

Kabbalah, consciousness and the universe

Rabbi Samuel Cohon

Introduction: There are rather amazing similarities between quantum physics, cosmology, and ancient writings of the Kabbalah. Recently I had the honor of co-teaching a class on "Kabbalah, consciousness and the universe" with Rabbi Samuel Cohon at Temple Emanuel in Tucson. Reprinted below are 1) the course syllabus, 2) a class handout I prepared entitled "To get to the other side - Kabbalah, consciousness and the universe", and 3) High Holiday Yom Kippur sermon by Rabbi Cohon entitled "The origins of awareness".

Course Syllabus

Adult Education Academy of Temple Emanu-El, Tucson, Arizona, Winter
5761

Kabbalah, consciousness and the universe
Rabbi Samuel M. Cohon and Dr. Stuart Hameroff

February 4, 2001

Class One: Mystical Connectedness, a Different View of Reality

Rabbi Cohon and Dr Hameroff

Quantum consciousness and Kabbalah

Introduction of the ideas, concepts, and connections

February 11, 2001

Class Two: A Quantum Approach to Consciousness,

Dr. Hameroff

Enigmatic features of consciousness, Approaches to consciousness: reductionism,
emergence, panexperientialism

Superposition, multiple worlds, connectedness and other quantum weirdness

Is the conscious mind subtly connected to a basic
level of the universe?

Microtubules, qualia, and free will

February 18, NO CLASS

February 25, 2001

Class Three: Kabbalistic Consciousness, Rabbi Cohon

Mystical creation

Tzimtzum--contraction and creation

Interconnectedness in mysticism
Sephirot--rising realms of awareness
Multiple worlds of existence and connection

March 4, 2001

A Quantum Scientific Approach to God

Rabbi Cohon and Dr. Hameroff

Is God implicit in the universe?

The Hard Problems:

What is consciousness?

What might God be?

Are qualia God? Is God the universe?

What is the nature of the universe? Why is there a universe?

"To get to the other side"

Kabbalah, consciousness and the universe

Stuart Hameroff

www.consciousness.arizona.edu/hameroff

In "Power of Kabbalah - Secrets of the Universe and Principles of Life" Rabbi Yehuda Berg describes a "Fountainhead of wisdom -- a hidden wisdom that reveals and unifies the spiritual and physical laws of life -- the true sources of all teachings -- its insights have had profound effects on foremost thinkers".

What is this hidden wisdom? Where is it? Rabbi Berg and Kabbalists call the wisdom Light...a code word, or metaphor for a broad spectrum of fulfillment, pleasure, wisdom which floods the universe.

How do we access it, and where did it come from? People are the essence of desire, and the universe is flooded with light/fulfillment, what's standing in the way of our everlasting happiness?

Answer: A Curtain

We are on one side of the curtain, and the Light/Wisdom/Fulfillment is on the other side. The curtain according to Rabbi Berg separates 1% from the other 99%

The 1% is our world.

In our world events happen suddenly, and are seemingly chaotic without apparent cause.

We react to these events "reflexively" without any deep understanding of their origins and implications, nor with any foresight as to the consequences of our actions. Quite often these reactions are completely wrong. We are "in the dark".

On the other side of the curtain (99%), according to Kabbalah is Wisdom, lasting fulfillment, infinite knowledge, endless joy, absolute order, perfection and spiritual light.

There lies the source, the seed and the hidden origin of the physical world. The Kabbalah itself may be

an example of the wisdom written down many years ago.

This Kabbalistic description of wisdom is similar to Plato's world of ideas and absolute truth. In fact Plato traveled to Egypt when the Jews were numerous in that country and may have picked up his "metaphysical opinions about the superior beings and formal causes of all things, which he calls Ideas and which the Kabbalists call Sfirot [dimensions or emanations].... " (MS. Yahuda, 15.7, p. 137v)

Physicist Roger Penrose, one of the great experts on the makeup of the universe says in his book "Shadows of the Mind": "According to Plato, mathematical concepts and truths inhabit an actual world of their own that is timeless and without physical location. Plato's world is an ideal world of perfect forms, distinct from the physical world, but in terms of which the physical world must be understood"

So Plato's world may be synonymous with the Kabbalah's 99% world of wisdom and light.

How do we raise the curtain, move between the 1% darkness and the 99% light in an open and continuous way, rather than haphazardly? Rabbi Berg describes the 99% as "dancing on the edge of consciousness". The Kabbalah teaches us how to do this – to open our conscious minds to the wisdom, but from a scientific standpoint we would like to know what exactly is the 99%, where in nature may it exist, and what does it mean to access it, to lift the curtain? What is the nature of the curtain? How can the 99% world affect our thoughts and feelings, our consciousness?

To even attempt to answer these questions requires that we have some understanding or reasonable models of both consciousness, and reality

We will address consciousness, but first consider reality--- the makeup of the universe?

Science grapples with the issue of reality. For 100 years it has been known that there exist two worlds, the classical world and the quantum world. We live in the classical world where everything seems "normal" (if unfulfilling). Everything has a definite shape, place and substance. However at very small scales the quantum world reigns and everything is strange and bizarre, defying common sense.

At the level of atoms and small particles such as electrons (the quantum world) nothing is certain. Particles can behave like waves and exist in two or more places simultaneously ("superposition"). When particles become separated they can remain connected "gcoherence", "entanglement"). In some views of the quantum world there is an underlying deep connection among all entities in the universe, e.g. David Bohm's "implicate order".

Could the submicroscopic realm of the quantum world be the 99% world of Light and wisdom? Science still knows very little about the quantum world, but there are indications that the quantum world could qualify as the 99% world, and that a curtain does indeed exist between the two worlds. The curtain, the edge between the classical world and the quantum world is "collapse of the wavefunction".

A paradox immediately appears. The 99% world is said to be vast, far greater than the 1% world. How can a sub-microscopic world be vast?

While the quantum world is smaller than the classical world, the quantum world has far more information capacity because at very small scales, the fine structure of reality, "spacetime geometry" itself becomes quantized.

Lets imagine we are going downward in scale, say from our macroscopic world, roughly meters down to the sizes of atom, 10^{-10} meters, down through the sizes of atomic nuclei and subatomic particles (10^{-14}), but continue downward to where a near infinite number of photons pop in and out of existence, this is the zero point energy measurable through the Casimir force. Continuing downward leads to what appears to be the fundamental limit---an infinitesimally small 10^{-33} centimeters (the Planck scale). At this scale the structure of reality itself, known as spacetime geometry, is no longer smooth, but granular or quantized. The grain, or quantum of reality is roughly one "Planck volume" of the Planck length (10^{-33} centimeters) cubed.

A teaspoonful of spacetime contains about 10 raised to the power of about 37,000 of these Planck volumes, each of which may be in a number of different states, changing over time. Descriptions of the fundamental Planck scale (quantum gravity) includes spin networks, twistors, and superstrings. The Planck scale is teeming with activity and information, although quantum processes seem random at our scale.

Quantum theory rules the micro-world, but general relativity describes the large scale and tells us how spacetime is curved, and that mass causes curvature which can bend the path of light. But the two theories don't "jivh". When general reativity is applied to the quantum worlds, or vice versa, infinities arise in the equations---the wheels fall off. A potential congruent explanation for both quantum theory and relativity is called a "theory of everything" or "grand unified theory".

Superstring theory is a possibility, as is Roger Penrose's "twistor" theory based on an earlier, simpler idea called "spin networks". In this view, the fundamental essential ingredient of the universe is spin, and that spin quantum interact to form three dimensional spider webs at the Planck scale. Lee Smolin (Life of the Cosmos) describes how spin networks are dynamical, changing and evolving in time, and the the universe at this level is somehow "alive".

In spin networks each edge may have various lengths, and spin, so the network has a great number of possible states of each Planck volume. The information capacity is huge----about 10^{107}

Planck volumes per liter (or volume of brain), changing or ticking at the Planck time of 10^{-43} seconds. And because spacetime is inherently nonlocal, long range connections and patterns can occur basically everywhere. If the Platonic wisdom is embedded at this level, the capacity is infinite.

If the Fountainhead of wisdom of which the Kabbalah speaks is indeed embedded at the Planck scale of fundamental reality, how can our brains access the wisdom? This is where consciousness comes in. It is our conscious minds which must connect to the Planck scale. What is consciousness?

Conventional approaches see consciousness as an emergent property of complex computation in the brain. In this view, neurons and synapses are fundamental switches, like bits in a computer.

The idea is that at a critical threshold of complexity, the novel property of consciousness will emerge, like the property of music emerges from the movement of air molecules.

However this approach fails to deal with enigmatic features of consciousness. These include what philosophers call "qualia", or the essence of subjective experience, "binding", or unity of conscious experience, and free will. Other approaches suggest that our brains utilize a form of quantum computation to produce consciousness. These types of theories do offer possible connections to fundamental reality.

In conventional computing information may be represented as, for example, bits of either 1 or 0. However in quantum computing information can also be represented as quantum superpositions of both 1 AND 0. That's correct: quantum theory, and experimental results show us that particles can exist in two or more places or states at the same time---quantum superposition of bits, or "qubits". While in this state qubits can communicate instantaneously and nonlocally with other qubits, so that quantum computation approaches infinite speed and capacity. After a time, the qubits "collapse", or reduce to definite classical states as the answer, or solution. So instead of superpositions of both 1 and 0, we have definite bits of either 1 or 0. This reduction from the world of multiple possibilities (quantum superposition) to the classical world of definite values is called collapse of the wave function, or "reduction" of the quantum state vector. It remains one of the mysteries of science.

Early experiments in quantum mechanics seemed to show that quantum superpositions if hidden, or isolated from environment would remain in superposition until measured by a conscious observer. Studies showed, amazingly, that if a machine measured a quantum system the results would actually remain in superposition until a conscious human observed the measurement results of the machine. Consciousness collapsed the wave function. Furthermore the results of the collapse---whether, for example 1 OR 0 occurred, was considered to be random, or probabilistic. Einstein didn't like this idea: "God does not play dice with the universe" he responded famously.

The explanation that consciousness caused collapse (and that the mind, in a sense, created reality) was favored by Danish quantum pioneer Niels Bohr, and is called the Copenhagen interpretation. But the idea that an unobserved system could remain in quantum superposition seemed just too weird. Erwin Schrodinger tried to illustrate the absurdity of this with his famous thought experiment which came to be known as Schrodinger's cat. Imagine a cat in a box. A vial of poison in the box is connected to a microscopic quantum system, like a photon passing through (and not passing through) a half-silvered mirror. According to the Copenhagen interpretation the cat would both be poisoned, and not be poisoned, and would thus be both dead AND alive until a conscious observer opened the box and took a

peek. While this seems absurd, there was no good alternative explanation.

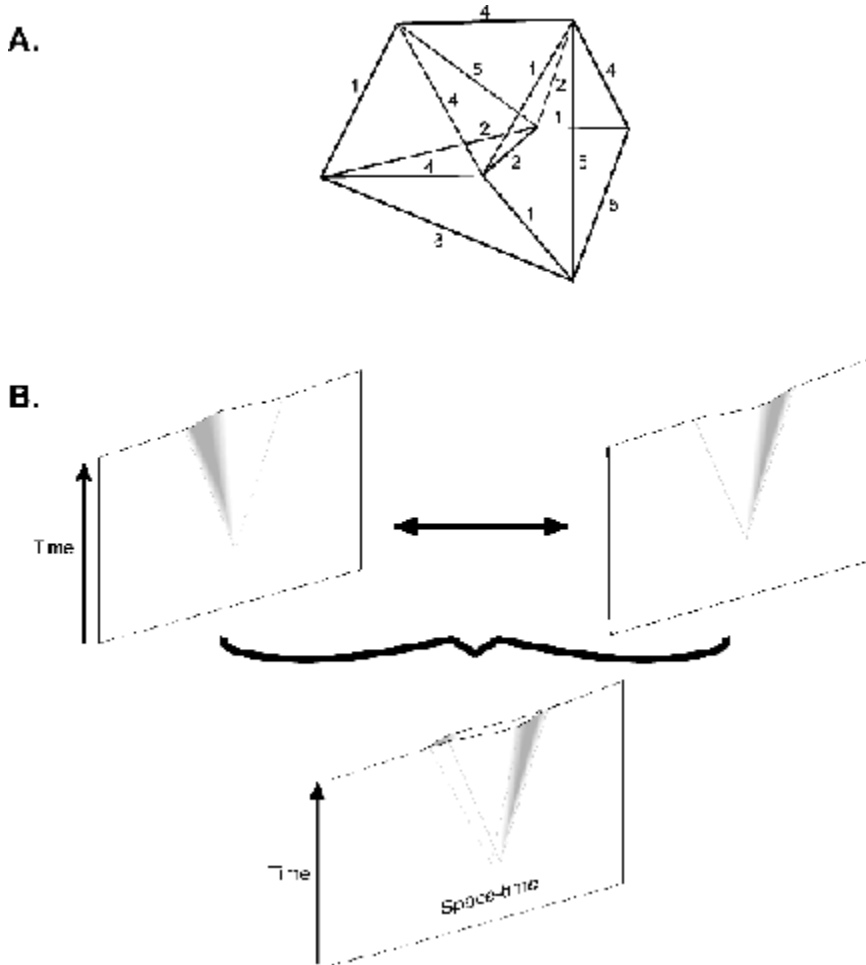


Figure 1. Two descriptions of fundamental spacetime geometry. a) A quantum spin network. Introduced by Roger Penrose⁸ as a quantum mechanical description of the geometry of space, spin networks describe a spectra of discrete Planck scale volumes and configurations^{9,10}. Average length of each link is the Planck length (10^{33} cm). b) Four dimensional spacetime may be schematically represented by one dimension of space and one dimension of time: a two dimensional "spacetime sheet." Mass is curvature in spacetime, and the two spacetime curvatures in the top of Figure 1b represent mass (e.g. a tubulin protein) in two different locations, or conformations respectively. In quantum superposition mass separated from itself is simultaneous spacetime curvature in opposite directions, a separation or "bubble" of spacetime. At a critical degree of separation, the system becomes unstable and must select either one state or the other².

Other types of theories came along. For example Hugh Everett's "multiple worlds" interpretation said that whenever there seems to be a collapse (e.g. dead cat observed), the alternative (live cat) went on in

another universe, and that every collapse created another world so that there exist an infinite number of parallel universes. This seems a bit messy, but gives a coherent picture.

However later theorists suggested that some "objective" factor, or threshold would intervene and cause the superposition to reduce, or collapse. This type of theory became known as "objective reduction" (OR). The best developed OR theory is that of Roger Penrose.

To address the problem Penrose first asked what exactly does it mean to be in quantum superposition? How can a particle be in two or more places or states at the same time. The answer, Penrose decided, is that a particle in two places at once means that reality itself has separated. That the universe at its fundamental level splits into separate fabrics of reality. This is actually very much like the multiple worlds view, however Penrose added that the separations, the bubbles in reality were unstable, and would self-collapse, or reduce by an objective factor (objective reduction) due to properties of fundamental spacetime geometry itself. This type of reduction (OR) would not be random, Penrose reasoned, but influenced by the very fine structure of the fabric of spacetime itself. If wisdom and Platonic values (and qualia) are embedded in fundamental spacetime geometry, Penrose OR would be a process which could access this wisdom, and be influenced by it! Perhaps it is no coincidence that the Hebrew word in the Kabbalah for consciousness is "Or". A particular type of quantum computation in the brain could allow us to access fundamental spacetime geometry, to be influenced by the Fountainhead of wisdom.

Next week we consider how quantum computation in the brain can be connected to, and influenced by, the fundamental level, and the possible origin of the Fountainhead of wisdom.

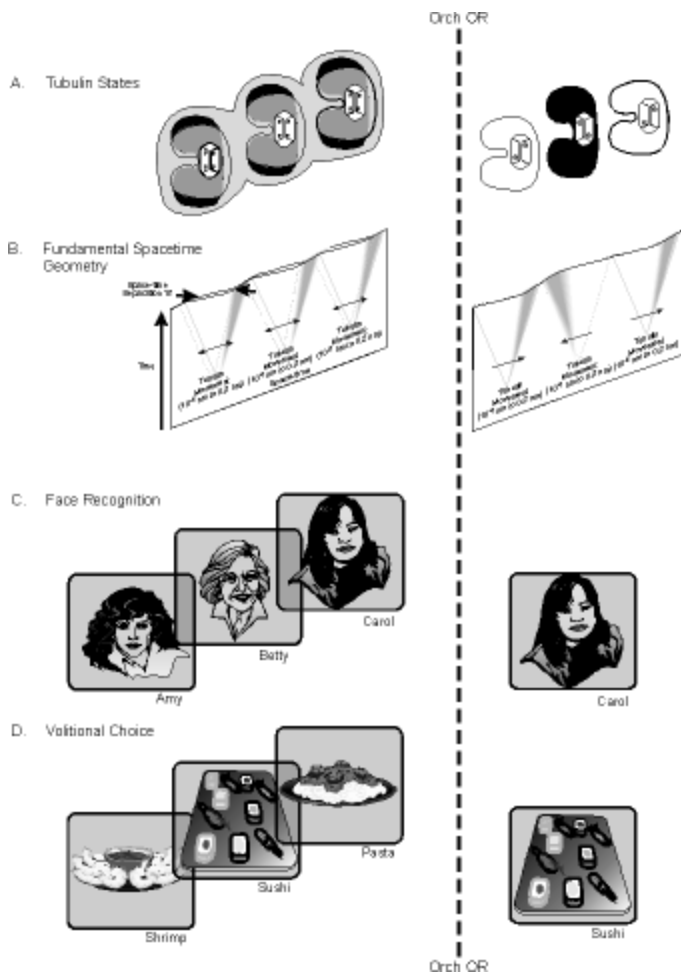


Figure 2. Orch OR events in conscious experience. a) (left) Three tubulins in quantum superposition prior to 25 msec Orch OR. After reduction (right), particular classical states are selected. b) Fundamental spacetime geometry view. Prior to Orch OR (left), spacetime corresponding with three superposed tubulins is separated as Planck scale bubbles: curvatures in opposite directions. The Planckscale spacetime separations S are very tiny in ordinary terms, but relatively large mass movements (e.g., hundreds of tubulin conformations, each moving from 10^6 to 0.2 nm) indeed have precisely such very tiny effects on the spacetime curvature. A critical degree of separation causes Orch OR and an abrupt selection of single curvatures (and a particular geometry of experience). c) Cognitive facial recognition. A familiar face induces superposition (left) of three possible solutions (Amy, Betty, Carol) which "collapse" to the correct answer Carol (right). d) Cognitive volition. Three possible dinner selections (shrimp, sushi, pasta) are considered in superposition (left), and collapse via Orch OR to choice of sushi (right).

Sermon

The Origins of Awareness

Yom Kippur 5761

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There is a wonderful story of Rabbi Naftali of Ropshitz, a great Hasidic teacher. One day he was traveling in a strange district, and came upon a magnificent mansion on a huge estate. A peasant was working in the front garden of the estate, and Rabbi Naftali called out to him. "Tell me, who do you work for?" The man told him "I work for the noble count of this district." And then he asked politely "And you, who do you work for?"

Rabbi Naftali gave a strange response: "I'd like to hire you to work for me."

The peasant was a little surprised, but he asked "But what would I do for you?"

And Naftali responded "Every day, you would ask me that same question, 'Who do you work for?' And that would be a great service."

For Rabbi Naftali of Ropshitz the implication of that question is that he works for God. But the critical element, the role that the peasant can play in his life, is to keep him aware of whom he serves. It is not simply the fact that he serves the Holy One, blessed is God; it is the awareness, the consciousness of his place in the world.

It is consciousness, the awareness of our own uniqueness, our own personality, that forms the basis for much of what we understand to be human. But according to certain scientific theories being explored these days, consciousness may be much more even than that. It all begins, in a way, with a problem having to do with machines.

I don't know how many of you here use computers regularly. I suspect it is many of you, even if you, like me, grew up in era in which computers were far from personal. In point of fact, "personal" computers are still pretty far from being personal, in the sense of having human personalities and identities, and possessing the ability to grow and learn as human beings do.

When they were first developed, the idea of computers was that they would be thinking machines, endowed with the ability to artificially understand and comprehend, to learn, to have cognitive capacity as we do. At first, they were just fast-moving calculators, superior adding machines, if you will, able to perform simple and repetitive functions with greater rapidity than human beings could. As such, they were useful; but the goal was to create machines that were more than that, to create systems that could really think, solve problems, have artificial intelligence. If computers were truly intelligent they would not only be faster and more efficient, they would be infinitely more useful to society.

The first great efforts at creating artificial intelligence date back to the 1950's, believe it or not, to the Jurassic Age of computer development. Wouldn't it be great, the computer types thought, if these machines could really think, if they had the awareness to learn the way we do? Wouldn't they be able to do much more than they do now, to solve complex problems that we can't, fulfill a wide variety of jobs in our society and free us to engage in more useful and enjoyable pursuits? And to achieve that end, conscious computers, a huge amount of human and financial resources have been poured into artificial intelligence, AI as it is known, in the ensuing decades, the close to fifty years since computers first really became viable.

The essential approach to solving the problem of creating artificial intelligence was that the more speed

and power you put into a computer, the more binary synapses you had, the closer you would get to creating a machine which was truly alive, really able to think consciously. If you just had enough memory and enough speed and enough power in the box, true conscious intelligence would eventually emerge. This was somewhat akin to Archimedes' famous statement that if he had a lever and a fulcrum large enough he could move the earth. More electronic power and speed would eventually equal consciousness.

The ideal behind this was exemplified in a movie a few years ago, in which after a steady diet of increased power and capacity a computer suddenly came to "life"- "number five is alive". But there are wonderful science fiction stories dating back to the 1950's of computers coming alive, actually developing personalities. Some are heartwarming and charming, like Isaac Asimov's Bicentennial Man, finally made into a film a year or so ago. Some are chilling, like Arthur C. Clarke's 2001-A Space Odyssey. In general, the tendency was to see artificial intelligence as the next great frontier of technological development, the brave new future of development. We would pour resources into making computers faster and more and more powerful, and once we had enough stuff in there they would sort of-well, wake up. Consciousness would spontaneously emerge.

The great irony is that, for all of the early optimism, artificial intelligence is the now the slowest developing area in the history of computers. Your Palm Pilot has more computing power and speed than the computers that directed the Apollo moon landing 31 years ago. It's possible that your microwave oven and cellphone have more computing power than the Apollo computers. And yet, in an era in which technological development has been meteoric, in which every area of computer development has spiked exponentially, in which smaller and smaller computers perform functions undreamed of ten years ago, in which you can receive your email on your handheld phone and communicate with anyone on the globe almost instantly; in this age of increased knowledge of almost everything, there has been almost no progress in the area of artificial intelligence. We seem to be less clear on what it is that makes for consciousness and awareness than Naftali of Ropshitz was.

Perhaps we have been going about this the wrong way. There is another theory of what it is that creates consciousness. It holds that consciousness is not the result of some meta-mechanical process that emerges when we have enough on/off switches working at once. It is not the result of a massive collection of binary bits that spontaneously combust into awareness. It suggests that instead consciousness is fundamental to the universe, that the components of our own self-awareness are present in the smallest elements of existence. That, in fact, everything in the world has a latent potential for consciousness, but that we humans are blessed with a higher level of those elements-and the sensory apparatus to bring them to life-that make for a complex sense of identity. This theory holds that consciousness is part of the fabric of space-time, the very material of creation and all existence.

I have had the privilege of being guided through the latest developments in the understanding of consciousness by my friend Dr. Stuart Hameroff of the University of Arizona, developer of their renowned conference on consciousness and a dynamic thinker in the field. His original work was in a very small area-quite literally-called microtubules, tiny structures that form a kind of skeletal network within each cell. Microtubules develop within cells and organize cell activities, and because of the kind of structures they create organically they can actually contain certain kinds of information-that is, the ways in which they develop and change provides a way in which information can be stored at a very small level. In our brains, the microtubules play a critical role in consciousness.

A few years back Hameroff began working with Roger Penrose, one of the great physicists of our era. Penrose, who brought the notion that spacetime effects exist not only at the level of planets and stars but also at the very tiniest levels of existence, was deeply intrigued by the implications of cells seeming to be able to learn in this structural way. Penrose and Hameroff have theorized that the capacity for

consciousness goes much deeper even than these microtubules within our cells. They suggest that within everything in the universe is the capacity for sentience, awareness, personality-consciousness. These elements are known as qualia, particles that are the fundamental components of conscious experience. As quarks and atoms are the building blocks of all matter, so they believe that qualia are the building blocks of awareness and consciousness. The ways in which qualia are accessed, triggered by changes in energy within nerve cells and pathways, ultimately shapes our conscious experience. We are aware because of an ongoing process of qualia, these particles of consciousness, being accessed-or chosen-within our brains.

How does this happen, exactly? How is it that we become aware and conscious? Well, first a warning: to understand consciousness, as Penrose and Hameroff do, you must first learn a tiny bit of quantum physics. Now, Quantum physics has many similarities to Kabbalah, Jewish mysticism, not least of which is that the more you study it the less you understand it. Physicist Richard Feynman once said that anyone who tell you they understand quantum physics is either lying or crazy. With that caveat, perhaps the secret lies in trying to understand both Kabbalah and quantum physics at the same time. Because it turns out that one of the elements intrinsic to existence is also a fundamental element of Kabbalah, and that it potentially connects this cutting-edge scientific understanding of consciousness to a rich Jewish mystical tradition of more than 2000 years.

Quantum physics starts with a conundrum: objects can be in two places at once. This violates our basic understanding of the way the world works. How can anything be in two places at once? This is busyness not even a Palm handheld can create-and yet, in quantum physics, at the smallest level, we have observed for a century the apparent anomaly that objects exist in two places at once, called quantum superposition. Because of Einstein's concept of general relativity, the curving of spacetime leads to the fact that all mass-that is, all material in the universe-actually consists of energy, and that energy can, in fact, exist in two places simultaneously. So, in theory, if you were a quantum human being, you actually could be in two places at once.

As crazy as this sounds to us, quantum effects have been measured for a century. They clearly exist. Particles in a quantum state are both here and there, superpositioned in both places.

Penrose's great work lay in bringing understanding of these effects down to the smallest level. Now, with Hameroff, the theory is that consciousness is a kind of quantum effect. When those qualia, the building blocks of conscious experience are accessed and chosen, there is a kind of bubble in spacetime-a bending in the fabric of the universe in two ways at the same time-which allows for a quantum effect to take place. We choose among qualia-aesthetic or moral choices-that are part of the fundamental spacetime material of the universe. Our consciousness is composed of our individual brain's activities coupled to self-organizing ripples in fundamental reality; in other words, we choose elements of consciousness, and at the same time we are completely connected to the entirety of consciousness at that very moment.

There is just a little more science to all of this. First, quantum states are tricky to maintain: you can't be both here and there for very long once other environmental factors intrude. The world intervenes, stuff happens, and a state called decoherence ensues. And second, once objects have been in a quantum state, in superposition-that is, both here and there-they are never quite the same afterward. In fact, they seem to always remain connected to both places, entangled.

I'm reminded of the kinds of human connections we have with our parents and our children. Picture the early stages of life as a kind of quantum relationship, deeply interconnected; and know that as life goes on that enmeshment diminishes, as the child grows and becomes interested in outside environmental factors and the physical and immediate quantum parenting state melts away. And yet you continue to

feel quite connected, at some level always entangled, without even being in the same time zone.

Putting all of this together, this theory of consciousness suggests that the whole universe, everything we know, is actually a massive spacetime energy field, all interconnected, some of it in a quantum state, the rest entangled. And we, and our brains, are part of this elaborate network, and our consciousness is thus both a reflection of our uniqueness and a demonstration of our connection to everything.

There is one final piece, the smallest part of consciousness, which goes to the very heart of all existence. Penrose theorizes that qualia, those particles of consciousness, are actually composed of almost infinitely small spin networks, energy bumps in the spacetime fabric whose configurations convey particular types of meaning and aesthetic values. A process going on at smallest conceived level [, on the Planck scale (e.g. quantum state reductions)] could access and select configurations of experience. Elements of consciousness would then be found at the very basis of all existence: in responses to stimulæ that are not purely physical, or apparently chemical. That are, perhaps, moral.

All very interesting, rabbi, you say, but why are you boring us with elaborate scientific stuff on Yom Kippur, holiest day of the Jewish year? What has this to do with me-or, in fact, Judaism?

Only this: the implications of what Hameroff and Penrose theorize goes even further than trying to explain just how it is that our brains work, or what it is that makes us conscious. They believe that these qualia, these particles of consciousness, are actually embedded in the basic level of reality as described by modern physics. In other words, proto-consciousness, the ability to be aware and intellectually alive, is implanted in Creation as we know it.

Everything in the world has the capacity to become conscious, aware, endowed with the latent capacity to be alive. And this brings us to a very Jewish understanding of what we are all about.

The key question is-what are these qualia? Penrose sees these essential elements of consciousness encapsulating eternal values-perfection, goodness, and the like, what we philosophers call Platonic values.

Stuart Hameroff's understanding is slightly different: "My own view, though I've been reticent to say it, is that the dynamic, Platonic world embedded at the basic level of the universe is the best explanation for God I can imagine. This does not at all demean the concept, because the immensity and vastness of the fundamental level is, to me, far more awe-inspiring than any abstract notion or man-like image of God."

And so, if you were to say that they actually incorporate elements of holiness, or God, you would be equally justified. And you would be part of a long and sacred Jewish traditional understanding of God and the world.

There is in Jewish mysticism a long-held belief that we are all interconnected, that in creating this universe God implanted everywhere within it divine sparks, sacred elements within the fabric of energy that makes up all creation. Non-Kabbalists have accepted this understanding as well,

There are close parallels, in fact, throughout the Kabbalistic understanding of God and this understanding of consciousness, that are astounding. In Kabbalah, the universe is composed of sefirot, spheres of existence, that are made up of energy and possess circular motion-spin, in physics terms. These sefirot, these spheres are connected, yet distinct, located in a variety of places both above us and within us and yet simultaneously linked to the Ein Sof, the Divine Source of all energy, and thus linked

to all creation.

A fascinating parallel: in Kabbalah, the emanation of the Divine takes the form of energy, and usually of light. There are many words for light in Jewish mysticism, from A to Z, or to ziv, if you will, and each expresses in one way or another the constant flow or emanation of that light as a continuous Divine process. In Hameroff's microtubule work-those tiny substructures that form the basis for all cellular organization-he believes that the microtubules themselves may convey information by means of quantum light effects, something like lasers, within the neural pathways. That is, that there is going on within us at all times a kind of light emanation which is the absolute key to consciousness. So, too, in Lurianic Kabbalah: light conveys God's presence, and flows continuously in a state of quantum mystical connection. God is everywhere-but more accurately, God's connections are everywhere, if we know what's going on. I hope to further explore these Kabbalistic/consciousness connections in a course in our Adult Education Academy this spring...

But you need not be a Kabbalist to find profound Jewish parallels to consciousness studies. Baruch Spinoza, the great 17th century Dutch Jewish philosopher, believed that there were motes of God in all of us, that these could become active if we chose to activate them. And most tellingly, Maimonides, the great medieval Jewish philosopher and legalist, a rationalist who certainly never embraced mysticism, understood revelation as "an overflow" coming from God to us. Our human goal, for the Rambam, was to seek to unify our minds into a perfect connection with the Divine. In effect, to try to move into a quantum state of existence, in superposition with God. The description that is used in the Guide to the Perplexed is "flow", that the ideal human mind is in a state of flow with the great mind; that is, God. Our own consciousness is dependent on finding a way to connect with God in the world, to sense the interconnectedness of all things, to touch the holy and Divine solely by becoming aware of its presence.

What does this flow, this interconnection of all consciousness have to do with us? Well, potentially, only everything. For the central goal of Yom Kippur is to arouse our own awareness, our own consciousness of holiness and God in this world. And if we can become aware of what seems to be both a religious truth and a scientific one-that we are connected to all awareness, and that consciousness is an implicit gift of our universe and our God-well, then we may actually come to live lives that reflect that constant presence.

There is a beautiful passage that describes true prayer in a Hasidic work called *Liquitum Yekarim*, published in Lvov in 1863. It captures the essence of what we are trying to accomplish today, and what we might successfully accomplish this year:

The purpose of all prayer is to uplift the words,

To return them to their Source above.

The world was created by the downward flow of letters:

Our task is to form those letters into words

And take them back to God.

If you come to know this dual process,

Your prayer may be joined
To the constant flow of Creation--
Word to word, voice to voice,
Breath to breath, thought to thought.

The words fly upward and come before God
As God turns to look at the ascending word,
Life flows through all the worlds
And prayer receives its answer.
All this happens in an instant
And all this happens continually;
Time has no meaning in the sight of God.
The divine spring is ever-flowing;
Make yourself into a channel
To receive the energy* from above. [original: waters]

On this Yom Kippur, may we each become aware of that flow of Divine energy; and may we use our own connections with it and all those around us to make our lives become a blessing. And then we will come to be aware, like Naftali of Ropshitz, of whom we serve...

Ken yehi ratson.