

Theoretical

UNITY CONSCIOUSNESS: *A QUANTUM BIOMECHANICAL FOUNDATION*

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ABSTRACT

Citing research in consciousness, quantum physics, biophysics and cosmology, we propose the collective amplification of quantum effects as the basis for scientifically describing Kundalini awakening, and the higher-order, emergent phenomenon of Unity consciousness. Such alterations of consciousness have their origin in quantum-scale processes, such as self-induced transparency, superradiance, superpositions, quantum tunneling, and Bose-Einstein condensation. Microtubules are considered to be key components in non-local, quantum processes critical to human consciousness. We postulate that bundles of fibers (neural cells), each containing numerous microtubule “lasers” acting in unison, collectively result in a massive surge of light energy to the brain. The sudden onset and radically altered nature of such states are consistent with a model based on the activation of a laser. The liquid crystalline nature of the human body likely provides a foundation for the non-local aspect of Unity consciousness. The unifying paradigm of the “quantum hologram” is introduced to apply quantum properties to macroscopic events.

KEYWORDS: Unity consciousness, kundalini, microtubules, non-local communication, Bose-Einstein condensate, liquid crystals, dark matter, zero-point energy

INTRODUCTION

The history of humanity has been irreversibly altered by a relative few individuals who have attained the highest state of consciousness known to humankind: Unity consciousness, described as a merging with the Oneness of all Creation. The historical figures of Buddha (“the illumined one”), Jesus Christ, and the contemporary spiritual leader, His Holiness the Dalai Lama, exemplify those who have contributed to uplifting consciousness through their enlightenment. However, while spiritual traditions enumerate the many possible paths to enlightenment, there has been no adequate scientific explanation of its physiological basis. We begin by exploring the phenomenology of Unity consciousness. We next review the pioneering research in consciousness, quantum physics, biophysics and mathematics that forms the basis for our theory that amplified quantum processes on a cellular level can ultimately provide the scientific explanation for Unity consciousness.

UNITY CONSCIOUSNESS AND KUNDALINI AWAKENING

Unity consciousness is notoriously difficult to comprehend, relative to ordinary consciousness.¹ Ordinary consciousness breaks up the unified field with each act of perception; hence, a world of discrete, separate objects appears to us in what is termed *subject-object consciousness*.^{2,3} Embodying the Hindu philosophy of nonduality which holds that only the undivided Self is ultimately real, Advaita Vedanta teaches that nothing truly exists but the One Consciousness, or Brahman. The ultimate understanding—Unity consciousness—means to become identical with Brahman, which is all That Is. “It is the *nirvana* of Buddhism, the *samadhi* of yoga, the *satori* of Zen, the *fana* of Sufism, the *shema* of the Kabbalah, and the Kingdom of Heaven of Christianity. Attainment of this kind of consciousness causes a permanent alteration in the practitioner’s way of being in the world...^{4(p.203)}

What is enlightenment? Ancient and modern examples abound—from Western sages to Eastern saints and gurus—that illustrate its influence on human evolution. We will perforce use many quotations from the sages who live among us to describe the nature of the state.

The ancient *rishis*, the seers of Universal Truth, directly and fully realized atman, or their own true nature, to be boundless awareness. This ultimate realization at the root of all civilizations is not possible through faith, through reasoning, or through scientific investigation. Conventional religion is limited by cultural conditioning. Philosophy is limited to what can be apprehended by the rational mind. Science is limited to the information provided by the senses or by instruments that extend the senses but remain on the material plane. Supreme Reality simply cannot be approached by the ordinary intelligence, which is focused through cultural norms, reason, and sense experience.^{5(p.109)}

Thus spoke Ramakrishna, the great Bengali sage (1816-1886) called *paramahansa*, or Great Swan. A *paramahansa*, is a fully awakened being, “a confluence of all the lineages of sacramental power—initiatory successions that have been cherished and carefully transmitted by generations of disciplined practitioners.”^{5(p.1)} Awakening to Supreme Reality, according to Ramakrishna, involves being in the presence of awakened sages such as himself. Spiritual seekers call such attendance *darshan*—being within the physical presence or “sight” of the guru to quicken the “subtle vibrations” of the disciple. In scientific terms, such a doctrine suggests a process of resonance or entrainment—and though previously uncharacterized, physiological changes must clearly be induced before enlightenment can occur.

Kundalini energy is fundamental to this discussion because its activation is said to be a necessary precursor to enlightenment. “According to Vedic scriptures Kundalini energy is the fundamental power of creation and the primary consciousness of the universe.”^{6(p.72)} Kundalini, a term derived from the ancient Yogic tradition, literally means “coiled up” like a serpent. It is said to be a subtle form of bioenergy latent in each of us that remains dormant at the base of the spine until activated by various spiritual disciplines. Although the physiological effects of such an awakening are very real to those experiencing them, the nature of the transmitted energy remains uncharacterized by science. Enlightened individuals are also said to possess the ability to transmit this “energy” to others, thereby stimulating a Kundalini awakening, described by Sannella below.

According to this Indian tradition (Tantra Yoga), the kundalini is a type of energy—a “power” or “force” (*shakti*)—that is held to rest in a dormant, or

potential, state in the human body. . . . When this energy is galvanized, “awakened,” it rushes upward along the central axis of the human body, or along the spinal column, to the crown of the head. . . . Upon arriving there, the kundalini is said to give rise to the mystical state of consciousness, which is indescribably blissful and in which all awareness of duality ceases. [italics added]^{7(p.25)}

Gopi Krishna was among the first to provide an intimate account of this process of which few Westerners had any prior knowledge.

. . . an automatic mechanism, forced by the practice of meditation, had suddenly started to function with the object of reshaping my mind to make it fit for the expression of a more heightened and extended consciousness, by means of biological processes as natural and as governed by inviolable laws as the evolution of species or the development and birth of a child.^{8(p.56)}

In the following, Gopi Krishna describes his 1937 Kundalini experience, said to be a natural biological phenomenon that any healthy human body can attain at a certain state of evolution. “Suddenly, with a roar like that of a waterfall, I felt *a stream of liquid light entering my brain through the spinal cord*. . . . [I was] a vast circle of consciousness in which the body was but a point, bathed in light and in a state of exaltation and happiness impossible to describe.” [italics added]^{8(pp.12-13)} Krishna’s lucid phenomenological report implicates the CNS as the primary conduit for an energy flow whose evolutionary process will be explicated below.

But what is enlightenment? No matter the paths, Self-realization itself, is one state, whether realized through traditional or non-traditional means, through sacred scripture, seemingly spontaneous experience or initiation. Our examples will reveal what even a touch of such grace engenders. We begin with time-encapsulated, even momentary mystical experiences, until ultimately we encounter the fully enlightened *jnani*, that one who has realized the Self Absolute. Above all, we want to delineate Unity consciousness in terms of certain of its characteristics: (a) the holographic awareness of the Unity of all existence; (b) the experience of the structure of space and time as non-local; (c) the ability to engage in non-local communication; (d) the experience of brilliant, self-luminous light.

Holography is a helpful metaphor for understanding how the mind can seemingly experience the Unity, or Ground of Being, of all existence.⁴ According to physicist David Bohm, consciousness on the level of what he terms “the implicate order” has access to all information embedded within the whole.⁹ Holographic consciousness functions on a level where all things are “enfolded” into one another, and hence in direct contact. Consider Richard Moss’s seemingly spontaneous mystical experience at the age of thirty. Though his shift in consciousness initially seemed utterly spontaneous, it was most certainly a developmental process that included not only a disciplined meditation practice, but several crucial, psychospiritual milestones.

At that moment life changed forever. The descriptive words that came in the following days all involved the imagery of Marriage and Union. I am at once the Lover and the Beloved. All of Existence confirms me and is none other than Myself. . . . Every thought, sensation, perception unites me with the Divine and is the Divine.

In that moment, all of creation became a single consciousness, a state of indescribable glory and unspeakable peace. The fear that existed when I stood rooted in egoic consciousness was now the most exquisite nectar. I was suffused with a current of aliveness so transcendently blissful that there is no analogy within ordinary experience that even approximates it. It was a living bliss, but it was also the most profound intelligence.^{10(p.25)}

Unity consciousness is an identification with all of Creation. It is an identification that overwhelms and subsumes all other identities. From the moment of Suzanne Segal’s awakening, all thoughts, feelings, and perceptions would appear and disappear against the backdrop of Unity consciousness. Such a state renders all thoughts, feelings and perceptions—as part of the dream of relative reality from which the spiritual adept has awakened. Suzanne Segal’s account of slipping into Unity consciousness while driving serves to illuminate how simple and tangible such awareness can be.

. . . I was driving north to meet some friends when I suddenly became aware that I was driving through myself. For years there had been no self at all, yet here on this road, everything was myself, and I was driving through me to arrive where I already was. In essence, I was going nowhere because I was

everywhere already. The infinite emptiness I knew myself to be was now apparent as the *infinite substance* of everything I saw. . . .

As I drove through the wintry landscape . . . everything seemed more fluid. The mountains, trees, rocks, birds, sky were all losing their differences. As I gazed about, what I saw first was how they were one; then, as a second wave of perception, I saw the distinctions. . . . A lovely calm pervaded everything—no ecstasy, no bliss, just calm.

. . . From that day forth I have had the constant experience of both moving through and being made of the “substance” of everything. This is what is experienced first—the stuff of unity, its texture, its flavor, its substance. This non-localized, infinite substance can be perceived not with the eyes or ears or nose, but by the substance itself, out of itself. . . . Form is like a drawing in the sand of oneness, where the drawing, the sand, and the finger that draws it are all one.¹¹(pp.130-131)

According to Suzanne Segal, the shift to Unity consciousness was self-evident. When the substance of creation is perceived *first* and distinctions *second*, there is no doubt what state of consciousness is prevailing.

Our scientific description of the higher-order, emergent phenomenon of Unity consciousness will account for such experiences as Andrew Cohen’s, who at age sixteen experienced an opening into the Absolute. His direct experience *of space and time as non-local* exemplifies the underlying quantum-level structure of reality.

Suddenly the doors of perception opened. It seemed like the walls in the room had disappeared and suddenly there was infinite space. And this infinite space was full of energy. And this energy was conscious, it was aware of itself.
. . . .

Then what happened was that I realized that this energy which was aware of itself was intelligent—there was intelligence—and the nature of it was love. Unbearable love. Excruciating love. And it also became apparent that everything that existed in the manifest universe was of the same substance, which was this consciousness. And in that it became apparent that *every point in space was exactly the same point as every other*. For example, now we’re here in this room. . . . Before that I was in Europe. Before that I was in America.

While these all seem to be different places, what I realized in that moment was that every place I could be was the same point, literally and actually. [italics added]^{12(p.31)}

The deconstruction of spatial and temporal dualism appears to enable so-called “miraculous” abilities, though these are largely eschewed by those who are enlightened.⁴ Richard Moss describes how the onset of Unity led to an experience of non-local, “telepathic” communication.

As the state of Union or Oneness subsided, I went for a walk. . . . Every house I passed radiated aliveness. *I could sense the occupants, their joy and suffering, their aspirations and fears, as though they were telling me directly.* I had no preference; there was no high or low in the perfect naturalness of it all. I was in a state of devotion, but not to any abstract deity. God was immanent, inseparable from all that entered and was “my” awareness. I celebrated God in the pavement, the litter, the grass and the trees. [italics added]^{10(p.27)}

According to the great wisdom traditions—enlightenment is not a change of state but the recognition of the nature of any present state. How does *sahaja*, seeing clearly, manifest itself? Even a glimpse of ultimate reality is a state of consciousness where the world of ordinary perception is virtually *de*-constructed to its raw material—said by the Self-realized to be self-luminous light. One of the most significant components of enlightenment, Kundalini, and also near-death experiences (NDEs), is the presence of brilliant, conscious light often referred to as the “source.” These extraordinary experiences share one aspect—light—that is central to the basic nature of quantum biological processes in the physical body.

The experience of “Ajja,” or grandfather, as India’s Ramachandra is known, “is of the Universal soul only, that is energy, light and power.” Ajja’s reputation as a living master of Advaita or *non-duality* reaches throughout the state of Karnataka in southern India.

We only *use* the word “I.” Whatever there is in this body, for that we say “I” as a simple indication. We say that it is “me,” but I am nothing. I am not the body. I am not even a power. What really exists is That whose nature is light, its nature is *satya* [ultimate reality]. It is truth, it is bliss, it is peace, and that is the real existence. . . . The individual self has become one with That.^{12(pp.32-33)}

Ajja's identification with the Absolute Self that is Light is the quintessential enlightenment experience. Melvin Morse hypothesizes that the Light phenomenon involves an excitation and alteration of the body's electromagnetic field that serves to "rewire" the brain's circuitry, and open previously unused neural pathways in the right temporal lobe, an area he calls "the seat of the soul."¹³ While his theory deals with the gross level of neuroanatomy, this paper will examine the fine-structure and electromagnetic properties of the central nervous system(CNS)—on the level of quantum interactions—and their role in the evolution of human consciousness.

The physiological basis for states of transcendent consciousness has been investigated in terms of EEG measurements.¹⁴⁻¹⁷ In both literature and art, mystical traditions depict sages and saints with light (a halo or aura) surrounding an area above or around the head (the crown chakra). While Wade has argued that the source of Unity consciousness, whether emanating from inside the brain or an energy field outside the body, is unknown, either location would be consistent with specific electromagnetic fields produced by the brain during certain altered states.¹⁸

The use of positron emission tomography (PET), and functional magnetic resonance imaging (fMRI) has provided further insight into the large-scale, structural brain correlates and electroneurological dynamics of transcendent consciousness. Dr. Richard Davidson has used PET scans of meditators to reveal asymmetries in blood flow in the anterior part of the brain, that is, directly behind the forehead.¹⁹ Dr. Andrew Newberg's neurophysiological research, termed "neuro-theology," implicates the brain's right parietal lobe in the biological basis of religious experience that might allow us to apprehend the unity of God or the oneness of the universe.²⁰

Beyond established physiological correlates, we will argue that Unity consciousness represents a phase shift to a higher state of consciousness that is based on the collective amplification of quantum processes within human physiology. It is the *amplification* of long-range, coherent quantum phenomena such as super radiance, laser-like effects and self-induced transparency in microtubules, that are proposed by Jibu and others to account for ordinary consciousness—that is ultimately the basis for the emergent phenomena of Kundalini awakening, and Unity consciousness.²¹⁻²⁵

QUANTUM MECHANICS: IMPLICATIONS FOR REALITY AND PERCEPTION

Quantum mechanics characterizes the physical properties and energetic interactions of fundamental particles, called *quanta*, at a basic level of physical reality. Mathematics is the language used to describe such interactions and their relationship to space and time. Each *quantum particle*, such as an electron or photon, is characterized by a wave function. However, according to a principle tenet of quantum mechanics, it is not possible to simultaneously know both the location and the velocity of an individual quantum. Simply looking at a quantum particle requires the use of light that changes the path of the quantum, thereby disallowing a complete description of its position (the *Heisenberg uncertainty principle*). Indeed, interactions at the subatomic level bear little resemblance to those of macroscopic objects and forces in our everyday lives that fall within the purview of classical mechanics.

Four concepts of quantum mechanics highlight subatomic interactions. The first deals with how energy is continually emitted and absorbed in discrete bundles. When an electron in an atom's outer shell jumps instantaneously down to a lower level, the atom emits a photon (or quantum) of light of a distinct frequency and therefore a distinct color. This *quantization of energy* is what gives quantum mechanics its name. Secondly, quanta, including electrons, photons and other entities, can be described as either particles or waves. This *wave-particle duality* helps explain certain phenomena associated with light. Such quanta or wave-particles can also be thought of as probability waves. Thirdly, when wave-particles or probability waves encounter a barrier, the bulk of the wave is reflected. Remarkably, however, a small part of the wave can actually *tunnel through* the barrier. The final concept, *non-locality*, refers to the movement and communication between quanta that occurs instantaneously, independent of the distance involved. Tunneling and non-locality will be further discussed below.

The macroscopic reality we perceive with our physical senses would seem much less solid—if we were able to perceive at the quantum level. Historically, physicists have tried to interpret quantum mechanics to explain human consciousness. What reality actually is, and our perception of it, are said to be inextricably linked through a creative act of consciousness. Indeed, according

to physicist David Bohm, we may even construct the dimensions of space and time. Bohm theorized that our brains mathematically *construct* “objective reality” by transforming frequencies that are ultimately projections from a deeper order of existence beyond both space and time.⁹ This deeper level he terms the *implicate* order, whereas our everyday level of reality that arises out of the implicate is termed the *explicate* order.

Bohm hypothesized that the seemingly tangible reality of everyday experience is a sort of illusion, similar to a holographic image. Karl Pribram’s theory of consciousness incorporates a holographic representation of the brain that continually makes rapid implicate-explicate transformations.²

Lens-like perception limits consciousness to the explicate order and contents of awareness. Lens-like perception operates in the “normal,” bounded four dimensions, creating an identifiable, finite, historical individual personality (the quantum parallel is Heisenberg’s particle, a material identity). Lens-less perception accesses timeless, spaceless energies (i.e., quantum waves) that have yet to be translated into objects by Pribram’s Fourier series brain activities, but that are no less real. Lens-less perception captures the Absolute nature of the implicate world.^{4(p.219)}

Bohm construes physical reality to be an undivided whole in a state of continual flux. Given such interpretations of quantum theory, perhaps Unity consciousness can be considered as a direct, unmediated perception of Bohm’s implicate order—known in mystical traditions as the Absolute. In the following, His Holiness the Dalai Lama compares the experience of ultimate reality or “emptiness” to conventional reality. “When you deeply experience the ultimate reality, it is so powerful that the understanding of a conventional, objective reality will be very different . . . the influence and appearance of conventional reality will be almost negligible.”^{26(p.80)} Apparently, material objects are not what they seem. Yet the Buddhist notion of emptiness (*shunyata*) does not mean blank or void; it can mean the unobstructed perception of light.

Sri Yukteswar [Yogananda’s teacher] . . . struck gently on my chest above the heart. . . . Soul and mind instantly lost their physical bondage and streamed out like a fluid piercing light from my every pore. An oceanic joy broke upon calm endless shores of my soul. The Spirit of God, I realized, is exhaustless Bliss; His body is countless tissues of light.^{27(pp.166-168)}

Such an experience, in which quantum-level reality is seemingly apprehended, suggests that quantum processes on a sub-cellular level can be embodied to a degree that will reflect that level of reality.

Biological processes within the physical human body function at a sub-atomic level, and as such, are *quantum mechanical*. Quantum biology involves the dynamics of biological structures and energy utilization at that fundamental level. Indeed, life could not exist without these ubiquitous processes. We will argue that quantum phenomena that occur within the biological systems of the human body—when multiplied and amplified—give rise to the higher-order, emergent property that is Unity consciousness. Several areas of research, considered together, can provide a new understanding of the quantum mechanical nature of the CNS—the physiological structure underlying higher states of consciousness.

HUMAN NEUROPHYSIOLOGY AND MICROANATOMY

Unity consciousness is described as an extreme alteration of awareness, markedly different from ordinary subject-object consciousness. Self-reports of Kundalini awakening and Unity consciousness, including descriptions of an “inner” bright light, roaring sound and bodily energy surges, may result from a greatly amplified flow of coherent electromagnetic energy upward via the spine to the brain. We hypothesize that with the attainment of higher states of consciousness, a natural process takes place that allows for an amplified flow of energy throughout the CNS. A brief description of spinal cord structure at the level of neural cells and axons sets the stage for understanding coherent nanopulses of light as the basis for *emergent properties*, namely higher states of consciousness.

A cross-section of the spinal cord at the uppermost or atlas vertebra reveals its complex structure, consisting of many millions of individual neural cells. Some neural cells within the human spinal cord are unique in that their axons extend for nearly one meter. For a sense of proportion, if a meter-long axon is enlarged to one inch in diameter—the size of a garden hose—it would extend for approximately 160 miles (~258 km). The axons within the spinal cord can be likened

to a large bundle of fiberoptic cables facilitating two-way telephone transmissions. The primary organizing and structural elements within neural cells are *microtubules*.

MOLECULAR SELF-ORGANIZATION IN MICROTUBULES

Each of the billions of Neural cells within the CNS contains numerous complex protein structures called “microtubules.”^{24,25} (See Figure 1) Microtubules (MTs) are microscopic, self-organizing, tubular protein structures present in nearly all eukaryotic cells (those with a nucleus). Eukaryotic cells include neural cells as well as most other cells in the human body—and throughout the animal kingdom.

Microtubules form a complex, skeleton-like structure that physically supports the entire cell, giving it shape and resilience.^{28,29} In addition to their purely physical attributes, microtubules comprise a sophisticated communications network within each cell that is essential for the cell’s overall functioning. Indeed, the microtubule network is referred to as the cell’s “brain.”^{21,22,30} A crucial part of the cell’s MT structure is the “microtubule organizing center” that manages the cell’s functions, including replication of DNA during the critical process of cell division. Despite the present understanding of MT protein structure and overall network organization, it is not completely understood how MTs self-organize on a cellular level and orchestrate all functions, including communication, within the human CNS.

MICROTUBULES AS RESONATOR TUBES

The collective functioning of MTs, specifically in the spinal cord, may provide the basis for the amplification of quantum effects that results in expanded consciousness. To begin with, microtubules are natural, miniature resonators. Resonators are chambers with physical dimensions that amplify internal oscillations of electromagnetic or acoustical waves of specific frequencies. Wind chimes are a familiar example of resonator tubes. Each chime has a specific diameter and length designed to resonate at a specific frequency. Wind chimes function through the action of amplified acoustical oscillations in which the

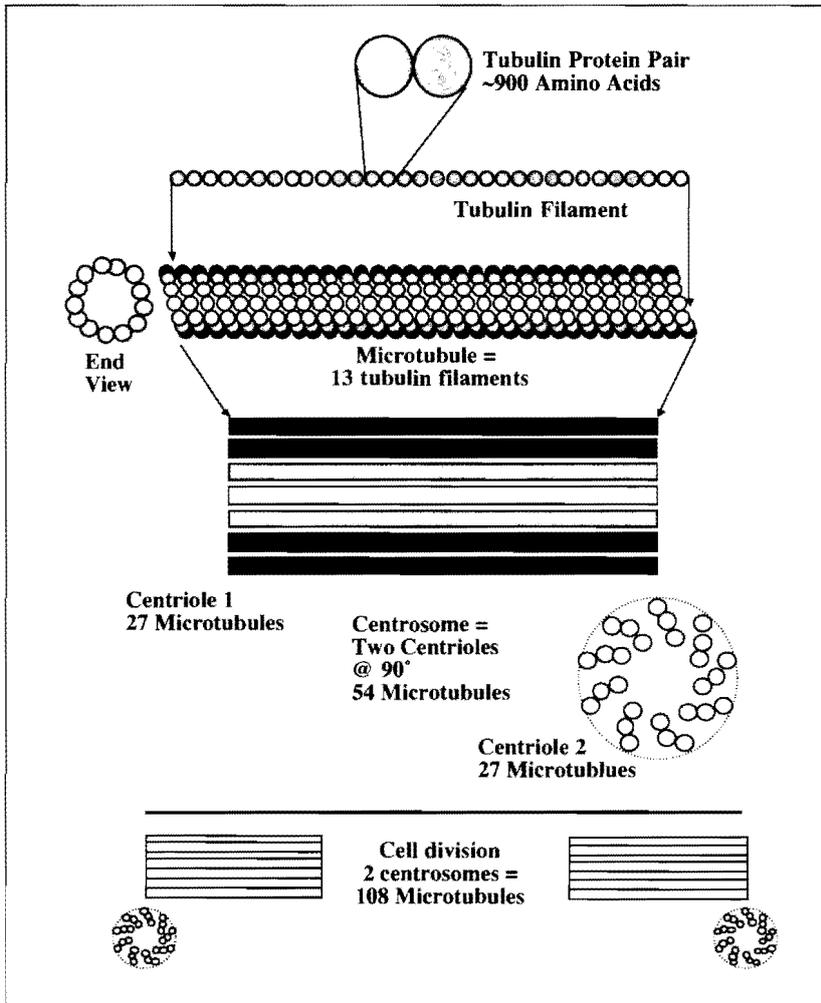


Figure 1.

flow of wind past the ends of the tubes creates resonant vibrations within the tubes that we hear as a tone—actually a group of tones clustered around a primary frequency. However, rather than metal chimes being energized by the wind, the cytoskeleton (or cellular framework) of MTs appears to be energized by the body's natural 98.6° F random metabolic energy .³¹

Lasers represent another example of resonator chambers. In lasers, however, resonance occurs with light vibrations rather than sound. While a single, unique sound comes from each individual wind chime, a unique color (or frequency) of light is associated with each laser. Laser light can be created in colors ranging throughout the visible spectrum, as well as infrared and ultraviolet light, normally invisible to humans. It results from the collective absorption and re-emission of energy by countless atoms acting in unison. The intense, narrow beam of a laser demonstrates *quantum coherence*, in which many emitted light particles (photons) oscillate together at the same frequency and phase—resulting in an intense light beam of a single color. In effect, the many light particles become like one giant photon. A useful analogy to understand the properties of a laser beam would be to envision thousands of soldiers (atoms) marching in parade step, all wearing the same color uniform. Their lock step represents being “in phase” while their uniform color represents the laser beam’s color.

Microtubules, as the name implies, are molecular-scale tubes that resonate at specific frequencies of *both* light and sound. Microtubules oscillate with the following electromagnetic and acoustic frequencies: $f_{EM} = 6 \times 10^{15}$ Hz and $f_{AC} = 5 \times 10^{10}$ Hz (Hz = cycles per second).³² Nature herself has evolved groups of microtubules—centrioles—that resemble wind chimes in their overall physical form.³³ Moreover, evidence from recent biophysics research and mathematical modeling indicates that MTs within neural cells act much like lasers that emit extremely tiny, intermittent pulses of coherent light.³⁴ “Practically all organisms emit light at a steady rate from a few photons per cell per day to several photons per organism per second.”³⁵

Quantum physics describes a *photon* as the minimum quantity or “quantum” of light that is naturally emitted by atoms. When an electron in an atom spontaneously drops from an outer to an inner shell, it emits one photon, one bundle of light energy. The “color” of that photon, that is, the frequency of energy released, depends on how far the electron jumped. Photons can be envisioned as packets of energy waves that travel the length of the MT. These single pulses of light may be the fundamental means by which cells transmit information via the microtubule network. *Laser-like, pulsed, coherent photons may be the method by which communication takes place both within neural cells and among adjacent cells.*³⁶

Resonance appears to take place at the most fundamental level—within the neural cell—where numerous MTs are situated parallel to one another along the length of the axon. Microtubules in the CNS are all comprised of the same repeating protein structures, suggesting that all emissions are of the same frequency. When a MT resonates with a distinct vibration, nearby MTs are also stimulated to resonate at that same frequency. This coupling or resonating of MTs—of precisely the same diameter—serves to amplify both acoustical and electromagnetic vibrations.

Bundles of microtubule-filled axons in the spinal cord can be compared to bundles of glass fiberoptic cables that carry information in the form of light pulses. Coherent individual photons in MTs would thus function like signals in fiberoptic lines.^{37,38} Coherent, single photon emissions have already been demonstrated in the laboratory, thereby proving that these kinds of signals can be generated and transmitted.³⁹ *We postulate that bundles of fibers (neural cells), each containing numerous microtubule “lasers” acting in unison, may collectively result in a surge of light energy to the brain.*

The perception of brilliant, white light that infuses the entire body—a fundamental aspect of Kundalini and Unity consciousness—is consistent with an increased flow of electromagnetic energy within the CNS. According to this theory, countless “energized” MTs within parallel axons simultaneously conduct an increased flow of acoustical and electromagnetic vibrations that are perceived by the subject as roaring sound and inner light. The enhanced perception of light may be due to the amplification of nanopulses of light that occur continually throughout the body’s MT networks. Brilliant, white light may result from a surge of coherent light channeled to the brain by the collective agency of countless spinal cord neural cells.

EMERGENT PHENOMENA

The sudden onset and radically altered states of Kundalini and Unity consciousness are consistent with a model based on the activation of a laser. Although individuals may prepare themselves through years of meditation, entering Unity is described as a *precipitous phase shift* into a state qualitatively unlike anything that preceded it. Macroscopic lasers typically must reach an energetic threshold

before a phase shift occurs. However, recent research in *microscopic*, thin-film lasers has demonstrated extremely low threshold lasing, and indeed, threshold-less lasing.⁴⁰ They exhibit coherent light emission when virtually any amount of light of specific frequencies strikes them. The most appropriate model for Unity consciousness might thus be based on the collective effects of very-low-threshold lasing, or threshold-less lasing.

Within the domain of microscopic laser materials, MTs apparently produce coherent micropulses of single photon light with only the slightest thermal provocation. They likely are powered by the random energy of surrounding body heat, as compared to the external light stimulation required by lasers. If extremely low threshold or threshold-less lasing occurs in MTs, such emissions would resonate with other MTs in close proximity throughout the CNS, potentially resulting in specific states of consciousness.

Furthermore, coherent processes do not require every particle to participate. Indeed, in coherent phenomena such as superconductivity, in which electric currents flow indefinitely, “. . . only one part in ten thousand of the material participates in the phase change, but the macroscopic properties are dramatically altered.”^{41(p.79)} Similarly, not all particles are involved in laser-like phenomena. In addition, in macroscopic lasers, as little as 7% mirror reflectivity may be adequate for lasing to occur. Under certain conditions, a form of lasing called coherent backscattering may even occur *without* mirrors, demonstrating that such coherent phenomena are surprisingly easy to achieve.⁴⁰ Regardless, the macroscopic impact is dramatic. With regard to states of consciousness, it is reasonable to assume that when a critical level of collective, neurological coherence is achieved, a significant alteration of one's state of being takes place.

Long-range, coherent quantum phenomena such as superconductivity and lasers are examples of emergent properties occurring in complex systems. Emergence implies a qualitatively new property or phenomenon that appears at a hierarchical level above the level at which rules of interaction are operating.⁴² “Consequently, at a critical degree of coherence, totally new macroscopic properties emerge.”^{23(p.92)} Evidence indicates that MTs may represent the physical structures responsible for the emergence of consciousness. For example,

anesthetics impair the functioning of MTs, an effect that leads to loss of consciousness.⁴³ Experimental research also links MTs to bio-information processes such as memory and learning.³⁴ The net effect of countless bundles of neuronal MT “cables” would thus be the basis for a profound, emergent collective effect: *Consciousness*. Consciousness, as an emergent property, is thus considered to result from collective quantum effects that occur at a critical threshold in MT networks within the CNS.³²

Moreover, according to Koruga, “brainwaves (EEG) may originate from the oscillatory processes of microtubules and ionic water clusters . . . through the collective quantum action of many (10^{12}) of the neurons in the brain.”^{32(p.256)} It would follow that *levels of consciousness* correspond to EEG measurements of the oscillatory or acoustical vibrations of MTs. Meditation is known to affect brainwave patterns, which may be effectively generated via microtubule oscillations. Based on the foregoing, we propose that at a critical physiological threshold, ordinary subject-object consciousness, itself a microtubule-generated emergent state, goes through a phase shift to the higher-order, emergent state of Unity consciousness.

THE LIQUID-CRYSTALLINE BODY

Mae-Wan Ho has demonstrated that biological organisms, including the human body, are composed of liquid crystalline materials.⁴⁴ Such materials include connective tissue and cell membranes, plus other tissues that fill up the spaces between organs. “The connective tissues of our body include the skin, bones, tendons, ligaments, cartilage, various membranes covering major organs and linings of internal spaces.”⁴⁵ Liquid crystals are fluids containing stiff, rod-like, organic molecules that tend to form ordered structures. They are states of matter that encompass a wide range of fluidity—from solid crystal to semi-solid proteins, to gel-like cellular fluids. Whereas the calcium phosphate crystals in bones are solid, and the collagen in bone is semi-solid, each is referred to as liquid crystal. Yet when the two are combined in a matrix, the resulting substance—bone—is stronger than steel, yet flexible. Furthermore, bone tissue possesses unique electromagnetic properties.

Ho's research sheds new light on the body's ability to transmit information and conduct energy. Liquid crystals, used extensively in calculator displays and flat screen monitors, possess properties that make them ideal for rapid intercellular communication. Within the coherent, liquid crystalline human body, cellular intercommunication is likely non-local.⁴⁶ Non-locality refers to processes in which energy or signals propagate *across any distance instantaneously*. Non-local communication is (1) instantaneous, (2) independent of distance, and (3) impervious to shielding. By contrast, signals that propagate in a finite period of time are called *local* signals, for example, the visible electromagnetic light to which our eyes respond. According to Ho, on the molecular scale, non-local communication occurs within the physical human body by virtue of its liquid crystalline structure. "Weak signals originating anywhere within or outside the system will propagate throughout the system and become amplified, often into macroscopic action."⁴⁶

We refer again to the model of the laser, whose core element is a crystal. A laser's coherent light, in addition to carrying enormous amounts of information, can also transmit intense pulses of energy. Quantum non-locality is a characteristic of coherent systems such as lasers—and the light pulses within MTs. Non-locality is an inherent property of signal propagation within the MT. Consider the effect of laser-like, pulsed, coherent photons generated within MTs—occurring in the liquid crystalline body. The occurrence of conscious awareness at a critical threshold is considered to result from the cumulative effect of MT "lasers" acting in unison. The liquid crystalline body would serve to facilitate the collective effect of those surges of light energy to the brain, thereby inducing the emergent phenomenon of ordinary, subject-object consciousness.

The next higher-order, emergent property that is Unity consciousness may result from an even higher degree of coherence. A pure, coherent state for an entire biological system may be attainable "only under very exceptional circumstances, as during an aesthetic or religious experience when the "pure duration" of the here and now becomes completely delocalized in the realm of no-time and no-space."⁴⁷ This suggests that the liquid crystalline body, having reached a critical degree of coherence, makes such an aesthetic or religious experience possible. And ultimately, enlightenment.

What is thereby acquired is not linear “information,” but rather a profound and direct comprehension of the nature of reality beyond intellectual understanding or sensory perception. That which is known via Unity consciousness is non-local, such as the non-local structure of space and time described by Cohen and Segal.^{11,12} The liquid crystalline nature of the human body likely provides the foundation for this non-local aspect of consciousness.

QUANTUM BIOLOGY

SELF-INDUCED TRANSPARENCY AND SUPERRADIANCE

Microtubules in the CNS possess another remarkable property suggesting that they are highly efficient, laser-like structures. *Self-induced transparency* is the ability to become transparent to specific frequencies of coherent light that propagate within the MT. Within the same MT, other frequencies of light do not necessarily stimulate transparency.⁴⁸ Self-induced transparency results in a communications conduit that exhibits virtually no energy loss or signal degradation. The entire cellular communications network thus becomes extremely energy efficient. Unlike manufactured fiberoptic cables that require signal boosting at regular intervals, the MT communications system has no such requirement.

Microtubules exhibit a further electromagnetic property known as *superradiance*. Microtubules are referred to as paracrystalline ensembles due to their extreme regularity of form, combined with their organization into networks. “Superradiance” refers to the conversion of energy of various kinds into coherent, electromagnetic energy. The microtubule “can transform any incoherent, thermal and disordered molecular, electromagnetic or atomic energy into coherent photons inside the microtubule.”^{21(p.199)} Coherent photons are the basis for generating holographic information, such as with lasers. The property of superradiance could prove to be the basis for quantum holographic communication within and between living cells. Single photon holography has already been demonstrated in the laboratory.³⁹ Within this model, neural axons containing superradiant MTs—can be viewed as the principle structural elements for intercellular communication and energy flow.

The transmission of signals that constitutes communication *is* energy flow. The quantum properties of self-induced transparency and superradiance suggest that the neural axons within the CNS function as conduits for the amplified energy flow described as Kundalini. Light pulses within transparent and superradiant MTs, and the resultant highly efficient CNS—set the foundation for an energy flow whose amplification may further result in phase shifts. Higher-order processes, such as Unity consciousness, potentially emerge.

According to a seminal paper on quantum optical (light) coherence in MTs, “Superradiant optical computing in networks of microtubules and other cytoskeletal structures may provide a basis for biomolecular cognition and a *substrate for consciousness*.” [italics added]^{21(p.195)} Microtubule signal coherence is crucial to intercellular communication via superradiance and self-induced transparency—quantum processes that when amplified may shift one from ordinary consciousness to higher states. Hagen, et al. address Tegmark’s assertion that microtubules lack the ability to sustain coherence in the warm and wet, thermally noisy, biological milieu of the human body, referred to as *environmental de-coherence*.⁴⁹ Hagen, et al. have demonstrated that microtubules avoid de-coherence in much the same way that lasers avoid de-coherence at room temperature, namely, by functioning faster than de-coherence can occur.²²

PROTEIN FOLDING AND QUANTUM SUPERPOSITION

Quantum biology brings to light a remarkable property of proteins. As proteins form, long strings of amino acids are linked together. Specific combinations of the 22 possible acids are strung together in organelles within the cell body. Tubulin protein, the building block of Microtubules, is composed of roughly 450 amino acids. This amino-acid chain folds itself into a complex and precise, three-dimensional shape that is crucial for its specific functioning in the cell. It folds itself very quickly, thus becoming part of a MT. Of the 100’s of trillions of possible shapes for each of many thousands of distinct proteins in the human body, the single most efficient shape for a given function emerges. No current computer can begin to solve even the simplest problem of protein folding because of its overwhelming complexity. Protein folding occurs countless trillions of times every day in the human body.

Quantum theory provides a possible explanation for this folding capability. It is known as “quantum superposition,” which refers to the ability of proteins to assume *all possible shapes simultaneously*. As counter intuitive as this seems, evidence suggests that it accurately describes the protein folding process. Rather than sequentially folding through all possible configurations, in effect, folding occurs all at once. Quantum superposition during protein formation plays a vital role in the collective effect of MT photon emission that occurs throughout human physiology.^{24,50} Tubulin protein is continually organized into MTs whose emission of photons is believed to result in the emergent, collective effect of *ordinary consciousness*: the cumulative effect of photon emissions that occur trillions of times throughout the body.

Consciousness may then be seen as a dynamic macroscopic quantum state originating from a mixture of coherent states originating in microtubules. . . . Thus Jibu et al. suggest that microtubules can behave as optical waveguides which result in coherent photons: they estimate that this quantum coherence is capable of a superposition of states among microtubules spatially distributed over hundreds of microns. These in turn are in superposition with other microtubules hundreds of microns away in other directions and so on. Consequently microtubule quantum dynamics may be coupled over brain-wide areas, a superposition which could . . . account for unity of thought and consciousness.^{23(pp.104-105)}

We suggest that this process ultimately leads to superconscious awareness as well. With a sufficient increase in photon emissions, the CNS may exceed a critical energy threshold, resulting in surges of energy upward through the spine. The neurons of the CNS would then increasingly function in a collective, coherent, laser-like manner. “In the ideal, the organism is a quantum superposition of coherent activities, with instantaneous noiseless intercommunication throughout the system.”⁴⁷

Though the precise mechanism has yet to be determined that initiates the emergence of higher states, evidence exists that the CNS is capable of emitting a massive surge of light under specific circumstances. Physicist Janusz Slawinski has demonstrated that dying organisms emit a burst of electromagnetic energy.⁵¹ Physician and near-death researcher Melvin Morse hypothesizes that this light phenomenon involves an excitation of the body’s EM field that serves to “rewire” the brain’s circuitry, and open previously unused neural pathways in the right temporal lobe, the area he calls “the seat of the soul.”¹³ Morse attrib-

utes the paranormal abilities that are residual from NDEs to the opening of this circuitry. Light surges are consistent with a greatly increased energy flow along the spine during Kundalini awakening, as well as with the abrupt light intensity at the moment of enlightenment. We postulate that higher states of consciousness result from such an amplification of underlying quantum biological processes—the coherent states in superposition on a brain-wide scale that have led to normal consciousness.

Unity consciousness may thus represent an amplification of quantum biological processes such as MT photon emission—to the macroscopic domain. However, the concept of “superposition” takes on new meaning when applied to human consciousness. Unity consciousness is subjectively described as an awareness of the totality of creation. “*There was a flood of knowing, of understanding as though all of existence stood before me in its totality with its secrets uncovered and revealed.*”^{10(p.25)} It is not so much an overlapping of separate realities that is experienced during this heightened state, but rather a “superposition” of all possible awarenesses simultaneously.

BIOLOGICAL ELECTRON TRANSFER

At a more fundamental level, electrons, in discreet shells surrounding the nucleus of atoms, frequently jump from one shell to another, *instantaneously*. In fact, electrons exist as a cloud of probability: a superposition of all states. In a related process, the transport of electrons within proteins is called biological electron transfer, more commonly known as *quantum tunneling*.⁵² Electrons and protons (hydrogen atoms minus the electron) can exist in a superposition of overlapping states within specific regions of a protein’s molecular structure.⁵³ They are thus able to tunnel *instantaneously* between two relatively distant locations because they exist simultaneously in both positions. Current research has demonstrated that long distance tunneling in DNA can occur across as many as 60 base pairs, the “rungs” in the DNA molecule.^{54(p.187)}

Tunneling behavior runs contrary to our daily experience of material objects that move measurably and predictably. Yet the human body can be understood as an assemblage of trillions of dynamic, nano-scale quantum processes in which superposed waves of matter interact with waves of light. Modern physics

describes matter, at its most fundamental level, as interacting wave patterns. On the quantum level of electrons, atoms and proteins—non-local superposition and tunneling are the rule. Yet at certain levels of consciousness, aspects of the quantum nature of physical reality can seemingly be experienced directly. “It seemed like the walls in the room had disappeared and suddenly there was infinite space. . . . And in that it became apparent that every point in space was exactly the same point as every other.”^{12(p.31)}

Through meditation, the physical body gradually becomes adapted and capable of sustaining such an expanded perspective of reality—and the more fully “coherent” energy state that it necessitates. Preparing one’s physiology for the extreme state that is Unity consciousness is thus an integral part of spiritual practice, which Ramakrishna aptly described. “By engaging in authentic disciplines, your nervous system, both physical and subtle, is prepared to receive and assimilate the tremendous impact of God-vision. Then the living Divine Reality takes the initiative and enters completely into the human consciousness that has been sufficiently prepared.”^{5(p.189)}

Quantum superposition and tunneling, at the heart of biological life processes, provide a quantum biological basis for understanding the superposition of awareness that is Unity consciousness.

AMPLIFICATION FROM QUANTUM TO MACRO-SCALE

Numerous examples exist in quantum-bio-mechanics that demonstrate amplifications from quantum processes that cascade upwards, leading to macroscopic effects. These are amplifications of “normal” neurological processes. Partially coherent biological systems require only an increment of additional energy input to push them into full coherence. “Whole populations of cells may be poised in critical states so that a small, specific signal would set off a train of macroscopic, coherent reactions.”^{44(p.116)} Cascades of neurological events can cause an entire organism to reach a state of highly enhanced, electromagnetic excitation. Extremely subtle processes can have powerful resonant effects on biological processes.

The dark-adapted human eye, for example, can perceive a single photon of light via amplification. This occurs by “cascading,” in which the photon

bounces back and forth between several neural cell layers and is amplified into a signal that is otherwise imperceptible. Cats' eyes are even more capable in this regard, allowing them to see in near-total darkness. Through survival adaptations, the human nervous system has evolved to become exquisitely sensitive to very specific signals from the environment in the form of light, sound and biological molecules. These minimal signals are then amplified by the nervous system, thereby becoming perceptible to the brain. Amplification is a natural process within the human CNS, lending support to our view that the CNS—through amplification via coupled, coherent systems—can phase-shift to allow higher states of consciousness.

Very small (even infinitesimal) initial differences that arise from quantum uncertainty are amplified upward, across all scales, because all scales are iterative and nested. Yet the particular mundane-appearing reality that we experience is what it is . . . because of the superpositions, coherences, and fuzziness that take place everywhere in the universe and at all times and that life has learned to capture at its smallest scale and uses to its great advantage, and which the nervous system amplifies upward because of its computational structure.^{54(p.204)}

Neurological cascading is especially relevant to Kundalini awakening. Minimal signals are presumably amplified by the nervous system until the upward flow of energy is perceivable, and in some cases, highly distressing. Such a macroscopic alteration of consciousness, however, has its roots in quantum scale events, such as microtubule self-induced transparency and superradiance, superpositions and quantum tunneling. After all, some of the quantum processes that life has learned to use to its “great advantage,” and which the nervous system amplifies upward, are the coherent, neurological events that can lead to dramatic alterations of consciousness.

BIOLOGICAL BOSE-EINSTEIN CONDENSATES

Solid-state physicist Herbert Frohlich was among the first to point out that some form of coherent, collective activity (“condensation”) may be occurring in living systems such that living organisms are, in effect, superconductors functioning at physiological temperatures.^{55,56} He suggested that much of metabolic energy, instead of being lost as heat, is actually stored in the form

of coherent, electro-mechanical vibrations in the body. Frohlich called these collective modes simply “coherent excitations.”^{57,58}

Similarly, lasers undergo a phase transition in which many photons become coherent and are all described by the same mathematical wave function. In quantum mechanical terms, such systems of “coherent excitations” are called *Bose-Einstein condensates* (BECs). BECs demonstrate collective, macroscopic quantum states—*macroscopic* because the effects of some BECs can be directly observed without magnification, as in lasers. BECs are the most highly ordered structures known in nature—including pure crystals. While some BECs (composed of atoms of alkali metals, rubidium, sodium or potassium) have been demonstrated in the laboratory only at extremely low temperatures (-459°F), lasers can operate at or above room temperature(+72°F). Microtubules might be considered as biological BECs that play a vital role in cellular communication.⁴¹ Moreover, these BECs occur at body temperature. Their energy source is theorized to be the 98.6°F ambient heat bath of body fluids (cytoplasm) in which MTs are immersed.

The significance of these biological BECs stems from their apparent ability, as liquid crystalline structures, to conduct coherent energy *instantaneously* throughout the CNS.⁴⁴ The network of microtubule-filled, long axons in the human spinal cord functions as *collective bundles of laser-like conduits* for electromagnetic (light) energy. The human CNS has thus evolved into the homeostatic, coherent state that supports ordinary, subject-object consciousness. We theorize that various forms of physiological preparation such as meditation can serve to entrain a biological system that is inherently capable of the increased energy flow implicated with Unity consciousness. For the basic foundation for Unity has been established through the MT network, and the quantum biological properties of the CNS. The increased flow of electromagnetic energy allowing for Unity consciousness would thus be an amplification of processes within an already coherent biological system, resulting in the next evolutionary stage in the development of conscious awareness.

Moreover, recent theories have linked Bose-Einstein condensates to *cosmic dark matter*, which has significance for any physical theory explaining Unity consciousness.

Dark matter, proposed decades ago as a speculative component of the universe, is now known to be the vital ingredient in the cosmos: six times more

abundant than ordinary matter, one-quarter of the total energy density, and the component that has controlled the growth of structure in the universe. Its nature remains a mystery. . . .⁵⁹(p.1913)

Dark matter theoretically possesses very remarkable properties. Dark matter “atoms” (axions) appear to interact or “couple” with visible (baryonic) matter—but only through gravity. As a result, dark matter axions, unlike normal matter, do not coalesce into stars or planets or people. Moreover, Yu theorizes that cosmic dark matter, a vast cold cloud of low-mass particles existing at near absolute zero, *may constitute a Bose-Einstein condensate*.⁶⁰ Such a condensate could provide the physical medium necessary for cosmic scale instantaneous communication, for BECs are inherently non-local, behaving like one huge atom or photon, rather than merely a collection of independent particles.

Silverman and Mallett also describe dark matter as a BEC—a *galactic superfluid*.⁶¹ Nishiyama, et. al. theorize a cosmological process by which dark matter gradually condenses into dark energy, thereby providing a unified model of a cosmic phase transition.⁶² Accordingly, “the largest scale of the universe, as well as the smallest, would turn out to be described by quantum mechanics,” which would also allow for the non-local communication and holographic awareness of all existence that is Unity consciousness.

Although speculative, researchers suggest a *physical coupling mechanism* between biological quantum mechanical processes and a cosmic BEC communication medium. Dark matter is by far the predominant form of matter in the universe; it seems reasonable to conjecture that the human body *has* evolved a mechanism to couple with it. Rudquist proposes that a coupling mechanism should exist between the brain and such a cosmic dark matter condensate, which he refers to as a *galactic axion halo*.⁶³ Such a coupling mechanism would be crucial for expanded states of consciousness, including “telepathic” communication—a non-local phenomenon. *We hypothesize that the coupling mechanism between the human body and the dark matter condensate consists of microtubules.* This model of non-local communication encompasses all levels of existence from quantum structures to galactic clusters. As such, it may provide an important missing link—the physical continuum that could make possible non-local communication across any arbitrary distance, up to millions of light years.

THE ELECTROMAGNETIC ZERO-POINT FIELD

The electromagnetic zero-point field (ZPF), experimentally confirmed by Lamoreaux, is also referred to as the quantum vacuum, implying that a plenum or abundance of matter and energy exists in interstellar space—previously believed to be an empty void.⁶⁴ All of space, including the space *between* the atoms of “solid” matter, contains enormous energy potential. Matter and energy are continuously created and annihilated, emerging spontaneously out of the ZPF and disappearing back into it. It is now widely accepted by physicists that the quantum vacuum is the underlying source of all matter and energy in the universe. At first blush, the ZPF—as the Ground of Being—is remarkably similar to Gopi Krishna’s description of “prana.” “All systems of Yoga are based on the supposition that living bodies owe their existence to the agency of an extremely subtle immaterial substance, pervading the universe and designated as Prana, which is the cause of all organic phenomena . . . manifesting itself as the vital energy.”^{8(p.105)} Such an enduring and systematic world-view is arguably based on more than mere conjecture. Indeed, it is said to be based upon direct experience. The ZPF itself, is composed of electromagnetic (light) waves. According to physicist Bernard Haisch, everything “appears to be sustained at every instant by an underlying sea of quantum light.”^{65(p.5)} In other words, *light* is the fundamental substrate of the universe. That would seem to be the fundamental experience of one enlightened East Indian, Ajja: “What really exists is That whose nature is light, its nature is *satya* [ultimate reality].”^{12(p.32)}

The enlightened perspective represents a *direct experience* of that which lies beyond subject object comprehension. That direct experience is Unity, whether the underlying field or Ground of Being is experienced as Light, *or* as Suzanne Segal-driving-through-herself-to-get-to-herself, *or* as Andrew Cohen’s Europe-is-not-a-different-point-in-space-than-New York. Such an expansion of awareness breaks down the habitual compartmentalization of the world. Unity consciousness is thus the simultaneous comprehension of all aspects of reality, not unlike an optical hologram, which is a visual representation of all aspects of the object of a laser’s illumination. However, “optical holography” is more than mere metaphor. According to this model, the CNS functions like an organic, fiber optic cable capable of coupling mind-to-matter in a myriad of different ways—from ordinary consciousness to enlightenment—through what is known as “the quantum hologram.”

THE QUANTUM HOLOGRAM

In simple terms, quantum holography can be described as a novel information processing paradigm that explains human intra- and inter-communication. Such interactions involve processes on all cosmological scales, from subatomic particles to interstellar dynamics.^{66,67} One functional example of a quantum holographic, information retrieval system is the magnetic resonance imaging (MRI) machine that hospitals routinely use to obtain internal images of the human body. Quantum holography also models the workings of neurons in the CNS, whose MTs emit single-photon pulses of light. According to quantum holography, single-photon light pulses holographically encode information. Nature may thus have evolved her own quantum holographic system that utilizes fundamental particles of light that may literally communicate with the whole universe via a cosmic dark-matter condensate.

Based on the principle that all material objects absorb and re-emit energy continuously, Marcer and Schempp mathematically describe a quantum model of self-organization from the dynamic quantum vacuum by means of an emitter/absorber model of holography.⁶⁸ Their model has been utilized to describe how quantum properties are responsible for seemingly implausible macroscopic events such as *near-death life reviews*.⁶⁹ The virtual re-living of every single event in one's life history, as well as the "felt effects" of one's actions on others, simply cannot be explained by current memory research. However, an application of the quantum holographic theory can account for such phenomena.

As each particle emits and absorbs quanta of energy or information—transmitted beyond the physical body, through the medium of the dark-matter condensate—the entire history of the particle is "recorded" and potentially accessible. Microtubules, emitting single-photon light pulses that holographically encode information, theoretically communicate with the entire universe. Analogous to a cosmological, wireless telephone network with a power source (zero-point energy) and a medium for communication (dark matter), the transmitter and receiver would be the human body. Marcer and Schempp propose the base-pairs of DNA as a holographic storage medium of virtually unlimited capacity, coding all particle interactions, including macroscopic life events.⁶⁶ Based on the holographic principle,

long-term memory retrieval from the ambient zero-point field may occur when interference patterns are reconverted into the image of those objects or events originally recorded.^{46,70} In Laszlo's model, the brain and CNS are viewed not as memory locations themselves, but rather as organic processes that interact directly via the zero-point field on a quantum level.⁷⁰ Yet a specific altered state, typically only achieved when a person is near-death, may be required to access such long-term memories as reportedly occur during a near-death life review.

While ordinary perception is readily explainable in terms of classical mechanics, non-ordinary states of consciousness seemingly involve non-local interaction as the predominant mode of communication. The extrapolation of quantum holography to higher states of consciousness is thus highly relevant.⁷¹ Quantum holography allows us to reconsider our classical view of space-time. *Quantum properties can ultimately be related to macroscopic events through quantum holography.* The human CNS, under certain conditions, is capable of perceiving the underlying unity of space and time, and of material physical objects. After years of having no sense of separate "self," Suzanne Segal, while mindful of her hands on the steering wheel, suddenly became aware that *everything* was herself, and that she was driving through herself to arrive where she already was.¹¹ She was essentially going nowhere because she was *everywhere* already. For the first time, a scientifically rigorous, quantum bio-mechanical model is emerging through which this state of consciousness can be described.

According to this model, the CNS holographically creates representations of reality sometimes as separate objects, and *sometimes* as those representations superimposed upon the undifferentiated Ground of Being. Unity's non-locality of space and time becomes comprehensible because the application of quantum properties to the macroscopic world is possible with quantum holography. Mitchell, who has applied the theory to consciousness, states that it is "the first quantum physical mechanism compatible with the macro-scale three dimensional world as we experience it." As summarized by Mitchell, "Further, recognition that the quantum hologram is a macro-scale, non-local, information structure described by the standard formalism of quantum mechanics extends quantum mechanics to all physical objects including DNA molecules, organic cells, organs, brains, and bodies."⁷¹

SUMMARY

Microtubules within neural cells act much like lasers that emit minute, intermittent pulses of coherent light. The net effect of countless bundles of neuronal MT “cables” is considered by some researchers as the basis for the emergent collective effect that is ordinary, subject-object consciousness. We propose that with the attainment of *higher states of consciousness*, a process takes place that allows for an amplified flow of energy throughout the CNS, involving a coupling with the dark matter, bose-Einstein condensate. Bundles of fibers (neural cells), each containing numerous MT “lasers” acting in unison, would have the collective effect of a surge of light energy to the brain. Brilliant white light, a fundamental aspect of Kundalini awakening and Unity consciousness, may result.

The sudden onset and radically altered nature of such states are consistent with a model based on the activation of a laser. With a sufficient increase in photon emissions, the CNS may exceed a critical energy threshold. We theorize that various forms of preparation such as meditation serve to “entrain” an already coherent biological system that is inherently capable of the coherent state implicated with Unity consciousness.

Neurological cascading, the amplification of minimal signals by the nervous system until perceivable, is especially relevant to Kundalini awakening. Such alterations of consciousness, however, may have their roots in quantum scale events, such as self-induced transparency and superradiance, superpositions, quantum tunneling, and Bose-Einstein condensation. *We propose the collective amplification of quantum effects as the basis for scientifically describing Kundalini awakening and Unity consciousness.* Light pulses within transparent and superradiant MTs, and the resultant highly efficient CNS—set the foundation for an energy flow whose amplification may result in such a phase shift. The increased flow of electromagnetic energy allowing for Unity consciousness is thus a phase shift within a biological system that results in the next evolutionary stage in the development of conscious awareness.

Unity consciousness involves non-local interactions as the predominant mode of communication. Quantum non-locality is a characteristic of coherent systems, and an inherent property of signal propagation within the MT. On

the molecular scale, the liquid crystalline nature of the human body likely provides a foundation for this instantaneous aspect of consciousness. The liquid crystalline body would serve to facilitate the collective effect of those surges of light energy to the brain, and the higher-order, emergent phenomenon of Unity consciousness.

Microtubules, emitting single-photon, light pulses that holographically encode information, theoretically communicate with the entire universe via the dark-matter condensate. According to this model, the CNS functions like an organic, fiber optic cable coupling mind-to-matter through “the quantum hologram.” The quantum properties described throughout this paper can be applied to macroscopic events, such as the non-locality of space and time, through quantum holography. For the first time, a scientifically viable, quantum bio-mechanical model can begin to describe the state of Unity consciousness.

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