' anesthetic, can produce subjective reports of conscious awareness outside the body, as can various other psychoactive drugs.

The same phenomenology has been reported in various cultures including medieval Tibet. And since every Eastern tradition is based upon pure consciousness as the ground of existence, there is nowhere to go when you die. Individual consciousness loses its boundaries and returns to the field of consciousness to be recycled. In Eastern traditions, the soul comes naturally.

There are literally thousands of other types of experiences that depend on the mind or its components existing outside the brain, from telepathy and clairvoyance to premonitions, synchronicity, and the perception of subtle domains of reality. Unable to fathom a rational explanation for out-of-body and/or after-death consciousness, modern science ignores such reports. Short-sighted skeptics reinforce the assumption that they are either subjective folly, hallucinations, or outside the scope of scientific proof.

The central weakness here is that modern science can't explain normal, in-the-brain consciousness. Despite detailed understanding of neuronal firings and synaptic transmissions mediating non-conscious, 'auto-pilot' perception and behaviors, there is no accounting for conscious awareness, free will or 'qualia' — the essence of experienced perceptions, like the redness, texture and fragrance of a rose. Philosopher David Chalmers refers to this as the 'hard problem' — explaining qualia and the subjective nature of feelings, awareness, and phenomenal experience — our 'inner life'.

Unable to explain consciousness in the brain, it is easy to see why conventional science ignores out-of-body, or after-death consciousness, if they do indeed occur. However one controversial theory of in-the-brain consciousness can also in principle explain possible out-of-body and after-death consciousness. That is the Penrose-Hameroff 'Orch OR' theory of consciousness as sequences of quantum computations inside brain neurons.

Most approaches to brain function consider neuronal firings and synaptic transmissions as fundamental information states (e.g. 'bits') in computational networks of neurons. But neurons are complex, not simple on-off switches representing either 1 or 0. For example the lowly single cell paramecium can swim around, avoid obstacles, find food and mates, learn and have sex & all without a single synapse. Paramecium activities are organized by their microtubules, cylindrical polymers of the protein tubulin. In brain neurons, microtubules are the structural scaffolding, organizing movement, transport, neuronal growth and synaptic plasticity. Their lattice structure and seeming intelligent functions have prompted suggestions that microtubules are also the nervous system of each cell, capable of molecular-level computation and information processing. In each and every neuron, millions of tubulins coherently vibrate in the megahertz frequency range, providing potentially quadrillions (10^{15}) of operations per second per neuron. That may be bad news for artificial intelligence prospects for brain equivalence anytime soon, but increased information capacity per se doesn't explain consciousness.

The Quantum Plunge

The Penrose-Hameroff Orch-OR theory ('orchestrated objective reduction') proposes that microtubules perform not just molecular-scale computation, but also, specifically related to consciousness, quantum computations.

Quantum means the smallest fundamental unit of energy and matter, usually considered at very small scales. But the laws governing the quantum world are bizarre and exotic, quite different from our everyday world of classical physics governed by Newton's laws and Maxwell's equations. For example in the quantum world, particles can exist in multiple locations or states simultaneously — quantum superposition. Another quantum feature is nonlocal entanglement — quantum particles separate but still remain mysteriously connected (what Einstein referred to as 'spooky action at a distance'). And multiple quantum particles can condense to a unified state — quantum coherence.

Quantum entanglement tells us that the universe is somehow nonlocal, that instantaneous hidden connections occur between spatially and temporally separated particles, objects and energies. Despite the complete lack of any explanatory mechanism, entanglement has been repeatedly demonstrated and, along with quantum superposition, used in new technologies including quantum cryptography, quantum teleportation and quantum computing.

In quantum computing, information may be represented not only as bits of either 1 or 0, but also as superpositioned quantum bits (qubits) of both 1 AND 0. Qubits interact with other qubits by nonlocal entanglement, and then collapse/reduce to specific output states as the solution to the quantum computation.

But we don't see quantum superposition and entanglement in our everyday classical world. It seems there's an edge, or boundary between two phases of reality — the quantum and classical worlds, and that consciousness may have something to do with

that edge, also known as 'quantum state reduction', or 'collapse of the quantum wave function'.

Quantum pioneer Niels Bohr found that measuring a quantum superposition caused it to reduce, or collapse to specific values. Because a conscious observer was required to complete the measurement, Bohr and colleagues proposed that consciousness caused collapse of the quantum wave function. This 'Copenhagen interpretation' (after Bohr's Danish origin) was pragmatic, but put consciousness outside science. Erwin Schrodinger thought it so bizarre he invented his famous thought experiment — a cat is both dead and alive until consciously observed.

Another view — the multiple worlds hypothesis — suggests that each and every superposition is a bifurcation of the fabric of reality, each branching off to form its own new universe, resulting in an infinite number of coexisting universes. There is no collapse, and no implicit consciousness.

Decoherence theory suggests any interaction with a classical environment degrades quantum superpositions. But isolated superpositions remain unexplained, as does the precise nature of quantum isolation.

There are other interpretations, e.g. Bohm, Cramer's Transactional, Stapp, weak measurement etc. And then there is Penrose 'objective reduction' (OR) which puts consciousness emphatically into the picture, precisely on the edge between the quantum and classical worlds.

Enter Sir Roger Penrose. In 1989 the famed British physicist, mathematician and cosmologist wrote 'The Emperor's New Mind', proposing that consciousness involved a specific form of quantum computation in the brain.

He began by considering the nature of superposition \exists an object in two or more locations simultaneously. Penrose related it to Einstein's general relativity in which matter is equivalent to curvature in underlying spacetime geometry. Superposition could then be viewed as simultaneous spacetime curvature in opposite directions, a separation, bubble, or blister in the fabric of reality. Penrose considered the separations to occur all the way down at the infinitesimally tiny Planck scale, the basement level of the universe.

What is the universe composed of? If we were to shrink in size, smaller and smaller, we would see that atoms are mostly empty, as is the space between them. If we shrink smaller and smaller, 25 orders of magnitude smaller than atoms, we would eventually come to Planck scale geometry, laden with information and patterns around the Planck length of 10^{-33} centimeters. Descriptions of Planck scale geometry include quantum gravity, spin networks, twistor theory and string theory. Which of these is correct remains unknown. But we do know that Planck scale information is down there. And despite the vast difference in scale, it can influence our world, as spacetime is organized like a hologram, or fractal, with information repeating nonlocally and at different scales.

The Penrose notion of superpositions as Planck scale separations is very much like the multiple worlds hypothesis. Except rather than branching off new universes, Penrose concluded such separations are unstable, and will undergo quantum state reduction due to an objective threshold inherent in Planck scale geometry (hence objective reduction, 'OR'). Moreover he proposed that the choices of such OR self-collapses are not random, but influenced by what he termed Platonic information embedded in Planck

scale geometry. Such information includes mathematical truth, as well as aesthetic and ethical values. Further, each such event, he concluded, is a moment of conscious awareness. Thus Penrose connected consciousness to the most basic level of the universe

But he lacked a good candidate for biological qubits in the brain, only suggesting the possibility of superpositions of neurons both firing and not firing. In the early 1990s Stuart Hameroff, medical doctor, anesthesiologist and microtubule researcher, suggested to Penrose that tubulin components might be his qubits, and microtubules his quantum computer. The two teamed up, with Hameroff showing how synaptic inputs could 'orchestrate' Penrose objective reductions in neuronal microtubules, hence 'orchestrated objective reduction' (Orch OR). They calculated the number of superpositioned tubulins required to reach OR threshold coinciding with physiological brain events such as gamma synchrony EEG, concluding that microtubules in hundreds of thousands of neurons would be required for 40 or more conscious moments, or frames per second. Gamma synchrony (30 to 90 cycles per second, hertz, or Hz) is the best measure of conscious awareness. Interestingly, ancient Buddhist texts also reported 40 or more conscious moments, or frames per second.

To account for the 'hard problem', the nature of experience, Penrose and Hameroff asserted that 'qualia', the components of conscious experience, are fundamental and irreducible components of reality, like electron spin, charge and mass — all derived from the omnipresent matrix of fundamental spacetime geometry at the Planck scale. In Orch OR the essential quantum spacetime qualia of an observed object are reproduced in the brain, specifically in/around microtubules. Thus Orch OR contends that consciousness in the brain is a sequence of conscious frames at roughly 40 Hz, but also as sequences of self-annealing ripples in the fine structure of the universe.

Penrose and Hameroff published several papers on Orch OR in the mid-1990s, prompting near-immediate skeptical rebuke from many directions, having offended computer/artificial intelligence proponents, neuroscientists, philosophers and physicists alike. One seemingly crucial issue was decoherence, the assertion by critics that the brain was far too 'warm, wet and noisy' for delicate quantum superpositions. Laboratory efforts to build technological quantum computers are plagued by thermal disruptions, and accordingly carried out at near absolute zero temperature. Orch OR suggested microtubule quantum coherence could be energetically pumped (e.g. like a laser) in a manner proposed in the 1970s by Herbert Frohlich, thus avoiding decoherence.

In 1998 twenty testable predictions of Orch OR were published, a number of which by 2007 had been validated, and none refuted. (Theories of consciousness based on emergence from complex neuron-based computation have yet to produce any testable predictions, much less validations.) In the past 6 years, Frohlich coherence has been discovered in microtubules at 8 megahertz (8×10^6 Hz), and warm temperature quantum coherence has been repeatedly observed in proteins supporting photosynthesis. Recent experiments also hint strongly at quantum coherence, entanglement and computation in DNA and microtubules. Life, at its core, may be a quantum process.

Running on Empty — The Soul At Large in the Universe

The notion that consciousness involves something more than electrochemical processes in brain neurons, that quantum processes connect us to a deeper reality,

may have profound implications. For example, quantum entanglement between individuals could account for a range of so-called paranormal effects such as telepathy, and (because quantum physics allows what appears to be backward time effects) premonitions, or precognition — information from the future. What about the soul? Clinical studies of patients who survive cardiac arrest have revealed consistent reports of so-called near death experiences (NDEs), white light, being in a tunnel, serene calm, life review and in some cases out-of-body experiences (OOBs). Many people report similar phenomena unrelated to cardiac arrest, e.g. associated with meditation, psychological trauma, drugs, or straightforward life events. A Gallup poll estimated 10 million Americans have reported subjective phenomena consistent in some way with NDEs and/or OOBs.

Some see NDEs/OOBs as spiritual events, manifestations of consciousness, or the soul, leaving the body. In this context, when the patient is resuscitated, the soul/consciousness returns to the body/brain. If the patient does not survive, many believe the soul/consciousness persists in some way, and may enter another body in reincarnation.

Conventional science rejects the possibility of an afterlife. NDEs/OOBs are regarded as hallucinations or illusions, manifestations of an ischemic/hypoxic brain. But ischemic/hypoxic patients, if conscious, are confused, agitated and amnesic, not calm and serene.

Recently two clinical studies used processed EEG brain monitors at the time of death in terminally ill or severely brain-damaged patients from whom support was withdrawn, allowing the patients to die peacefully. In both sets of patients, measurable EEG brain activity dwindled as blood pressure dropped and, eventually the heart stopped beating. But then, in each patient, there was an abrupt burst of brain activity lasting about a minute or more which correlated with gamma synchrony EEG, the most reliable marker of conscious awareness. Then, just as abruptly, the activity ceased.

Because these patients died, we can't know if they had NDE or OOB experiences, or if the activity actually marked the soul leaving the body — 'giving up the ghost'. But regardless, the mystery is how the energy-depleted brain could muster synchronous neuronal EEG activity — whatever it was. One possible answer is that consciousness and gamma synchrony involve very low energy quantum entanglements which persist while other brain functions have run out of fuel.

Could consciousness exist outside the body after death? We believe it can. We should point out that Sir Roger Penrose may not agree with our assertions about the soul, and we do not claim to speak for him. Nonetheless his work is essential to our proposal.

According to Orch OR, under normal conditions in an intact, healthy brain, consciousness occurs as frames or snapshots extending through multiple spatiotemporal levels from networks to neurons to microtubules to quantum forces, down to and including Planck scale geometry. When the blood stops flowing and metabolic energy can no longer drive microtubule quantum coherence, quantum information relating to the subject's conscious experience and memory isn't necessarily lost or destroyed, but may dissipate to the universe at large, remaining entangled as a unified soul-like entity grounded in Planck scale geometry. If the body is resuscitated, the quantum information can return, and the subject may report an NDE or OOB experience. If the body is not resuscitated and the patient dies, the entangled quantum

information constituting the subject's consciousness and memory may persist in spacetime geometry, perhaps entering an embryo in the context of reincarnation. Could the universe — empty spacetime geometry — conceivably host consciousness on the loose? There is ample energy in the form of zero point fluctuations, so the question is whether information can be registered in the nothingness of spacetime, and transcend from Planck scale to biological scale.

Scientists measuring gravitational waves emanating from the Planck scale detect signals — initially thought to be noise — repeating at different scales separated by several orders of magnitude (described as holographic, fractal, or scale-free dynamics). The repeating signals range from very fast at very small scales (near the Planck length), upward to as slow as 300 Hz within range of microtubules and other neuronal structures.

There is also scale-free dynamics in the brain. Self-similar information repeats from a time domain of roughly 10 seconds (0.1 Hz, e.g. a 'train of thought') down to tens of milliseconds (gamma synchrony 'frames' around 40 Hz). Microtubules have vibrational resonances in the kilohertz (103 Hz) for tubulin C-termini, megahertz (106 Hz) for tubulin, and gigahertz (109 Hz) for ordered water in hollow microtubule cores. So holographic/fractal/scale-free information representation may extend from the Planck scale to the brain, with information repeating every few orders of magnitude.

These levels could conceivably correspond with lokas, or astral planes, described in Eastern traditions as locations or destinations for consciousness. NDEs/OOBs, as well as certain rishi meditative and altered states may involve consciousness shifting to a series of smaller/closer -to-the Planck scale, higher frequency and intensity lokas, or astral planes. As the Beatles said (the White Album): 'The deeper you go, the higher you fly. The higher you fly, the deeper you go.'

The yogi's state of complete immersion in the ground state of consciousness is called Samadhi, an immersion from which all ancient spiritual knowledge was obtained. Perhaps this corresponds with consciousness moving deeply, near to the source of Vedic and Platonic values, with highest frequency, intensity and resolution.

The notion of wisdom, truth and consciousness embedded in the universe has roots in both East and West. The seers or rishis of ancient India detected these values through actual experience. Socrates, speaking for Plato, uses his teacher, Diotima, as his authority for experience of subtler domains of consciousness. If Penrose is correct, these ancients discovered quantum information embedded in Planck scale geometry. Science attempts to verify conscious knowledge — minus the label of spiritual — by first principles using its own methods. But this may turn out to be topsy turvy — the wrong way around. The Vedic seers regarded reality as a manifestation of one ocean of universal consciousness, and so they were like fish exploring the ocean by swimming through it. Science attempts to explore the ocean of consciousness from the outside. That is, the universe is taken to be 'out there', divorced from subjective experience and therefore measurable without personal bias. But if the brain is connected to the universe at the quantum level, the distinction between subjective and objective experience, between 'in here' and 'out there' no longer holds. The spacetime geometry configuration of the observed world is reproduced in the brain. Again, the Beatles said it well: 'Your inside is out, and your outside is in. Your outside is in, and your inside is out.'

We two authors (SH and DC) differ slightly with regard to the ocean of consciousness, and the subject/object split.

In accordance with Vedic traditions, DC sees pure consciousness as a vast ocean pervading the universe, creating matter and everything else. It is Brahman, the quantum field, or spacetime geometry which includes 'qualia', the sights, sounds, and textures of the world. Atman, or self-consciousness is part and parcel of Brahman.

SH sees the universe as an ocean at the level of Planck scale geometry, containing precursors of consciousness, proto-conscious qualia, as well as precursors of mass, spin, electrical charge and other fundamental components, ranging up to biomolecular scales. Within the quantum ocean, superpositions reaching OR threshold result in conscious moments, like whitecaps, or ocean waves crashing on a beach. A sequence of such OR self-collapses gives rise to consciousness, Atman from Brahman.

DC maintains the subjective/objective split is nonexistent — a smooth continuum, the surface of a calm sea. SH sees the subjective/objective split as OR self-collapse, an edge or boundary between quantum and classical worlds. But these differences are trivial compared to the vast gap between our mutual views and conventional science, in which consciousness emerges exclusively as an epiphenomenon of complex neuronal-level computation.

We agree that observer, observed, and the process of observation, already linked in physics since the time of Bohr and Einstein, will surrender their differences. In the end, to say that the ocean of consciousness (or proto-consciousness) permeates everything is to say that there is only one consciousness (or proto-consciousness). It is artificial to believe, as science has done since Bohr's conscious observer, that the individual has a privileged position outside the ocean in which everything is embedded. Perhaps the only people who will shrug and say this was obvious all along are the poets. As Rumi wrote almost 800 years ago, "I have lived on the lip of insanity, wanting to know reasons, knocking on a door. It opens. I've been knocking from the inside!"

Conclusion — A Science of the Quantum Soul

We don't claim proof or final evidence of consciousness after death, but do propose a plausible scientific basis for it. Soul and spirituality imply the following, with quantum explanations:

- Interconnectedness among living beings and the universe Conscious minds and unconscious processes may be quantum entangled.
- Divine guidance/ 'Way of the Tao' Choices in each conscious event influenced by Vedic/Platonic values embedded in fundamental spacetime geometry .
- Consciousness/Soul after death Consciousness occurs at the level of Planck scale geometry, and may remain unified after bodily death by quantum entanglement, moving through different scalar 'astral' planes.

These proposals are testable, and falsifiable. We welcome critical analysis.

Stuart Hameroff MD

Professor, Departments of Anesthesiology and Psychology

Director, Center for Consciousness Studies

The University of Arizona, Tucson, Arizona

www.quantumconsciousness.org

Deepak Chopra MD and FACP
Speaker and Author of over 55 books
Board Certified Internist, Endocrinologist
www.deepakchopra.com

Deepak Chopra is the author of over 50 books on health, success, relationships and spirituality, including his most recent, "Reinventing the Body, Resurrecting the Soul," available now at www.deepakchopra.com. To follow him on Twitter, go to <http://twitter.com/DeepakChopra>.
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Physical Consciousness coupled to the Biomind of Universal Life
<http://tonyb.freeyellow.com/id185.html>

The labels of 'mind' and 'self-awareness' and of 'consciousness' have for long awaited rigorous definition in the nomenclature of science. Whilst most researchers and philosophers accept the existence of those labels; what those namings represent in a physically measurable sense of physical parameters have remained largely unexplored. These notions have remained as one of the major mysteries of science and have become subject to a number of speculations; from a purely materialistic interpretation of the 'mind' being a biochemical response to environmental stimuli, to the 'mind' being part of a 'spiritual soul' and subsequently constituting a transcendent aspect of biophysical life.

A related mystery is that of 'life' itself. How did the universe evolve 'life' from a generally accepted premise of a prior or older cosmology, which disallowed biological life as is observed today? The thermodynamically expanding universe follows well tested physical parameters engaging the quantum nature of physical existence in the form of nucleosynthesizing interactions such as nuclear fusion of atomic elements and an associated natural radioactivity inherent in nature and its laws of conservation of energy and momentum. Those same processes occurred in the primordial universe and due to the smaller volume then occupied by the expanding universe; the descriptive cosmology describes a much hotter universe (as a Black Body Planckian Radiator) and a universe in which say the life forms observed on planet earth could not exist in their biochemical and molecular constitutions.

Recent advances in the demetricated forms of supermembrane theory (M-Theory for 11-dimensional supermembranes propagating 10-dimensional superstrings in a 12-dimensional selfdual mirror-spacetime of supervolumars (Vafa-F-Space encompassing Witten-M-Space) have allowed a rigorous definition for the above labels in the parameters of the physics of the superbranes.

The Coupling of the Energy Laws by the Self-Frequency of the Quantum for Mass

It has been discovered, that the universe contains an intrinsic coupling-parameter between its inertial mass content and its noninertial energy content.

The matter in the universe is described by the physical parameter termed Mass (M), say as proportional to Energy (E) in Einstein's famous equation $M=E/c^2$.

This mass M then reappears in Newtonian mechanics as the change in momentum (p) defining the Inertial Mass (M_i) as being proportional to some applied Force (F) or the 'work done' for a particular displacement $\{F=dp/dt \text{ for } p=mv \text{ and } v \text{ a kinematic velocity as the ratio of displacement over time generalized in the light path } X=cT\}$.

It is also well understood, that the inertial mass M_i has a gravitational counterpart described not by the change in momentum of inertia carrying matter agglomerations; but by the geometric curvature of space containing matter conglomerations. This Gravitational Mass M_g is measured to be equivalent to the Inertial Mass M_i and is formulated in the 'Principle of Equivalence' in Einstein's Theory of General Relativity. F-Theory then has shown, that this Inertial Mass M_i is coupled inherently to a 'mass-eigen' frequency via the following formulation:

(1) Energy $E=hf=mc^2$ (The Combined Planck-Einstein Law)

(2) $E=hf$ iff $m=0$ (The Planckian Quantum Law $E=hf$ for light speed invariance $c=\lambda f$)

(3) $E=mc^2$ iff $f=f_0=f_{ss}$ (The Einstein Law $E=mc^2$ for the light speed upper limit)

(1) Whenever there is mass ($M=M_i=M_g$) occupying space; this mass can be assigned either as a photonic mass {by the Energy-Momentum relation of Special Relativity: $E^2=E_0^2 + (pc)^2$ } by the photonic momentum $p=h/\lambda=hf/c$ } OR a 'rest mass' $m_0=m/\sqrt{1-(v/c)^2}$ for 'rest energy' $E_0=mc^2$.

The 'total' energy for the occupied space so contains a 'variable' mass in the 'combined' law; but allows particularisation for electromagnetic radiation (always moving at the Maxwell light speed constant c in Planck's Law and for the 'Newtonian' mass M in the Einstein Law.

(2) If $M=0$, then the Einstein Law is suppressed in favor of the Planck Law and the space contained energy E is photonic, i.e. electromagnetic, always dynamically described by the constancy of light speed c.

(3) If $M>0$, then there exists a mass-eigen frequency $f_{ss}=f_0=E_{ss}/h=m_{ss}c^2/h$, which QUANTIZES all mass agglomerations $m=\sum m_{ss}$ in the massquantum $m_{ss}=E_{ss}/c^2$.

The Coupling of the Supermembranes in Vafa-F-Space

The quantization of mass m so indicates the coupling of the Planck Law in the frequency parameter to the Einstein law in the mass parameter.

The postulative basis of M-Theory utilizes the coupling of two energy-momentum eigenstates in the form of the modal duality between so termed 'vibratory' (high energy and short wavelengths) and 'winding' (low energy and long wavelengths) selfstates.

The 'vibratory' selfstate is denoted in: $E_{ps}=E_{primary\ source/sink}=hf_{ps}=m_{psc}c^2$ and the 'winding' and coupled selfstate is denoted by: $E_{ss}=E_{secondary\ sink/source}=hf_{ss}=m_{ssc}c^2$

The F-Space Unitary symmetry condition becomes: $f_{ps}f_{ss}=r_{ps}r_{ss}=(\lambda_{ps}/2\pi)(2\pi\lambda_{ss})=1$

The coupling constants between the two eigenstates are so: $E_{ps}E_{ss}=h^2$ and $E_{ps}/E_{ss}=f_{ps}^2=1/f_{ss}^2$

The Supermembrane $E_{ps}E_{ss}$ then denotes the coupled superstrings in their 'vibratory' high energy and 'winded' low energy selfstates.

The coupling constant for the vibratory high energy describes a MAXIMISED frequency differential over time in $df/dt|_{max}=f_{ps}^2$ and the coupling constant for the winded low energy describes its MINIMISED reciprocal in $df/dt|_{min}=f_{ss}^2$.

F-Theory also crystallizes the following string formulations from the $E_{ps}E_{ss}$ superbrane parameters.

$$1/E_{ps}=e^*=2R_{ec}^2=\sqrt{\{4\alpha h c^2/2\pi G_0 m_P\}}=2e\sqrt{\alpha[m_P/m_e]}=2ke^2/m_e=\alpha h c/\pi m_e$$

Here e^* is defined as the inverse of the sourcesink vibratory superstring energy quantum $E_{ps}=E^*$ and becomes a New Physical Measurement Unit is the StarCoulomb (C^*) and as the physical measurement unit for 'Physical Consciousness'.

R_e is the 'classical electron radius' coupling the 'point electron' of Quantum- Electro-Dynamics (QED) to Quantum Field Theory (QFT) and given in the electric potential energy of Coulomb's Law in: $m_e c^2=ke^2/R_e$.and for the electronic restmass m_e .

Alpha α is the electromagnetic finestructure coupling constant $\alpha=2\pi ke^2/hc$ for the electric charge quantum e , Planck's constant h and lightspeed constant c .

G_0 is the Newtonian gravitational constant as applicable in the Planck-Mass $m_P=\sqrt{(hc/2\pi G_0)}$.

As the StarCoulomb unit describes the inverse sourcesink string energy as an elementary energy transformation from the string parametrization into the realm of classical QFT and QED, this transformation allows the reassignment of the StarCoulomb (C^*) as the measurement of physical space itself.

Physical Consciousness and the Awareness Quantum

The Physical Quantum of Consciousness as SpaceAwareness (df/dt) maximised and minimised in the string coupling constants f_{ps}^2 and f_{ss}^2 respectively, so can be defined as:

$$e^*=2R_{ec}^2=(\text{Classical Electron Diameter})\times(\text{lightspeed})^2=\text{VolumexAngular Acceleration}$$

As the time differential operator on frequency is independent on radial displacement in df/dt as the square of frequency or the square of inverse time; we can now also define the parameter of:

$$\text{Spacial Awareness}=df/dt=\text{AlphaOmega}=\alpha\omega=a\omega=\text{Angular Acceleration Quantum.}$$

The Spacial Awareness 'aw' then operates upon any volumar in the rootreduced F-Space (12D being a 9-dimensional brane volumar of superstring dimensions to which is coupled a 3-dimensional temporal time-connector volumar in $12=9+3$ F-Space, $11=9+2$ M-Space and $10=9+1$ C-Space) AS the 3-D volume of the observed spacial component of the 'Euclidean flatness of the Minkowski spacetime metric.

The implications of those definitions for the physical universe and its cosmology are far reaching indeed.

As the expanding universe increases in its 3-dimensional volume, its 'spacial consciousness' is also increasing in the 'activation' of additional spacetime quanta. Each of these spacetime quanta describes the inherent Zero-Point-Energy (ZPE) as defined in the 3D-volumar of the Eps sourcesink superstring energy quantum then coupled to its characteristic 'starcoulombic' 'physical consciousness'.

The ZPE per unit volumar is $ZPE_{\text{quantum}}=4\pi E_{\text{ps}}/\lambda_{\text{ps}}^3=E_{\text{ps}}/2\pi^2 r_{\text{ps}}^3=4\pi/e^* \lambda_{\text{ps}}^3$ (Joules/m³)

Every ZPE quantum is coupled to a volume $V^*=e^*/(df/dt)$ and so defines the quantisation of spacial volume in terms of the ZPE, as well as the 'physical consciousness' contained in that volume.

The V^* here denotes the resonant quantum volumarized eigenstate in a minimised spacetime volumar and NOT in terms of spacial volume, but in the form of an ENTROPY COUNTER of 'statistical permutation selfstates' operation upon the 'Spacial Consciousness' quantum $e^*=1/E_{\text{ps}}=1/E_{\text{ss}}$. $f_{\text{ps}}^2=f_{\text{ss}}/h$.

The self-frequency of the mass quantum so can be expressed formally as $f_{\text{ss}}=he^*$ for the timeinstanton $t_{\text{ss}}=f_{\text{ss}}$, the latter triggering the 'inertialisation' of the postinflationary cosmology in the so-called Quantum Big Bang, precisely $3.333... \times 10^{-31}$ seconds* following the 'string epoch' of the matter wave inflation (detailed and referenced elsewhere on this site).

But it is the supermembrane coupling between the gravitational (photonic) mass M_g as given by the vibratory sourcesink string with the inertial mass M_i as given by the winding sinksourcesink string, which is the primary causation for this Quantum Big Bang, following the string parametric de Broglie wave matter inflation.

Rewriting $f_{\text{ss}}=he^*$ then describes this coupling in the ACTION=EnergyTime of the Planck Constant in the finestructure $f_{\text{ss}}=\text{Energy}^* \times \text{TimeInstanton} \times e^*$ for the Unity Condition of F-Space in $1=E^*e^*$ that is the original definition of $e^*=1/E^*$ as the definition for the 'Physical Consciousness of Space'.

The Frequency Resonance Selfstates as Entropy Counters

Generally then, the permutative entropy counter $df/dt|_{\text{max}}=f_{\text{ps}}^2$ gives precisely 9×10^{60} frequency eigenstates as the coupling constant between the two modes of the superstring; whilst its inverse defines the minimum as the 'Singularity' 'Null-State' or 'No Consciousness' state as $1/(9 \times 10^{60}) \sim 0$.

The Awareness operator applicable for all universal space so can fluctuate between the quasi-zero state and the maximised resonance state in the factor of 81×10^{120} and a value 'measured' by contemporary standard cosmological models as characteristic of

the density discrepancy between the Planck-(ZPE)-Density $\{\rho_P = m_P/V_P = c^5/\pi h G_0^2\} \sim 9.4 \times 10^{94}$ (kg/m³) and the actual matter density measured in the universe $\{\rho_c = 3H_0^2/8\pi G_0\} \sim 3.8 \times 10^{-27}$ (kg/m³) from the inner 10D observer frame and $\rho_c = H_0^2/4\pi^2 G_0 \sim 8.0 \times 10^{-28}$ (kg/m³) from the outer 11D observer frame of the Riemannian hypersphere as a 3D boundary of the 4-ball $V_4 = \pi^2 R^4/2$ for $dV_4/dR = 2\pi^2 R^3$ as a 3-dimensional surface descriptive for the overall topology of the standard cosmology).

The dimensionless ratios of ρ_P/ρ_c then indicate the ZPE/Critical energy discrepancies in the factors of the permutation string selfstates in the factors of 2.5×10^{121} and 1.2×10^{122} respectively.

Quantum Consciousness and MagnetoCharges define Quantum Gravitation

The ZPE-quantum $E_{ps} = E^*$ so represents the kernel or core for any region of space containing a maximised 'physical consciousness' given by $1/E^* = e^* \text{ StarCoulombs } (C^*)$.

The quantitative volume V for this consciousness is minimised in $V_{ps}^* = e^*/f_{ps}^2$ in sourcesink resonance to the vibratory superstring modality and is in modular duality (as a monadic dyad or monadic duad) to its coupled sinksources resonance of its winding mode in its quantum-maximisation of $V_{ss}^* = e^* f_{ps}^2$.

The minimum calculates as $V_{ps}^* = e^*/f_{ps}^2 = 1/1.8 \times 10^{58}$ permutation states and translates to a 3D volume of measurement R with a Compton radius ($R_c = h/2\pi m c = c/2\pi f c = c/\omega c$ with angular velocity $\omega = 2\pi f$) as of $R_{cps} = (e^* f_{ss}^2 / 2\pi^2)^{1/3} \sim 1.4 \times 10^{-20}$ meters for a Compton Energy of about 2.2 microjoules or 14.03 TeV (as the maximum design capacity of the Large Hadron Collider or LHC located at Geneva, Switzerland comprised of two individuated colliding proton beams).

The precise ratio between the ZPE-kernel and the 'Space Consciousness' surrounding this core becomes: Wormhole-Radius/Space-Consciousness-Radius and as: $r_{ps}/R_{cps} = (2\pi^2/e^* r_{ss}^3 f_{ss}^2)^{1/3} = c(f_{ss}/4\pi e^*)^{1/3} = (c f_{ss}/8\pi R_e)^{1/3} \sim 1/887.11$ (dimensionless); and because the string coupling defines $c = \lambda_{ps} f_{ps} = 1/\lambda_{ss} f_{ss}$, rendering the Minkowski lightspeed constant c as dimensionless in the lightpath $X_{ps} = c T_{ps} = c f_{ss}$. This defines the quantum gravitational coupling of the gravitational mass element m_{ss} to the observed and measured elementary particle masses in QFT and Quantum-Chromo-Dynamics (QCD); the 'chromaticity' or 'colour charging' of gluonic gauge interaction transmitters being identifiable as the MagnetoCharges defined in StarCoulombs (C^*)

The corresponding maximum then couples in macroquantisation to the microquantised quantum gravitational MagnetoCharges in $V_{ss}^* = e^* f_{ps}^2 = 4.5 \times 10^{63}$ permutation states for a characterizing 'Galactic Volumar' in $R_{css} = (e^* f_{ps}^2 / 2\pi^2)^{1/3} = (e^* f_{ss}^2 / 2\pi^2)^{1/3} \sim 6.1 \times 10^{20}$ meters or so 64,650 lightyears and a displacement scale which is then 'haloed' by the the winded string parameter $r_{ss} = 1/r_{ps} = 2\pi \lambda_{ss} \sim 6.3 \times 10^{22}$ meters or 6,648,875 lightyears and as the displacement scales observed by the standard cosmology.

Correspondingly,

$$r_{ss}/R_{css}=(16\pi^5\lambda_{ss}^3/e^*f_{ps}^2)^{1/3}=(16\pi^5/f_{ss}e^*c^3)^{1/3}=(8\pi^5/f_{ss}R_{ec}^5)^{1/3}\sim 102.85$$

$$\text{As } r_{ps}/r_{ss}=r_{ps}^2=(cf_{ss}/2\pi)^2 \text{ and } R_{cps}/R_{css}=(f_{ss}/f_{ps})^{2/3}=(f_{ss})^{4/3}=(4\pi^2r_{ps}/r_{ssc}^2)^{2/3}$$

$(R_{cps}/R_{css})^3 = (4\pi^2r_{ps}/r_{ssc}^2)^2 = 10^{-88}/c^4 = 1/8.1 \times 10^{121}$ as the awareness operator fluctuation range.

The 'Physical Consciousness' in the standard cosmology now crystallizes as being associated with biovital lifeforms, occupying space, and as evolving in the dynamics of (holographic) fractals of the encompassing 'consciousness envelope' aka the galactic cells of macroquantised entities.

This biovitality is defined in a 'kernel consciousness' inherent in space itself via the string-coupled modalities; mimicking the overall expansion of the thermodynamic (and stochastic) universe.

This process can be comprehensively described as the EVOLUTION of Core-Consciousness in its Spatial Occupancy.

The Definition of 'Life' must so fundamentally be based on the string coupling between the two modalities and as two modes of operation, which quantum relatively entangle the microquantum characterised by the 'wormhole core' as a function of the nuclear interaction scale (the classical electron radius R_e is also the scale of the magneto-asymptotic confinement of gluons in the definition of the magnetocharges and so becomes the limiting quantum geometric template for the nuclear gauge interactions and the 'Higgs Bosonic' blueprint at the 3 Fermi scale).

'Life' then becomes the cosmo-evolutionary consequence of a quantum geometry defining the spacial configurations of the supermembranes as superstring couplings. This is why the most basic and primordial 'lifeforms' such as viruses, bacteria and fungi follow highly geometrized patterns in Platonic- and Archimedean solids, characterised by highly symmetrical arrangements of their molecular and atomic constituents.

The most elementary 'life form' is the crystalline arrangements of the self-replicating pattern. This originally manifested in so called quasicrystals of fivefold symmetry, such as can be observed in Shechtmanites and the Penrose tiling. The underpinning cosmology of the decoupling and breaking of the so termed Planck-Symmetry transformed the Planck-String into 5 classes of superstring; this 'breaking of unification' following a pentagonal supersymmetry at the core of all 'natural laws'. Many details can be found on this website for perusal and utility.

For a 'lifeless' mass-only universe then the selffrequency of mass in the fss sinksource superstring would define the awareness operator as minimised in

$$V^*|_{\min}=e^*/(f_{ss}^2)=e^*f_{ps}^2$$

Corollarily, the 'fully life-conscious' universe (attained after an infinite linear time evolution of the descriptive cosmology) would be defined in $V^*|_{\max}=e^*f_{ss}^2$.

Consciousness of Inertia in Universal Quantization of Mass

We can now relate the 'spacial consciousness' in terms of the universe's inertia content to the volume occupied by mass.

As there are $(R_{\text{Hubble}}/r_{\text{ps}})^3 \sim 10^{147}$ spacetime quanta in the asymptotic string universe of 10D and bounded by the membrane universe of 11D (as an extremal Strominger braned Black Hole say) and the sinksource (winded string) $E_{\text{ss}} = hf_{\text{ss}} = m_{\text{ss}} c^2 = 2.222... \times 10^{-64}$ J; we can define a 'Consciousness-Density per unit mass' P_c for this 11D-'Mother-Black Hole' in Witten M-Space in dyadic coupling with a 12D-'Father-White Hole' in Vafa-F-Space (MBH and FWH).

The M-Space MBH defines the Hubble horizon in its 'closure mass'
 $M_{\text{Hubble}} = R_{\text{Hubble}} \cdot c^2 / 2G_0 = \Sigma m_{\text{ss}} = N m_{\text{ss}} \sim 6.4706 \times 10^{52}$ kg.

$P_c = e^* (R_{\text{Hubble}}/r_{\text{ps}})^3 / M_{\text{Hubble}} = 2G_0 e^* R_{\text{Hubble}}^2 / r_{\text{ps}}^3 c^2 \sim 7.81685 \times 10^{96}$ (~83.2 ρ_P)
 C^*/kg

This is about 83.2 times the Planck-Density ρ_P for M_{Hubble} and 2.34 times the Planck-Density applied to the baryonic mass seedling $M_0 = 0.0281 M_{\text{Hubble}}$.

The 'Base Inertia Consciousness' (BIC) per minimal mass quantum m_{ss} then calculates as $m_{\text{ss}} P_c = 1.930 \times 10^{16}$ C^* and for a count of $N = 2.6206 \times 10^{133}$ m_{ss} as the inertia distribution of the $\text{BIC}_{\text{Universe}} = 5.058 \times 10^{149}$ C^* .

A characteristic mass of 1 kg, say as the standard liter of water in 10^{-3} cubic meters of volume so possesses an inherent inertial consciousness of 7.82×10^{96} C^* . This is the ZPE of the quantum standard models redefined in units of consciousness and this total includes 'dark matter' and 'dark energy', the former as the effect of the DIM-Factor (see other references on this website) of 7.56 for the present linear time coordinate and the latter as the 'missing mass-energy' for the mass seedling M_0 in 10D to 'close' the universe in the MBH of M_{Hubble} in 11D.

In terms of the volume of 1 liter however; the 'spatial consciousness' quantizes in the form of the VPE quantum $E_{\text{ps}} = 1/e^*$ per unit volume and which is
 $V_{\text{PE}} = E_{\text{ps}} / 2\pi^2 r_{\text{ps}}^3 \sim 2.5133 \times 10^{64}$ J/m³.

The 'inertia consciousness' of 1 liter of water so relates the BIC of 7.82×10^{96} C^* to a V_{PE} or
ZPE of 2.51×10^{61} J/m³.

The example of a simple rock serves as a culmination of this essay.

A rock, occupying a volume V_{rock} carries an intrinsic Base-Consciousness due to its volume. This basic consciousness is given in the mass-frequency f_{ss} as the mass of the rock is quantized in a number count N of mass quanta m_{ss} .

This mass of the rock is actually a higher-dimensional mass-current as a form of 'natural superconductivity' $\{I_{\text{ps}} = 2ef_{\text{ps}}$ superstring coupled to $I_{\text{ss}} = 2ef_{\text{ss}}\}$. The rock can so also

be described as a summation of displacement current elements $I_{ss}=2e\lambda\psi/c$ (as James Clark Maxwell propositioned - see 'The Origin of Mass' section on this website). Mass in its purest form so is nothing but 'static magnetoelectricity' or densified electromagnetic monopolic sourcesink current. The nondensified form of mass is of course photonic and should this photonic mass NOT be a derivative from the acceleration of electric (Coulomb) charges 'e' coupled to preexisting mass (say fusion protons in stars), BUT be a derivative from the acceleration of magnetocharges 'e*', then the resulting ElectroMagnetic Radiation is monadic or Monopolic and defines the so called 'SPIRIT' of metaphysical cosmologies and philosophies.

The rock of volume V_{rock} and as some summation ΣI_{ss} or Σm_{ss} so describes an energetic selfstate of the superstring coupling between the string dyadics of the microquantum E_{ψ} and the macroquantum E_{ss} .

The interaction of the rock with its environment then, in elementary terms, becomes a dynamic of spacial interaction in the movements of the rock.

All Spacequanta are associated or quantum entangled with each other via the string coupling and as all spacetime volumars are defined by their ZPE-core and its 'haloed' or 'auric' envelope of the physical consciousness coupled to the volumars by the self-awareness operator df/dt ; the entire cosmology is rendered a unified kaleidoscope of holofractal self-interaction of the thus defined 'Cosmic Consciousness'.

A basic quantum consciousness then is multiplied and complexified in the interaction, self- and mutual, between spacetime volumars of varying sizes in the encompassing summation integrals of the initial- and boundary parameters of the cosmogenesis (described elsewhere on this website).

The phenomenon of 'life' then is characterized by the Awareness-Operator the Alpha-Omega $aw=\alpha\omega=df/dt$, namely the 'Change in Frequency' over linearised Time t and where the sourcesink frequency for minimum impedance for the 'natural current flow' (I_{ψ}) forms the upper bound source-resonance of the vibratory string modality and the maximum impedance describes the 'natural current flow' (I_{ss}) as the lower bound for the sink-resonance.

The 'lifeless' universe of the primordial Quantum Big Bang is in Sink-Resonance to the E_{ss} sinksource as a macroquantum, manifesting the supergalactic inertia in Black Holes as seedlings for mass agglomerations known as galaxies. Coupled to those 'higher-D' Black Holes are however imaged 'higher-D' White Holes (Quasars) who as Source-Resonators manifest the Source-Resonance of the E_{ψ} sourcesink as the microquantum of the superbranded cosmology from its cosmogony.

The purpose and reason for the universe of materiality so is found in the Coevolution of SourceSink Self-Consciousness as unified encompassment for the cosmo-evolution with its individuated and dispersed holographic shards or holograms of this selfsame self-consciousness in evolvment.

The operator for this evolvment is spatial selfawareness and the ability to use a biomind defined by the function of 'changing' or modulating the frequency received by an antenna, which can take the form of a biochemical and molecular arrangement of cellular units termed a 'brain'.

The biological evolution of brains, then accommodates the utility of the natural superconductive electricity embodied in space itself; the biochemical electricity (of say electromagnetic brain waves) representing a shadow function of the chargeflow $I=dQ/dt$ as a 'normal currentflow' to the electromagneto monopolic supercurrents of the magnetocharges aka the physical spacial consciousness.

“Now can you understand that 'consciousness' as a physical concept must have certain familiar parameters?

The two parameters I found in my research are: 1. Space in 3D and 2. Angular Acceleration.

So ANY metricated region of space becomes subject to a quantum operator defined in a radius independent parameter given in angular acceleration.

Angular acceleration is angular velocity over time or alternatively the time differential for frequency in df/dt .

Formally then the product $V.df/dt$ will define an 'awareness factor' (such defined) df/dt operating upon any volumar or 'spatial region'.

In purely physical terms then 'Consciousness' is modeled as an 'Awareness-Operator' acting upon 3D space.

Using string theory, the generalization $V.df/dt$ is QUANTIZED in a particular quantum mechanical 'constant', namey the so called classical electron radius R_e from electron parameters $mec^2=ke^2/R_e$ and the light-matter interaction constant of the electromagnetic finestructure $\text{Alpha}=2\pi ke^2/hc$.

The 'Consciousness-Quantum' for quantum operational spacetime volumars so becomes: $2R_e c^2 = \text{Electron-Diameter} \times \text{Energy/Mass}$.

As you can see, the mensuration dimensions of $\text{Diameter} \times \text{Velocity}^2 = \text{VolumexAngular Acceleration}$.

Again in string theory, one can now use this 'quantum of consciousness' or SPACIAL AWARENESS (physically defined) to assign a 'higher dimensional' definition to the 'physical space awareness' in using unification physics on the Planck-Scale realm. There so called Stoney-Units calibrate with Planck-Units to crystallize THE ELEMENTARY relationship between electric charges and metric displacement.

The equation is: $\text{Planck-Length} \times \text{Sqrt}(\text{Alpha}) = \text{PLO} = e/c^2$.

So in the string dimensions a 'absolute minimum displacement' becomes a 'Planck-radius' 'bounce' or oscillation (PLO), which in the 'lower' dimensions of the 3D manifests as the ordinary Coulombic charge, coupled to inertia.

This then leads to the DEFINITION of Electromagnetic Radiation being produced by the ACCELERATION of Electric Charges, the latter ALWAYS coupled to mass/inertia as a

secondary emergence (from a prior massless cosmology, given in Einstein's principle of equivalence).

There is more to this; such as how the electric charges of 3D couple to 'magnetic charges' in the higher-D and so on, but I'll now attempt to answer your particular questions.

1. Self-Realization

Self-Realization in view of the above definition of 'physical consciousness' necessitates a 'self-awareness' about the space you occupy.

So if Stanley McKeown considers himself just to be a 'Body' occupying a volume of say 70 liters of space; then Stan's 'self-awareness' in terms of 'spatial awareness' will be more restricted, as if Stan should consider himself to encompass a greater volume of space, say as the 'space of his house, including all his gadgets, pets and family'.

In the grandest 'self-realization', Stan would consider himself to BE an inhabitant of the entire physical universe and then his 'self-awareness' would be approaching 'godlikeness' and his 'self-consciousness' would begin to RESONATE with the collective consciousness of everything contained within the physical universe, say as the 'Body of the Goddess' or the 'Body of the Logos' or the 'Temple of God' or some other such label.

2. Beings that do not have 'soul'.

Spatial consciousness, physically defined requires the quantum definition to allow the resonance self-state in specifying $V \cdot df/dt$ as a generalized coordination, subject to boundary conditions.

The boundary condition is an inverse energy sourcesink quantum being equal to the definition of the magnetocharge.

This takes the form $(V \cdot df/dt)_{\max} = e^* = 1/hf^*$ in the modular (T) duality of supermembrane theory.

Because the resonance frequency f^* is defined, the corresponding minimization Volume can be calculated.

$V_{\min} = e^*/f^{*2} = 2Re c^2/f^{*2} = 2Re L^*^2$ for the resonance lightpath $c = f^* L^*$

V_{\min} then calculates at 5.55×10^{-59} cubic meters for a toroidal spacetime quantum $2\pi^2 R_{\min}^3$ and so for the quantum displacement $R_{\min} = 1.412 \times 10^{-20}$ meters.

This 'curvature radius' as a Compton-Radius translates to a quantum energy of $E_{\min} = hc/2\pi R_{\min} \sim 2.25$ micro-joules or 14.03 TeV, which is the maximum designer energy for the Large Hadron Collider (LHC) at Geneva, Switzerland.

You know the big machine, which keeps breaking down, because the 'God-Particle' is not ready yet to become discovered.

So now you might see, that anything any 'being' in the universe requires a 'consciousness' envelope or 'aura of spatial awareness'; namely of the scale just derived at the 14 TeV energy level of the quantum.

Now big is the Hydrogen-Atom?

It has a radius of about 1 Angstrom or 10^{-10} meters and a 'size' much bigger than the 'consciousness' radius by an order of magnitude 10.

The 'size' of a neutron and the nuclear interaction scale is about 3 fermi on the order of the Re at so 3×10^{-15} meters and 'too big' by order of 5.

This then shows, that even a neutron carries 'spacial consciousness', as there would be so 200 trillion 'space-consciousness' quanta within a neutron.

So what is the 'smallest' consciousness' carrier?

The smallest 'particle' in the universe is the 'point-particle' in the electron, known to have a 'size' at or smaller than the 10-20 meter scale.

So is the 'point particle' electron conscious?

IT becomes conscious as the 'classical electron' defining the classical interaction at the 3 fermi scale, BUT in a coupling to OPPOSITE electro-charges, such as definitive for the elementary table of the atomic elements.

So the list for non-conscious being in the universe is: Nil.

The definition for the 'Soul' then of course incorporates the wave-particle duality and the consciousness coupling between the particle selfstate (elementarily the point particle electron) and the wave eigenstate (elementarily the classical electron radius)."

JS

The good news is if your head hurts now, you are most definitely conscious.