

# Quantum Physics 107

Over the years since around 1998, many people have questioned me about the relevance of Quantum Theory to Paranormal activity. The only surprise in this is how long it took them to notice and ask. I think I have been hinting at it for about thirty years now that there is a very strong connection between the two. It is my belief, and the beliefs of others, that Quantum Mechanics holds the key to a scientific explanation for paranormal phenomenon. While it may seem like I am beating around the bush so to speak with these articles, there is a method to my madness. Have a little more patience and I will address those connections soon. I feel it is imperative though to lay down a firm foundation for comprehension. I promise to make it as entertaining as I can.

## Time

Time is an A-Class Humdinger. We perceive time as flowing. We cannot currently journey through time. We are firmly entrenched in the “here and now” or the present. But here is where the Humdinger comes in; there is no known law of physics that corresponds to the passage of time. It may all be simply an illusion. Our brain may need the reference of flowing time in order to give our life meaning, sense of accomplishment, and measure.

Or not...

Einstein pointed out that time is relative, and that when two events occurring at the same time will in fact occur at different times based on the point of observance by the witness. Additionally, the speed of light is related to different references in time. If you travel near the speed of light, time slows. Traveling at the speed of light, time stands still. Going faster would reverse the “flow of time”.

It's all relative.

Or is it?

If time is not linear, what is it exactly?

If you ask a physicist what time is, you will get a variety of answers. If you ask an engineer, you will get a variety of definitions, based on working models that are predictable and required to do his job. Therefore, Time must be something... One of the theories going around today is that time is a landscape, with the past, present, and future all as fixed points. To the physicist, time is just an accurate measurement made by a clock. We, on the other hand, see time as an arrow moving through space. In a four dimensional universe such as our own, the past, present and future must be equally real. In other words, the time line or track through 3D space of events we perceive to be happening in the past, present or future have actually, in a grand sense, already occurred. We as humans are processing them in a linear fashion. An event is, after all just a thing that occurs at a particular time, and at a particular place. This is how our brain sees it. So time travel is probably impossible, right? Wrong! Actually, time travel is happening all around us. Hold out your hand and every second a dozen or so tiny nuclear particles called cosmic ray muons will pass straight through you. These particles are too small to feel and sometimes do damage which your body

repairs. Astronauts in space can die from too much cosmic ray damage which causes radiation sickness.

Cosmic ray muons are the debris from collisions high in the atmosphere. Stable nuclear particles from the sun and the stars collide with the atmosphere 20 km above the Earth. Traveling at the speed of light, about 300,000 kilometers per second, it should take these muons around seven millionths of a second to reach a person on Earth. The only problem is that muons only live for two millionths of a second and so should never reach someone standing on the ground. But Einstein's special theory of relativity claims that the muons travel through time to get to reach us. So time Travel *is* possible. If only we understood what time was. Strangely enough, we may hold the answer deep inside us. Our DNA may be the key to understanding Time.

According to Sam El-Khazen in his paper *DNA - The Gateway to Time*, "The shape of DNA is fundamental to the nature of time. During a postsynaptic potential, positively charged ions flow towards the negatively charged phosphate groups in DNA molecules in brain cells. Due to the small size and unique geometry of DNA, this results in an interesting arrangement of electric and magnetic fields in space and time that assemble neatly to form, from scratch, new electromagnetic waves. The overall system of electromagnetic radiation surrounding DNA in this fashion possesses, due to the gyre of DNA, classical angular momentum. This angular momentum, when portioned off photon by photon, has the same magnitude as the intrinsic angular momentum of all photons. This astounding apparent coincidence results from the ratio of DNA pitch to radius. While ordinary photons can, in relativistic terms, be regarded as frozen at one point in time, existing and oscillating simultaneously at every point along their path in space, the newly formed electromagnetic radiation herein described comprises photons which can be regarded as the temporal analogue of ordinary photons, i.e. frozen at one point in space, but existing and oscillating "simultaneously" at every point along their path in time. Such temporal photons can couple with ordinary photons in satisfaction of Maxwell's equations to form spin-2 systems equivalent to gravitons, thereby unifying gravity and electromagnetism. The electric and magnetic fields surrounding brain DNA during a postsynaptic potential also form advanced  $\Psi$  functions responsible for observation induced wave function collapse. DNA geometry is correlated with time direction."

While we currently can't travel through time, particles can. When Albert Einstein proposed his Special Theory of Relativity in 1905, he conceived of the speed of light  $c$  as a limiting velocity such that transmission of energy from point to point in space-time at superluminal velocities is impossible: "velocities greater than that of light," he concluded, "have no possibility of existence." This is because the mass of a particle would become infinitely large as its velocity approaches the speed of light ( $c$ ). The speed of light was therefore conceived to be a barrier for particle velocities. In the second half of the century, however, physicists Olexa-Myron Bilaniuk, V. K. Deshpande, E. C. George Sudarshan, and Gerald Feinberg realized that Einstein's conclusion was a bit premature. While his equations prohibited the acceleration of particles traveling at subluminal velocities to or beyond  $c$ , they did not preclude the existence of particles whose velocities are always greater than or equal to  $c$ . After all, photons and neutrinos both travel with a velocity equal to  $c$  without ever having been accelerated from a

subluminal speed to luminal velocity. So why could there not exist particles that travel at superluminal velocities without ever having been accelerated from speeds less than or equal to  $c$ ? In this case the speed of light remains an inviolable barrier, but that does not preclude the existence of particles on the other side of the barrier. Feinberg dubbed such particles tachyons, from *tachiv* (swift), and the experimental search for these exotic entities was on.

If tachyons exist, they are exotic. Aside from other strangeness, the equations for energy and momentum for such particles reveal that tachyons would accelerate as they lose energy. Conversely, whenever energy was imparted to a tachyon, it would decelerate. This leads to one of the most peculiar characteristics of tachyons: their *prima facie* possession of negative energy. Let an observer at rest in a reference frame  $S$  observe a tachyon traveling with a velocity  $v$  relative to him. This same particle will travel with a different velocity  $u$  relative to another observer in a reference frame  $S1$  which is moving with respect to  $S$  with a velocity  $w$ . When the product  $wv$  exceeds  $c^2$ , the tachyon will possess negative energy relative to  $S1$ . More peculiar still, such particles will seem to travel backward in time. To the observer in  $S1$  the negative-energy particle would appear to be absorbed first and emitted later.

But this is nothing earth shattering or new. The implications of such behavior were noticed by Richard Tolman as early as 1917 in what has come to be known as Tolman's Paradox, namely, that communication with the past is possible. (Hey, now we are getting somewhere!) Let an observer  $O$  in a reference frame  $S$  send out a burst of infinitely fast tachyons at  $t_1$  to an observer  $O1$  in a reference frame  $S1$  which is receding from  $S$  at the uniform velocity  $w$ . The reception of the tachyon signal in  $S1$  triggers a similar burst of tachyons back to  $O$  which travel with an infinite velocity relative to  $S1$ . The relativity equations dictate that the second signal arrives in  $S$  at a time  $t_0$  before the burst of tachyons is sent at  $t_1$ . But, since the signal from  $O1$  to  $S$  was triggered by the signal from  $O$  to  $S1$ , it follows that the effect ( $O$ 's reception of  $O1$ 's signal) precedes the cause ( $O$ 's sending his signal to  $O1$ ) in  $S$ , or, in other words, tachyons furnish the mechanism for backward causation.

Ok, I know. The Excedrin is in the medicine cabinet.

Help yourself...

In classical physics, we can quantify a series of events by pointing out everything that led up to it. In Quantumville, however, there is no past, only probability. Once we measure a particle by observing it, it is preceded only by the probabilities of its location before the wave function collapsed. This means that the particle, up until the moment of observation, existed in all possible pasts. This is called the "Sum over Histories" which shows that a probability wave includes all of the possible pasts until the moment it is observed. Isn't this a new way to observe history?

In an experiment performed in the 1980s by physicist John Wheeler, photons were shown to adjust their behavior in the past, based on a future choice involving whether or not a photon detector had been turned on or off after the photon passed through a beam splitter! This referred to as the delayed choice experiment, suggests the photons behaved as though they could predict whether or not the detector would be turned on or off in the future, then adjusted their behavior accordingly in the past!

A separate experiment known as the quantum eraser experiment, demonstrated that it is possible to erase the past on a quantum level, in principle, anyway. Another experiment, the delayed choice quantum eraser, demonstrates the past can be shaped, at least on the quantum level. These intricate experiments involved sub-atomic particles, but the results are mind-bending. These exercises proved that particles may be entangled in space AND time. Michael Duff, of Texas A&M proposed that having two dimensions of time would clear up some of the mathematical inconsistencies involving the need for 11 dimensions. Wow, two time dimensions! Do I need another wrist watch? Cumrun Vafa, creator of F-Theory, suggests two dimensions of time and ten dimensions of space. This makes perfect sense in string theory as it resolves a lot of math conflicts. However, before you pack your bags, this is still highly theoretical. Sounds like I am creating a science fiction subplot here. F-theory, M-Theory, String Theory, inflation, parallel universes and hidden dimensions, all may add up to new explanations of how our universe works.

In the end, we have to conclude that Time is an emergent concept. There is a real phenomenon, a continuous change through which we live. To understand time we have to understand the mechanism which brings about this continuous change from which our mind creates the illusion of flow of time.

Time becomes evident through motion and is measured by comparison with other motions. Sunrise sunsets, night and day, the changing seasons, the movements of the celestial bodies are all indicative of continuous change. The aging process is a reminder that molecular motion and interactions are also at work and are a part of time. Other very important aspect of time is presence of motion of particles like photon and motion at atomic level. So in effect, time is interval.

Is it possible for Humans to travel through time? If you have a large bottle of pain killers or if you are immune to migraines, go here and find out. All the math has been worked out: <http://weirdsciences.net/weird-sciences-home-page/physics/quantum-physics/latest-experiment-provedtime-travel-is-possible/>

We have a final brick in the foundation to lay before we begin correlating quantum effects with paranormal effects.

Zero Point Energy.