

IS THE MIND/SOUL A PLATONIC AKASHIC TACHYONIC HOLOGRAPHIC QUANTUM FIELD?

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ABSTRACT: I speculate that the mind/soul may be an information field as perhaps envisioned by Plato—what I call the Platonic/Akashic/Tachyonic/Holographic quantum field (PATH-QF)—possibly what the ancients called the Akashic record, interacting with “real” matter fields. Though no material objects manifesting from appropriate quantum fields (those that generate real finite rest masses > 0) can travel at or faster than the speed of light, I speculate that the putative mind/soul exists as a PATH that interacts/creates with such slower-than-light-speed “real” matter through the intermediary of imaginal imaginary-mass objects—*tachyons*. It is the interaction between the PATH and matter fields that leads to the physical world and to the subjective experience we know as mind/life force.

Keywords: Mind; Consciousness; Quantum Field Theory; Tachyons; Higgs Field; Platonic Idealism

The Vacuum is a boiling sea of nothingness, full of sound and fury, and signifying everything.

*Anonymous - found in Ch. II.5 of Anthony Zee's
Quantum Field Theory in a Nutshell*

INTRODUCTION

The relation between Spirituality and modern science is a difficult subject for physicists to discuss. Perhaps it is even more difficult for physicists because of our objectivistic training. Being a physicist and a writer, I feel this difficulty keenly, and I

confess that at times I find some people who profess “spiritual wisdom” pretentious if not downright fraudulent. Nevertheless, in the following discussion I want to speculate farther into this realm than I have done before. I believe I see how time, mind, and the spiritual nature of humankind are deeply connected, and in order to discuss this connection I will need to enter into the territory usually and legitimately held by the clergy and scholars of religion. I am thus treading on shaky ground for a physicist.

So, let me put it as simply as I can. The key to our grasp of the true message of spirituality is our ability to become aware of the mind—or our normal, everyday state of subjective waking consciousness in which we think of ourselves as “I.” But what is this “I”, really?

I speculate that the mind/soul may be an information field as perhaps first envisioned by Plato—what I call a Platonic Akashic Tachyonic Holographic quantum field (PATH-QF), possibly what the ancients called the Akashic record—interacting with “real” matter fields. Though no material objects manifesting from appropriate Higgs quantum fields (those that generate real finite rest masses > 0) can travel at or faster than the speed of light, I speculate that the putative mind/soul exists as a PATH-QF—a kind of subsidiary Higgs field—that interacts with such slower-than-light-speed “real” matter through the intermediary of imaginal imaginary-mass objects—*tachyons*. It is the interaction between the PATH-QF and matter fields that leads to the physical world and the experience we know as a mind/life force. In this speculative work dealing with mind and quantum field theory, I subscribe to the notion that elementary fermions (spin- $\frac{1}{2}$ particles) are massless fields that generate *luxons* (particles that travel at lightspeed and hence do not experience spacetime) until they interact with the Higgs field whereby through the Feynman Penrose zig-zag picture they acquire both real and imaginary mass. In brief, I subscribe to the idea that the Higgs field can also act as an intermediary field carrying a mindlike quality through its production of the imaginary mass (tachyonic) component when it interacts with fermion fields. My ideas are speculative at best and are still developing.

HINTS

There are six speculative hints. Briefly,

- (1) Plato’s vision held that mathematics was the ultimate ideal, the only eternal—the essence of reality itself.
- (2) From Tegmark’s work (*Our Mathematical Universe*): We are entwined into *external reality* (ER) in two distinct ways that he labels as: *consensus reality* (CR) and *internal reality* (IR).
- (3) From some Buddhist’s subjective and Ben Libet’s neurophysiological work, we find time and mind don’t work in the brain and nervous system in a commonsensical way.

We may need both findings to see that mind cannot be contained spatially in the body or brain or nervous system and that cause before and after effect must both temporally arise.

(4) Using the Feynman path integral (PI) approach to quantum field theory that includes particles emerging from the vacuum going faster-than-light, I speculate that there are two basic quantum fields: a real Higgs field capable of generating real positive mass particles (fermions) and an imaginary Higgs field capable of generating mind-like imaginary mass particles (tachyons). Such tachyons emerge in an imaginal or virtual sense.

(5) Penrose's picture of a massless spin- $\frac{1}{2}$ particle moving in a zig-zag fashion shows it must move at light speed according to the Dirac equation. I label all lightspeed particles as luxons. Since luxons suffer neither movement through space nor time (from their own point of view), I speculate that luxons appears as the progenitor of both space and time when subjectively experienced.

(6) The latest theory uniting quantum physics and the Einstein general theory of relativity suggests that the entire universe can be seen as a two-dimensional informational structure "painted" on the cosmological horizon like a hologram. This holographic principle was inspired by a study of black holes; the insight was that the informational content of all the objects which have fallen into the hole can be entirely contained in its surface event horizon. In a larger and even more speculative sense I see this information constituting a voxelated distribution (PATH-QF) throughout spacetime accessible through tachyonic interaction with the matter constituting the brain and nervous systems of sentient beings. I speculate that this PATH-QF constitutes what ancients called the Akashic record.

PLATONIC MIND/SOUL PHYSICS TODAY

I am not the only physicist who sees Plato as being the forerunner of our modern view of quantum field theory; I include Roger Penrose¹ to name one. Today in spite of being immersed in the *quantum age*, a new understanding of how basic concepts such as time, space, and matter—the cornerstones of physics itself—really work are still a mystery. What doesn't seem to work is any purely realistic/materialistic theory. Simplistically all three concepts are products of mind.

Fundamental to this mystery of why materialistic theories fail maybe the question of the mind/soul. What, where, and when is the mind/observer? Is the world not at all as it seems to our common senses that seemingly divide spacetime/matter into mind and matter moving through space and time? A movie provides an illustration of the

¹ Penrose, Roger. *Shadows of the Mind: A Search for the Missing Science of Consciousness*. New York: Oxford University Press, 1994.

mystery of the observer. Just as all movies do, this cinematic illusion captures us, and we soon feel that we are no longer just an audience witnessing a screen but actual characters in the film. Perhaps in a similar sense as if coupled to this animated picture chimera, the “real world” inundates our senses so that we believe we live in an objectifiable world of time and space and that anything outside of this “reality” is purely subjective.

Perhaps Plato was referring to this phenomenon in his allegory of the cave in which prisoners are chained so that they can only watch their shadows cast by firelight upon a wall all the while erroneously believing that they *are*, in fact, those images. Would we readily accept the reality behind the images if we could? It would no doubt be quite difficult even to admit that we are “chained” by our desire to “exist” in material forms. Dropping those chains without some spiritual discipline could be quite devastating.

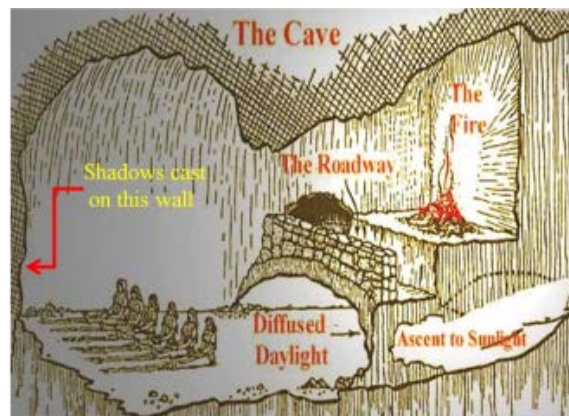


Figure 1. Plato's Cave.

This basic dialogue between spirituality and physicality continues today although the ancients might not see which side of the argument a modernist is on. Plato's vision held that mind/mathematics was the ultimate ideal, the only eternal thing—the essence of reality itself. If one would only take a few carefully- and perhaps spirituality-trained glances at the physical world one would “see” what lies beyond the illusion—the basic truths of mathematical beauty. If, on the other hand, one becomes too engrossed in the physical, one becomes chained to and polluted by it and loses sight of the ideal.

PLATO'S VISION OF IDEALISM AND ANCIENT REALISM:
THE FAILURE OF OUR SENSES

Plato's vision deviated from the purely rationalistic picture. The ancient Greeks, Leucippus and Democritus, pushed the idea of rationalism further than any other philosophers of their era and also drove our Western world onto a path that many feel we have still to steer away from. This was the path of *Rational Idealism*, seemingly separate and distinct from pure *Realism* and yet encompassing it. Their idealistic concept of reality was that *real* matter was made of ideally constructed atoms: simple, eternal, infinite-in-number, different in shape and size; that is, each with definite objective properties. These atoms existed as solid little nuts of ideal realism. But we poor mortals could only sense these wondrous properties erroneously through our imperfect, out-of-shape senses that always failed to see *what is really out there*. Thus the *real* world was indeed made from ideal objects, but our senses were not capable of perceiving them.

This failure of our senses led to our mistrusting our most human abilities to discern the world around us; a feeling that echoes in our world to this day. Truth was objective and *out there* but unfortunately hidden from our inept senses. Only through ideal conceptualization was truth to be found—but not through our senses—only in our minds.²

Hence, for ancient Greek philosophers, other than Plato, the ideal was “out there”, perceived or not, but when perceived, such perception was hopelessly distorted. Plato countered this ancient *rational idealism* philosophy of real non-perfect senses coupled to a real world with the notion any that any real object was an imperfect copy of its ideal. For Plato the mind took on greater significance as the only organ capable of determining truth by envisioning such ideal objects. The body senses could never “see” them. The question of whether or not they were really out there became moot. The world of ideas thus emerged as God-like; the world of our senses, not to be trusted, emerged as frail error-filled human-like.

Moot or not Plato's vision of truth held that mathematics was the ultimate ideal, the only eternal—the essence of reality itself. If one would only take a few careful glances at the physical world (just how to do this was not covered by Plato) one could “see” what lies beyond—the basic truths of mathematical beauty. If, on the other hand, one becomes too engrossed in the physical, one becomes polluted by it and loses sight of the ideal.

² Similarly modern classical philosophy or *realism* asserts that physical objects do exist independently of their being perceived. However, as strange as it may appear to us, modern or perhaps post-modern *idealism* states physical objects may not exist at all, but instead consist of ideas, perceived or not.

TEGMARK'S MATHEMATICAL UNIVERSE

Physicist Max Tegmark in his book³ sees that: We (meaning all that is) are entwined into a complex and possibly multiple-universal *external reality* (ER) in two distinct ways that he labels as: *consensus reality* (CR) and *internal reality* (IR). As such Tegmark believes that the parallel universes interpretation of quantum physics is the best description of how ER works to answer what Douglas Adams called⁴ the “ultimate question of life, the universe, and everything,” namely, how CR arises from ER.

Tegmark indicates this is a divisible problem; it is the job of physics to explain how CR arises from ER and the job of cognitive science to derive IR from CR.

In brief he believes, as I would suspect many do, that IR implies CR which in turn implies ER. Or in other words IR is a subset of CR which in turn is a subset of ER which holds them both. Thus it is entirely Venn-diagrammatically, logical that ER (blue) contains elements of reality that transcend our beliefs and observations found in CR (red) about ER and our mental representations, dreams, hopes, and thoughts, etc. found in the IR (green), of those beliefs and observations found in the CR.

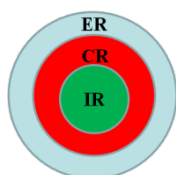


Figure 2. $IR \Rightarrow CR \Rightarrow ER$

Tegmark posits further ala Plato that the universe, the big multiversal territory consisting of parallel universes galore, is ER, which in turn is Mathematics (capital M) not just made describable by mathematics; but instead ER and Mathematics are completely equivalent, ER is Math—a kind of a possibly “madcap” Platonic universe of ideals completely expressible as mathematical concepts. In brief ER consists of Math in some way that we mortals can only describe in a Platonic sense by the mathematical tools we have come up with in our meanderings through the unknowable wilderness of the ER to make our maps, consisting of CR, which we visualize as IR.

³ Tegmark, Max. *Our Mathematical Universe: My Quest for the Ultimate Nature of Reality*. New York: Alfred A. Knopf, 2014.

⁴ Adams, Douglas. *The Restaurant at the End of the Universe*. NY: Pocket Books, 1980.

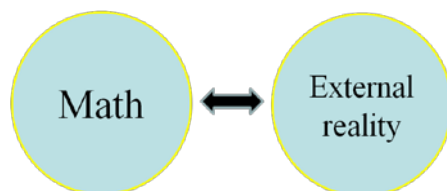


Figure 3. Math = ER

Well, maybe; however there is something clearly missing in all of this that Tegmark relegates to the universe of the cognitive scientists; namely conscious experience. Not just waking conscious experience but the continual ongoing conscious experience of life itself as certainly felt by me (even when sleeping, but not when under deep anesthetics) and I would assume by all living animal creatures and even perhaps living plants. And what of art and deep spiritual experience? Certainly mathematics can be viewed as forming the skeletal structure of all art including music, sculpture, painting, poetry, and other forms of art, as our digital age and devices so aptly indicate. However, clearly there seems to be a non-mathematical world of experience that is fleshed out from this skeleton to provide not only feelings of joy and appreciation, the appearance of thoughts and the sense that one has of having a mind, the cognition of our common senses, and the intuitions of the future and memories of the past, but also a sense of the mystery of all of that, even the mystery found in the joy of mathematical discovery.

Would an overlap of the mathematics of quantum physics and the general theory of relativity explain the mystery of such clearly conscious experiences? Decoherence theory⁵ would indicate that conscious experience plays no role in quantum physics and from this one would think plays no role in ER other than being a (unnecessary?) subset of CR. Indeed it may indeed play no role in ER; if in fact there is no such thing as ER and in the Berkeleyan sense this may be true; all we have is CR implies IR.

Taking the big bang into account, thus it is that mathematics is a derivation from a fundamental “chaotic” Mind (with a capital M) that arose as a way of dealing with its own chaos by attempting to place events in formal order resulting in humans thinking about the universe in terms of mathematics and physics in order to better survive, for example. This chaos may itself be necessary in order that anything possibly dreamed of in IR may come to exist as CR. Thus even the thought of an abstract realm called the ER may be constructed as Tegmark has admirably done.

In this sense, external reality implies consensus reality which in turn implies internal or mind reality. ER implies CR, CR implies IR, ergo ER implies IR. In the

⁵ Decoherence theory explains how super-positioned parallel universes are fuzzed out into separate real worlds.

Venn-diagrammatical logical sense IR encompasses consensus reality which in turn encompasses external reality. We are back in the cave.

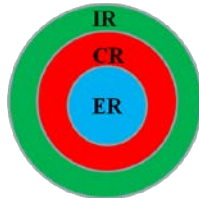


Figure 4. ER⇒CR⇒IR

WHERE AND WHEN IS THE MIND?

From some Buddhist spiritual thinking⁶ and Ben Libet's remarkable neurophysiological work⁷, we find time and mind don't work in a commonsensical way. We may need both approaches to see that spatially mind cannot be contained in the body or brain or nervous system and that temporally cause before and after effect must arise.

We may allow ourselves to become a tad crazy here and forsake rationalism.

BUDDHIST THINKING ALA DOUGLAS HARDING



Figure 5. What is being pointed at?

⁶ Rahula, Walpola. *What the Buddha Taught*. 2nd Ed. New York: Grove Press, 1974.

⁷ Libet, B.: 1985, "Unconscious cerebral initiative and the role of conscious will in voluntary action", *Behavioural & Brain Sciences*, 8, 529-566.

Libet, B.: 2003, "Cerebral physiology of conscious experience: Experimental Studies", in: N. Osaka (ed.), *Neural Basis of Consciousness*. [Advances in consciousness research series, 49] Amsterdam & New York: John Benjamin.

Libet, B., E. W. Wright, B. Feinstein, and Dennis Pearl. "Subjective Referral of the Timing for a Conscious Sensory Experience: A Functional Role for the Somatosensory Specific Projection System in Man." *Brain* 102: 1 (March 1979), pp. 193-204.

For my theory of Libet's work see "The Timing of Conscious Experience: A Causality-Violating, Two-Valued Transactional Interpretation of Subjective Antedating and Spatial-Temporal Projection," *Journal of Scientific Exploration*, Vol. 12, No. 4. pp. 511-542. Winter, 1998.

We begin with the obvious—the human body. From some empirical research we humans have found something surprising. Although there are many processes going on in the body, none of them seem to be you! In brief, science has shown that whatever you are, you are not to be found in the body. So consider doing some experiments to find out where you really are. Maybe we are looking in the wrong place or not looking correctly.

Point at an object on a wall or any other object. Notice that the object pointed to seems to be “out there,” a thing apart from you. Next, slowly rotate your finger 180 degrees till you are pointing at that space from which you look out commonly referred to as your own head—that feature-less, all-encompassing space you call your head. You are pointing to “who you are at center,” as Douglas Harding would say.⁸ Finally, slowly rotate your finger back toward the object on the wall. Watch very carefully and try to locate the point at which the “other thing out there” begins. Try to find the point at which you are no longer pointing at awareness, but are instead pointing at something else. Is it when you are not pointing at the “center” of your center? Is it when you point ten degrees off of dead center? Twenty degrees? Twenty-seven degrees? Is there such a point where and when “the other” separates from consciousness or does the first-person awareness extend outward and encompass all things? Try as you might, can you ever find where “you” ends and “other” begins? Think for a moment. Isn’t pointing outward the same experience as pointing in at any part of your body?

LIBET’S REMARKABLE FINDINGS

In a series of remarkable papers⁹ probably beginning in the early 1960s, the phenomenon of “backward through time masking” was discovered. Here perception of a test stimulus is suppressed by a masking stimulus which is presented to the subject subsequently.

During this time, a remarkable series of experiments probing more deeply into this phenomenon was performed by Benjamin Libet and his coworkers at the University of California, San Francisco Medical School. In early experiments they showed that events in the brain eliciting consciousness (called by Libet neuronal adequacy) of passive sensory “out there” events occur *after* the apparent awareness of these events and not before. In other words, conscious events and neurophysiological events are phenomenologically independent. Furthermore they may not be related in a simple temporal cause-effect manner.

⁸ Harding, D. E. *Head of Stress*. London: Arkana, 1990.

⁹ See end note 7.

What was the problem that Libet unearthed? In a nutshell, there appears to be an innate fuzziness in the relationship between physical time and conscious experience. This fuzziness indicates that a precise timing of physical events marked by the apparent awareness of these events does not match a causal sequence and that at times physical events eliciting awareness take place after one becomes conscious of them.

Ben Libet's work has led to a good deal of controversy. What Libet and his coworkers discovered was then and is today quite remarkable; for Libet has given us the first actually physical measurement of the time factor of consciousness in a human subject. Probably most surprising, Libet has shown that in the case of a skin shock, e.g., that blocking out or "backward through time masking" can take place even if the blocking signal is delivered 300 or more msec after the applied skin shock.

For various reasons, as one might rationally expect, Libet has shown that conscious experience of external or bodily stimuli cannot occur unless the brain has time to process data associated with them. But this leads to a temporal paradox; put briefly, one must ask: How can a subject be aware of a sensation, that is, be conscious of it, if the subject's brain has not registered that "awareness"?

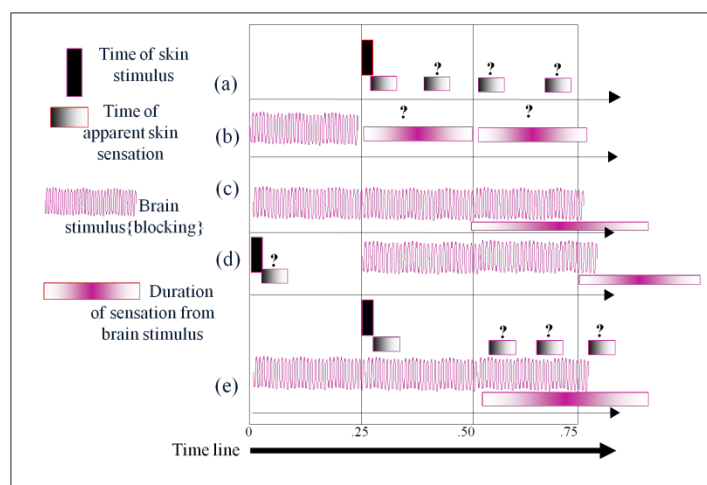


Figure 6. Libet's findings.

In the above figure 6 I have summarized Libet's findings. In (a) we have a skin stimulus applied. The question is when is it perceived? Evidence obtained from subjects indicated that it was perceived nearly at the same time it was applied (perhaps as much as 50 msec later). But how can this be if the brain has not achieved neuronal adequacy?

In (b) the cortical region of the exposed brain is directly stimulated with a high frequency (60 hz, I believe) "buzz" for approximately $\frac{1}{4}$ second. It is not perceived at

all this supplying further evidence of Libet's neuronal adequacy theory. The stimulated area of the brain is the one connected to a sensation region on the skin near the original skin-stimulus site. This would indicate that the brain must be acting at a time later than the inception of the brain signal.

In (c) the brain signal is extended beyond $\frac{1}{2}$ sec. After $\frac{1}{2}$ second the subject indeed perceives the signal as a tingling of the skin thus seemingly showing that Libet's neuronal adequacy model is correct. Perception requires a latency time for it to occur.

In (d) a skin stimulus is applied at time 0. Later at $\frac{1}{4}$ second the brain stimulus is applied and left on for more than $\frac{1}{2}$ sec. At the $\frac{3}{4}$ second mark the brain "buzz" stimulus is perceived (tingling). Is the skin stimulus ever perceived? The answer is no—the brain stimulus seems to have interfered with its perception and the skin stimulus is not perceived. Thus again confirming the neuronal adequacy hypothesis. This would indicate that the subject in (a) must be in error in believing that he perceived the skin stimulus just around the same time (50 msec later) it was applied.

But in (e) a contradiction arises. The brain stimulus is applied at time 0 and left on for more than $\frac{1}{2}$ sec. Again it is perceived after $\frac{1}{2}$ sec has elapsed. A skin stimulus is also applied but now at $\frac{1}{4}$ sec. The question is: when is it perceived if at all? Based on (c) and (d) and the neuronal adequacy hypothesis, one would expect the skin stimulus to be perceived after the brain signal was experienced, perhaps as much as $\frac{1}{2}$ second after, but no—the surprising result is that it is perceived not after the brain stimulus, but nearly $\frac{1}{4}$ second before, around the same time (within 50 msec) as it was applied to the skin. This could indicate that the achievement of neuronal adequacy needed for the skin stimulus to be perceived although requiring $\frac{1}{2}$ second, nevertheless projected the sensation backwards-through-time to the time it was applied to the skin.

Thus we have either a contradiction of the normal forward-through-time neuronal adequacy hypothesis or if it still holds, neuronal adequacy can project backwards-through-time.

HIGGLEDY PIGGLEDLY HIGGS

Can it be that time and causality do not play by the rules we have grown to accept without question? Can what happens in the future be a cause of what happens in the past or present? If indeed time were the same as space in that right and left were analogous to past and future, we would have no problem with thinking that what's on the left acting as a cause of what happens on the right or vice versa. To dig into this we need to look at another hint—not only do we need to consider when and where events occur, but we also need to consider what events consist of—the matter of these events,

for after all an event is something happening to something. Today this means examining what is called the Higgs field in quantum field theory.

IN THE BEGINNING: TWO KINDS OF “LIGHT”

Now when we look into quantum field theory we find that matter or energy (which is the same thing ala Einstein’s $E=mc^2$) is made of two kinds of twisting “luxonic matter”—a bosonic form emerging from the quantum field as photons (what we normally call light or electromagnetic energy) and gluons (inter-nuclear energy carriers) that all have spin-1 and a fermionic form emerging as spin- $\frac{1}{2}$ leptons and quarks, both moving at lightspeed provided they are not interacting with this special field called the Higgs field. The universe of matter is then made from the interplay of these luxonic bosons and fermions and these in turn emerge as these two kinds of luxonic matter: spin-1 and spin- $\frac{1}{2}$ luxons.

LUXON ZIGZAGGING IN SPACE, DRIFTING FORWARD IN TIME

Hence there would only be a universe of “light” (luxons) if someone had forgotten to push on the universal Higgs button. But it was pushed; however, the Higgs field only interacts with the spin- $\frac{1}{2}$ luxons causing them to zigzag and change handedness¹⁰ going from right-handed as they zig and then to left-handed as they zag through space, but always moving unidirectionally forward in time as shown in Fig. 7. In this manner these luxons on average appear to move slower than lightspeed as tardyons and can even appear at rest (zig-zagging back and forth at even lightspeed means you go nowhere) and thereby appearing with inertial rest masses. You can think of the Higgs field filling the universe as if it were honey filling a jar and the luxon as if was a spore of pollen. As the spore moves through the honey it picks up blobs of honey just as a snowball picks up snow when it rolls down a snow-covered hill, the snowball becomes more and more inert as it gains mass.

¹⁰ Handedness refers to how a spin- $\frac{1}{2}$ particle rotates with respect the direction in which it moves. A right-handed particle always spins with its axis of spin pointing along the direction of motion while a left-handed particle always spins with its axis pointing opposite to the direction in which it moves.

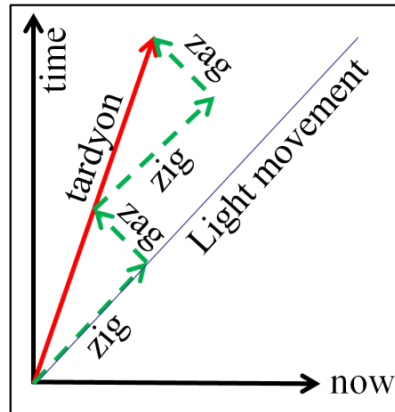


Figure 7. Tardyon emerging from a zig-zagging forward-through-time luxon.

Thus even mass has lost its massiveness. In quantum field theory the master or Higgs field, believed to fill all spacetime in a higgledy-piggledy manner, provides the necessary matrix of interactions that bring matter into existence emerging from massless matter (spin- $\frac{1}{2}$ luxons) fields.

Putting Plato back into this, I view the Higgs field as also providing an alogical yet ideal universal mind—a field of consciousness that permeates the higgledy-piggledy universe. But something else is required to complete the picture. Something that will provide the universe a direction and order of both space and time; in other words, a mind. To see how, we need to consider these luxons in a slightly different mode.

LUXON ZIGZAGGING IN TIME, DRIFTING FORWARD IN SPACE

If on the other hand these massless spin- $\frac{1}{2}$ luxons zigzag forward and backward in time as they move unidirectionally through space, as shown in Fig. 8, they appear to move faster than light as tachyons and thereby constitute the framework for both annihilation and creation processes, as was so elegantly presented by Richard Feynman; it is the ability of a tachyonic or virtual process occurring between two scattering events, say *A* and *B*, that made particles of matter going backward in time with negative energy and faster-than-light going from *A* to *B* appear as antiparticles going faster than light with positive energy and forward in time going from *B* to *A*. How a tachyon appears was dependent on the point of view of the observer of the two events. As Feynman put it, “one man’s virtual particle (tachyon) is another man’s virtual antiparticle (antitachyon).”

In Penrose's thinking¹¹ the Higgs field interacts with luxonic electrons moving forward in time causing them to zigzag through space (go backward and forward at lightspeed) thus making them appear to move tardyonically—slower than lightspeed—and thus massively. I propose that the Higgs field also acts to zigzag luxonic electrons through time (go backward and forward through time at lightspeed) as well and in so doing move tachyonically—faster than light speed. In this way we may account for the faster-than-light “movement” corresponding to “quantum wave function collapse.” This action acts like mind. In effect memory would be contained in the Higgs field as a back reaction.

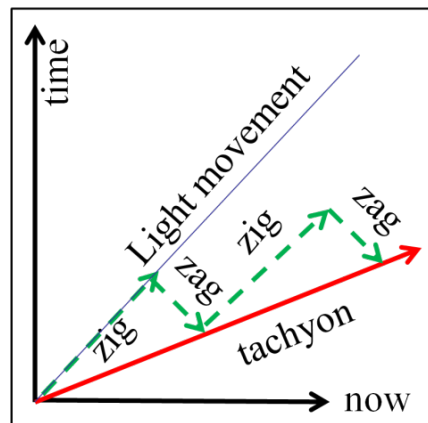


Figure 8. Tachyon emerging from a zig-zagging forward-through-space luxon.

DO LUXONS GENERATE SPACETIME?

A key hint comes from remembering that all luxons move at lightspeed and as such do not in their own reference frames experience either space or time. For every luxon only the here and now exist. How a luxon appears, as we imagine them to travel from one spacetime event to another, really depends on our points of view concerning the two spacetime separated events.

Since any spatially zig-zagging luxons can be only seen on average as moving at slower than lightspeed for all observers, we might speculate that such luxons appear to be a possible way of thinking about events occurring in time. Any two or more events connected by spatially zig-zagging luxons will always appear to be in a unique one-way-only time order no matter how the distinctly observers are moving relative one another. For all of them such events will appear to be indicative of objects having mass and moving with inertia one way through time.

¹¹ Penrose, Sir Roger. *The Road to Reality*. Chapter 25. NY: Knopf, 2005.

On the other hand, since any temporally zig-zagging luxons can be seen on average as moving at greater than lightspeed up to infinite speed for an appropriate observer, one might speculate that such luxons appear to be a possible way of dealing with the phenomenon of *spatial nonlocality* in quantum physics. Spatial nonlocality means two or more events in spacetime that cannot be connected by any object moving at lightspeed or less. Indeed perhaps temporally zig-zagging luxons are generators of space itself giving rise to what we call the experience of *now*.

Let me explain. We usually put the facts of our lives into a tabulated form we call temporal order, tending to compare the instant moments of our lives with moments to come or those that have gone by. What may not be so obvious is how we use the space we live in to do this. For example, we say “we are here, now, or I will meet you there, then.” How do we know this? Simply because we can look around and see if where we are is the same or different from where we were or where we hope to be. This is what is meant by an objective fact. What we experience as “fact” is what appears to be happening “now.”

Some philosophers say that all we have is the “now” moment and all else is not present either because it has already gone by or has not yet occurred. We think of the past as having slipped out of existence, whereas the future is even more shadowy, its details still unformed. In this simple picture, the “now” of our conscious awareness glides steadily onward, transforming events that were once in the unformed future into the concrete but fleeting reality of the present, and thence relegating them to the fixed past.

Obvious though this commonsense description may seem, it is seriously at odds with modern physics. Einstein’s startling statement¹² about the stubborn illusion of time stems directly from his special theory of relativity, which denies any absolute, universal significance to the present moment. Accordingly simultaneity is relative, which means it depends on one’s point of view, and nothing can beat a luxon as it speeds through the universe, ever coursing onward at one single lightspeed regardless of one’s point of view (that is, no matter how fast or in what direction one is going), simply because from its point of view it is going nowhere in no time.

Any two separated in space events that occur at the same instant for us we label as *now*. However, they will be seen to occur at different moments for other observers moving relative to us. Hence in Figs. 7 and 8 what we call space is really what we infer is happening now. We simply draw a line passing through such events so separated.

¹² Albert Einstein upon learning of the death of his old physicist friend Michele Besso wrote to the Besso family. “He has departed from this strange world a little ahead of me. That means nothing. For us believing physicists, the distinction between past, present and future is only a stubborn illusion.”

We call this a *nowline*. This nowline indicates all of the events spread out over imagined space happening at a single moment of time as we imagine them to be occurring. Hence we may think of this nowline as the *generator* of space itself—at least as we imagine that space to exist. In other words, temporally zig-zagging luxons drift (without experience time or space) through what we mean by space. In a similar line of reasoning spatially zig-zagging luxons drift (without experience time or space) through what we mean by time.

These characteristics are extremely important, both because of their imaginal or “mind-like” quality and ability to produce in our minds the logical temporal order of our experiences in spacetime. We can think of spatially zig-zagging luxons creating massive particles in time and temporally zig-zagging luxons as creating imaginal massive tachyons as our now realization. Because tachyons have imaginary masses, they are confined to speeds in excess of light; they may be seen to play a role in memory processes and a role in the feeling of intent following the orderly and massive process of thinking. This tachyonic speculation may be important as a model for how a temporally ordered mind arises from light-emitting tachyons interacting with tardyons as they pass through or by a tardyonic observer.

Zig-zagging luxons also indicate something else. Mind may not arise from the brain, but actually exists in the whole universe—the Mind of God, so to speak—as a tachyonic mind field. Our matter-filled brains consisting of spatially zig-zagging luxons are something like radio receivers that through our actions of intent (tuning to temporally zig-zagging luxons) tune to this greater mind to produce our thoughts, feelings, intuitions, and even our five perceptive senses.

The key point here is that observation is a mindlike event that instantly collapses the wave of possibilities from a spectrum to just one of actuality.¹³ If we are to associate a field with this collapse, it must be a temporally zig-zagging luxonic (tachyonic) field since this sudden event must occur in a spacelike or tachyonic manner—faster-than-light.

As you’ll see in what follows, a sequence of collapse events produced by the interaction of a tachyon and a tardyon by means of a photon (spin-1 luxon) appears to follow a peculiar logical order that is similar to the way in which thought forms into a sequence of words. I must admit, at first glance, I hadn’t realized that a logical temporal order could arise in this tachyonic manner. Again, to keep this simple as I

¹³ As I mentioned in Chapter 7 of my book, *Time-loops and Space-twists: How God Created the Universe*. (TX: Hierophant Publishing, 2011) many physicists believe that an additional *ad hoc* process called “decoherence” that has nothing to do with consciousness should be included in quantum physics resulting in superpositions suddenly or very quickly reducing to single realities on ridiculously short time scales.

can in what follows, I assume that all communication between tachyons and tardyons takes place via light signals—spin-1, *o*-mass bosons.

ORDER FROM HIGGLEDY PIGGLEDLY HIGGS

To see how temporal order arises from tachyons, let's consider something fairly well-known called the Doppler shift. You are already familiar with this effect, even though you may not know its name. It occurs when you are listening to a train's whistle as the train approaches when you are stopped at a RR crossing. The train whistle's pitch rises as it approaches and falls as it moves away. The same thing happens with the frequency of light emitted from a moving source, but instead of a changing pitch we see a change in color—the color we see shifts toward blue as something approaches us and toward red when it recedes from us.

Just as we also use our ears to sense when something is approaching or receding, we do the same thing with light. Hence, given the speed of the emitting object we can determine from the blue-shifted light where and when the object emitted the light as it approached us, and from the red-shifted light where and when the object emitted the light as it flew away from us.

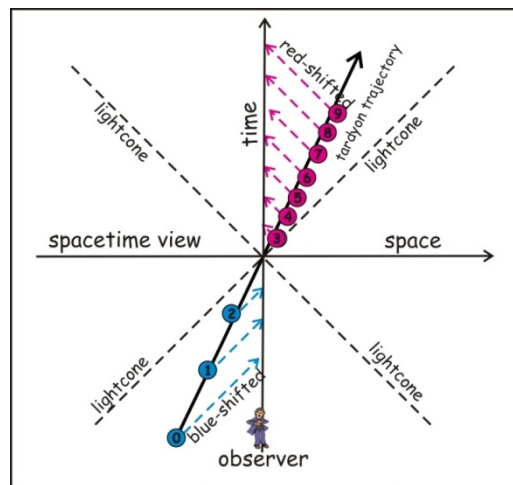


Figure 9. A tardyon communicating with an observer.

In Figure 9 we see a real object—a tardyon—speeding through the universe emitting light as it goes. We have placed an observer in this spacetime graph, and I show only the light the tardyon emits in his direction. Of course, both the light-emitting tardyon and the observer move in this diagram as they both journey through time. The difference is that relative to the observer, the tardyon appears to move toward him and then away from him while emitting light as it goes. The observer sees

the light as he make his journey in time and determines where the light is coming from and whether it is approaching him or receding from him. As the object approaches, the lightrays appear bluer and as the object recedes they appear redder, just like the changes in the train whistle's pitch.

The observer is perfectly able to distinguish between the blue-shifted light emitted from the earlier events *o*, *1*, and *2* and the red-shifted light from the later events *3*, *4*, *5*, *6*, *7*, *8*, and *9* and can then tell how the tardyon is moving. In brief, he sees the tardyon generated blue-shifted light before he sees its red-shifted light. The order of the emission events, *o* through *9*, is matched by the order of the receptions. He sees the events in the temporal order *o* through *9* just as they occurred.

But what happens when an object moves faster than light? We might inquire as well about a similar phenomenon in sound and water wave transmission, when an object moves faster than any wave the object could produce in the medium through which it travels. For sound in air we have the sonic boom effect; in water we often see a boat speeding faster than the waves it makes spreading out from the boat. And in these cases the object makes the familiar boom or bow wave splash especially noticeable when we stand to the side and observe, as when a supersonic plane flies overhead or a motorboat zips past us standing on a pier sending a big wash over us.

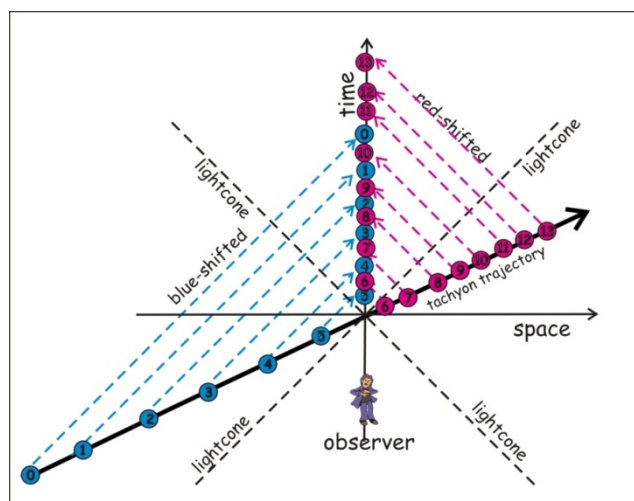


Figure 10. A tachyon communicating with an observer.

In Figure 10 we see a tachyon speeding through spacetime. Look carefully and note that no light from the tachyon reaches the observer until the tachyon has actually crossed his path. Whereas for the tardyon shown in Figure 9 (slower than light speed particle), the observer sees light coming from the tardyon well ahead of when they

cross paths. Note also that both the red-shifted and blue-shifted light are seen after the tachyon has crossed his path; so he sees the tachyon coming to him from past positions farther back in the past after they cross paths and later on in time. In the above the sequence, he sees the event sequence *5, 6, 4, 7, 3, 8, 2, 9, 1, 10, 0, 11, 12, 13* and so on. Intermixed with the logical order of the red-shifted light sequence *6, 7, 8, 9, 10, 11, 12, 13*: he sees the blue-shifted light signals coming from the past in the reverse order *5, 4, 3, 2, 1, 0*: in other words, it is like a watching a movie in reverse or a scanning of memory to earlier events.

Hence the blue-shifted light appears to the observer, as he moves into the future, as a recording of the past positions of the tachyon (it looks like a tardyon going backward in space) with the red-shifted light appearing to be a record of its future positions (it looks like a tardyon going forward in space). Consequently, we also see that as the tachyon approaches the observer the earliest-emitted blue-shifted light arrives after the latest-emitted blue-shifted light. Thus, as time goes on, we see the blue-shifted light coming from farther back in time, appearing as if it was emitted from something moving backward from the crossing point. Since a tachyon moves faster than the speed of light, we cannot see it approaching or receding. So, after it has passed, we would only be able to see two images of it, appearing and departing in opposite directions.

Perhaps what we call ghosts may have something to do with tachyonic-Akashic records. It may also explain what happens to us at the moment of death. This also may have a lot to do with how memory works. Tachyons racing through our brains may recall past events that appear as virtual images or flights of imagination. Perhaps at death or during an accident we have a quick flash of events occurring from a rush of tachyons. The red-shifted light in the brain registers an anticipation of the future, and the blue-shifted light brings up more of the past detail as time goes on. This may also indicate how we can form sentences.

PLATONIC TACHYONIC MIND ORDER

Let me explain a little more fully. A sentence or orderly thought consists of a logical array—a linear sequence of words or phrases. In Figure 10 we see the tachyon trajectory crossing the thinker's trajectory (a simple stay-at-home person). I'll call the events, occurring before the two trajectories cross, the past and the events, occurring after they cross, the future. As the tachyon moves by the thinker as shown in Figure 10, blue-shifted light from the deepest past positions on the tachyon's trajectory arrive after the tachyon does. Also after the tachyon goes on by, red-shifted light arrives. The two signals, the past blue-shifted and future red-shifted light, form an intermixed

sequence continually occurring as the thinker moves forward in time toward his future. Hence as time goes on new information from the future locations of the tachyon and old information from the past positions of the tachyon tend to intermix. Our thought processes may work this way: we think by looking at new information and comparing it with old information to see if the two streams of information gel or make logical sense. This tachyon-tardyion interaction model may also help us to understand how ordinary brain processes work according to similar atemporal processes, as I earlier indicated in the work of neural physiologist Ben Libet.

As I mentioned briefly, tachyon-brain interactions may indicate indeed how our thoughts form and how our minds may work. As we ponder anything and put our words in order to form sentences, we need to not only see where we are going (the future of our thought), but we also need to constantly modify that future by reaching back to the past to see where such a word order may have arisen. Hence, if tachyons are interacting with brain tissue in this manner, as our thought continues with more words and sentences coming into the picture, memory must play a continual role, allowing us to witness events or thoughts from the deeper past as our thoughts become more complex. Time order arising out of this atemporality is a key to understanding the process.

It may not seem to you that this is what we do in forming sentences. How do we formulate statements out of the raw material of our past linguistic and other experiences? We express new ideas; describe new experiences, by using and adapting the resources we have acquired so far. To do so, we need to go into our memory field, backward in time, so to speak and do this in a logical order. To express radical new ideas, do we need to use a kind of linguistic shock treatment to jolt ourselves into a new level of perception and/or understanding: a quantum-leap, so to speak? We may indeed do this. Such a jolt is the experience of the tachyon-tardyion interaction—the point where the tachyon and tardyion cross paths. As for instance, James Joyce may have experienced with his stream of consciousness in his wordplay writing of *Finnegan's Wake*, Garcia Marquez did with magic realism, and Kierkegaard did with existential challenges to conventional thinking, etc.

EXAMPLE: MAKING SENSE OF A SENTENCE.

Other research seems to suggest that “to effectively generate a plausible image of the future, subjects reactivate images (e.g., visual-spatial context),” these researchers write in a paper published online.¹⁴ “Post-experiment questionnaires indicate that while

¹⁴ Huth, Alexander G., Shinji Nishimoto, An T. Vu, and Jack L. Gallant. *Neuron* 76, 1210–1224, December 20, 2012.

envisioning the future, subjects tended to place those images in the context of familiar places (e.g., home, school) and familiar people (e.g., friends).” In other words, to imagine the future, we remember the past and put our projection in that context.

As an example consider how the mind composes a simple sentence. The mouse is _____. (Possibility 1): broken. (Possibility 2): dead. In figure 11 we see how the tachyonic model makes up this sentence. Remember red means coming after the tachyon and tardyon intersect and blue means before.

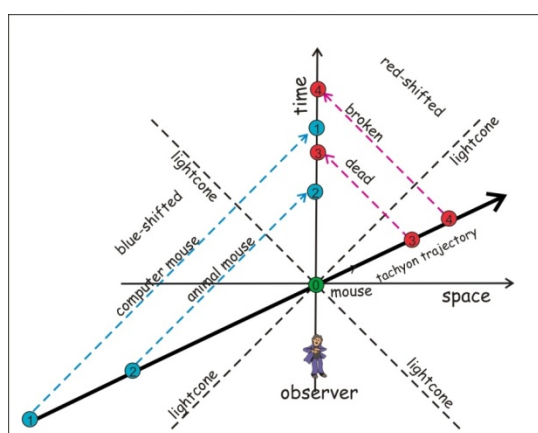


Figure 11. Using a tachyon to make up our mind.

A person finds his computer mouse has a dead battery. A mouse arises in the mind at the crossing point event 0 (in green). The noun-like competing ideas of a computer or animal mouse are marked resp. by events 1 and 2 while the adjective-like ideas of dead or broken are marked by events 3 and 4. The thinker imagines a mouse. The first possibility elicits a dead mouse picture and then he realizes that he wants a computer mouse not a living mouse. This realization brings forward a broken computer mouse and completes his sentence “my mouse is broken.” From his point of view the picture of the computer mouse occurred earlier than the picture of the animal mouse, but arrived later in time to his mind.

A BRIEF VIEW OF THE SPACETIME HOLOGRAPHIC AKASHIC GRID

In a larger and more speculative sense, the latest theory uniting quantum physics and the Einstein general theory of relativity suggests that the entire universe can be seen as a two-dimensional information structure “painted” on the cosmological horizon like a hologram.¹⁵

¹⁵ Bekenstein, Jacob D. “Black Hole Thermodynamics”. in *Physics Today*, Vol. 33, No. 1, pages 24–31; January 1980.

This holographic principle was inspired by a study of black holes; the insight was that the informational content of a black hole, represented by the entropy, of all the objects which have fallen into the hole can be entirely accounted for as if were contained in its surface event horizon. This entropy is found to be proportional to the area of the black hole's event horizon—the surface within which even light cannot escape the gravity of the hole. Specifically, a hole with a horizon spanning N Planck areas has $N/4$ units of entropy. (The Planck area, approximately 10^{-69} square meters, is the fundamental quantum unit of area determined by the strength of gravity, the speed of light, and the size of Planck's constant.) Considered as information,¹⁶ the entropy can be viewed as if written on the event horizon, with each bit (each digital 0 or 1) corresponding to 4 Planck areas (1 Planck area is indicated by the small red triangle in Fig. 12.)

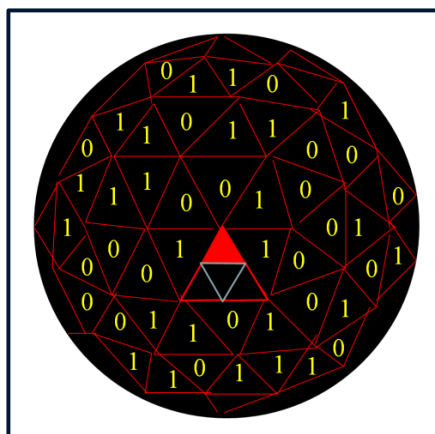


Figure 12. A tiny section of a black-hole's event horizon with pixelated information painted on its surface.¹⁷

Thorne, Kip S. *Black Holes and Time Warps: Einstein's Outrageous Legacy*. W. W. Norton, 1995.

Susskind, Leonard. "Black Holes and the Information Paradox". in *Scientific American*, Vol. 276, No. 4, pages 52–57; April 1997.

Hawking, Stephen. *The Universe in a Nutshell*. NY: Bantam Books, 2001.

¹⁶ The relation between information and entropy was first indicated by Claude Shannon. See Shannon, Claude E. (July–October 1948). "A Mathematical Theory of Communication". *Bell System Technical Journal* 27 (3): 379–423. Entropy represents the expected value of information sent by a sender to a receiver over a channel. Usually it is measured by a logarithm to the base 2. Hence for a coin with two sides $\log_2(2)=1$. For two coins with 4 sides possible, $\log_2(4)=2$ —hence with n such coins the information would be n , the number of coins. Each coin represents one bit of information expressed as a numerical measure of the number of possibilities present.

¹⁷ Drawing based on similar graphic in *Scientific American* p 61, Oct. 2003.

THE HOLOGRAPHIC PRINCIPLE

According to one version of the holographic principle¹⁸ the 3-Dimensional world and all of the physical processes occurring in it emerge out of information “printed” on 2-Dimensional surfaces called “light-sheets.” For example, imagine a falling apple situated in a spherically-closed room—that is the walls of the room are the inside surface of a hollowed out sphere. At one instance of time (say time 0) we picture this spherical room as a yellow blue-filled circle in the spacetime diagram shown in perspective in Figure 13. (In the spacetime diagram one dimension of space is suppressed so that a sphere at one instance of time looks like a circle.) Now imagine that someone has placed tiny light bulbs at every square inch of that inner room-surface wall (on the diagram they would be placed equally spaced and close together on the circle’s boundary) and that the bulbs are flashed at time 0. Then light rays coming from the bulbs will all be moving towards the room’s center where we imagine they all arrive at once at a later time. These light rays form an inverted ice-cream conical surface in spacetime with the tip of the cone just where the rays come together. We can also send light rays towards the past in our imaginations. We might prefer to think of these as coming from the past as if a single bulb at some earlier time was placed in the room’s center and turned on so that its rays reached the spherical wall at just the right time 0. What’s important in this light-sheet scenario is that the light rays must converge to a single point (called the caustic) both forward-through-time and backwards-through-time in order to describe all of the physics in the room. These light-sheets are conical surfaces that contract at the speed of light shown as green arrows both backward and forward in time and they encode all of the physics that describe this room and the falling apple.

In an informational sense, we, too, are nothing but projections from light-sheets into the present time from the edges of spacetime both in the past and in the future.

¹⁸ Bousso, Ralph. “The Holographic Principle.” In *Reviews of Modern Physics*. V. 74, No. 3 pp 825-874. <http://arxiv.org/abs/hep-th/0203101#>.

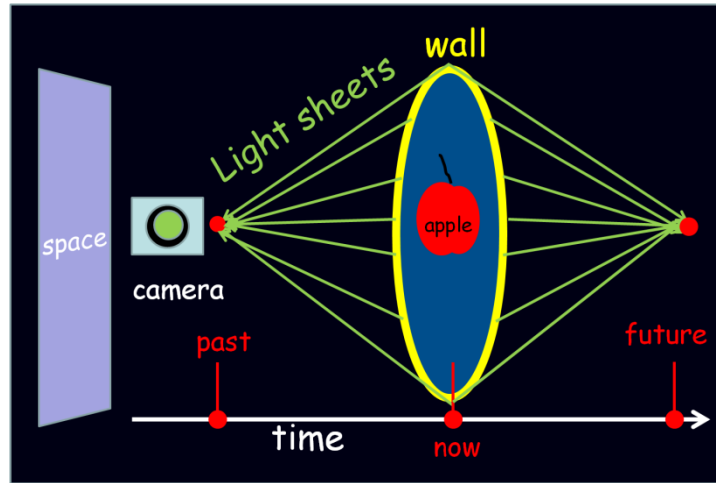


Figure 13. Three dimensional world projected from light sheets.¹⁹

THE AKASHIC RECORD

Some researchers indicate that Akashic records are similar to a cosmic or collective consciousness. For those who may have forgotten this, Akashic is a theosophical term referring to a universal filing system which records every occurring thought, word, and action. The records are impressed on a subtle substance called Akashi (or ether). In Hindu mysticism this Akashi is thought to be the primary principle of nature from which the other four natural principles, fire, air, earth, and water, are created. These five principles also represent the five senses of the human being.

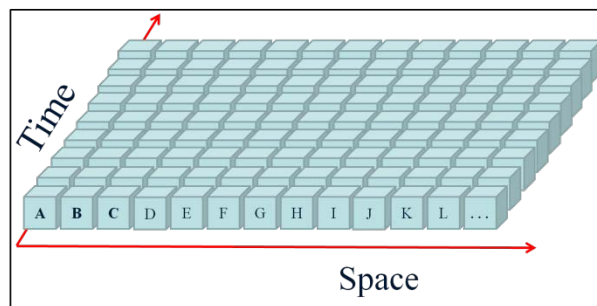


Figure 14. The Akashic Record in spacetime.

We can imagine the Akashi (as depicted in Fig. 14) as filling all of spacetime with tiny hunks of information called voxels. Each voxel contains a bit of info relevant to a tardyonic participant. These records have also been referred to by different names

¹⁹ Drawing based on similar graphic in *Scientific American* p 34, Feb. 2012.

including the Cosmic Mind, the Universal Mind, the collective unconscious, or the collective subconscious. Others think the Akashic records make clairvoyance and psychic perception possible.

CONCLUSION

According to quantum field theory and the current finding of the Higgs boson, we must have both tachyonic and tardyonic quantum fields present in our bookkeeping calculation as Feynman has shown.²⁰ Whether or not this is also true in nature remains a debatable question. My speculations may certainly not be the current picture of nature as seen by many physicists. This prescription can be viewed as an interaction between the Akashi record of the tachyonic field and the tardyonic fields of matter and, equivalently, a quantum field generator of a physical universe with different tardyonic masses. The big problem that the Higgs field having a tachyonic part may solve is not only how different masses come into existence, but also how a mind is there to know it. Again I caution the reader that this is speculation on how tachyon-tardyon interaction may explain collapse of the quantum wave function as a mindful realization and the appearance of mind in nature.

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²⁰ I haven't put a lot of mathematical detail in this paper. Here is the simplest (that I could come up with) fundamental Lagrangian, \mathcal{L} , describing a zig-zagging spin- $\frac{1}{2}$ luxon that zig-zags from R to L and back again (R means right-handed and L means left-handed spin- $\frac{1}{2}$ field) interacting with a simply constructed Higgs field, Φ . $\mathcal{L} = i\bar{R}\gamma^\mu\partial_\mu R + i\bar{L}\gamma^\mu\partial_\mu L + K(R\Phi L + \bar{L}\Phi^\dagger R)$. The bars above the terms R and L refer to fields that create particles while the unbarred terms refer to fields that annihilate particles. The term $\gamma^\mu\partial_\mu$ refers to a complex sum of terms denoting kinetic energy. K is in general a complex number thus giving rise to an imaginary mass component for the last two terms. If K were simply a real number and Φ was a constant real value term then the last two terms would reduce to $K\Phi(R L + \bar{L}R)$. In this simpler case we would write $K\Phi=m$, the mass of the spin- $\frac{1}{2}$ particle and the above Lagrangian upon calculating its extrema would reduce to the Dirac equation describing any free spin- $\frac{1}{2}$ particle with mass, m . Indeed the idea that the Higgs field has a constant part gives rise to the masses of all fermions.

The first two terms, $i\bar{R}\gamma^\mu\partial_\mu R + i\bar{L}\gamma^\mu\partial_\mu L$, are the kinetic energy terms and express the fact that a created left-handed particle, L , connects with an annihilated left-handed particle, L , through its kinetic energy operator, $\gamma^\mu\partial_\mu$, and a created right-handed particle, R , connects with an annihilated right-handed particle, R , through $\gamma^\mu\partial_\mu$, but the term $K(R\Phi L + \bar{L}\Phi^\dagger R)$ says that through the Higgs interaction, a created right-handed particle, \bar{R} , connects with an annihilated left-handed particle, L , while vice-versa, a created left-handed particle, L , connects with an annihilated right-handed particle, R . In brief, the right-handed particle knows what the left-handed version of itself is doing.