

OVERVIEW OF SYNCHRONIZED UNIVERSE THEORY

Extracted from Swanson's website: www.synchronizeduniverse.com

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1. TWELVE CLASSES OF ANOMALOUS DATA IN PHYSICS AND PSYCHOLOGY THAT NEED TO BE EXPLAINED

A New Scientific Revolution is quietly underway...

[Swanson's] book, *The Synchronized Universe: New Science of the Paranormal* [2003, Poseidia Press], reveals that the tapestry of modern science is showing a few tatters... There are many things modern science cannot explain, and yet they occur anyway. This includes phenomena in the "hard sciences" as well as in the paranormal. These effects are now being proven in the laboratory, even though they defy present scientific theory. These unfolding mysteries point the way to a new, deeper science, a science which no longer denies spirit and consciousness, but acknowledges and embraces them.

The Mystery Unfolds...A New Frontier Emerges

In the past three decades scientific evidence has accumulated showing that the present scientific paradigm is broken. In the hard sciences:

1.1. DARK MATTER of an unknown form makes up most of the matter of the universe. This matter is not predicted by the standard physics models. The so-called "Theory of Everything" does not predict and does not understand what this substance is.

1.2. THE LAW OF GRAVITY appears to be seriously broken. Experiments by Saxl and Allais found that Foucault pendulums veer off in strange directions during solar eclipses. Interplanetary NASA satellites are showing persistent errors in trajectory. Neither of these is explained or predicted by the standard theory of gravity known as Einstein's General Relativity.

1.3. COLD FUSION. The Cold Fusion phenomenon violates physics as we understand it, and yet it has been duplicated in various forms in over 500 laboratories around the world. Recent studies by the Electric Power Research Institute, a large non-profit research organization funded by the nation's power companies, found that Cold Fusion works. A recent Navy study also verified the reality of Cold Fusion, and the original MIT study which supposedly disproved Cold Fusion has been found to have doctored its data. Present day physics has no explanation for how it works, but it does work.

1.4. CHARGE CLUSTERS. Under certain conditions, billions of electrons can "stick together" in close proximity, despite the law of electromagnetism that like charges repel. Charge clusters are small, one millionth of a meter in diameter, and are composed of tens or hundreds of billions of electrons. They should fly apart at enormous speed, but they do not. This indicates that our laws of electromagnetism are missing something important.

1.5. COSMOLOGY. Quasars, which are supposed to be the most distant astronomical objects in the sky, are often found connected to nearby galaxies by jets of gas. This suggests that they may not be as far away as previously thought, and their red shifts are due to some other, more unusual physics which is not yet fully understood.

1.6. SPEED OF LIGHT, once thought unbreakable, has been exceeded in several recent experiments. Our notion of what is possible in terms of propagation speed has been changing as a result. Certain phenomena, such as solar disturbances on the sun which take more than eight minutes to be visible on the earth, are registered instantaneously on the acupuncture points of instrumented subjects. Acupuncture points apparently respond to solar events by some other force which travels through space at a much higher speed than light.

This covers just a few of the more glaring anomalies in the "hard sciences." Evidence has also accumulated in the laboratory that many paranormal effects are real, and can be verified and studied scientifically. Among these are the following:

1.7. ESP. Large-scale experiments by the Princeton PEAR Lab as well as other laboratories have proven that ESP is a real, statistically verifiable scientific phenomenon. Thousands of experiments have been conducted with dozens of subjects, which demonstrate that this form of communication is real, and that it does not weaken measurably with distance. This makes it unlike any known physical force.

1.8. PSYCHOKINESIS, OR MIND OVER MATTER. The ability to exert psychic force over objects at a distance has also been demonstrated in large-scale experiments. Even over

distances of thousands of miles, the behavior of certain machines, called REGs for Random Event Generators, have been altered by the intention, or the psychic force of a distant person. The odds that these effects are real, and not due to chance, is now measured in billions to one. In other words, this phenomenon is real.

1.9. REMOTE VIEWING. The American military conducted a secret remote viewing program for almost two decades. It was supported because it worked, and evidence of its success has now become public. The remote viewers have demonstrated that it is possible to view "targets" which are remote in space and time. In many cases details which were unavailable any other way were acquired by the viewers. Rigorous statistical experiments have confirmed that remote viewing has accuracy far above chance, and represents a real phenomenon which defies present science.

1.10. TIME AND PROPHECY. One unusual aspect of ESP, Remote Viewing and Psychokinesis is that "time" doesn't seem to matter. One can exert an influence or acquire information in the past and in the future, almost as easily as in the present. In conventional physics, the order of events is very important, but in the realm of psychic phenomena there seems to be a flexibility to move in time that defies current physics.

1.11. OUT-OF-BODY EXPERIENCE. Experiments have been performed which show that, during some out-of-body experiences, the "astral body" or center of consciousness of the individual can be detected at remote locations. When individuals go "out of body" and focus their consciousness at another location, physical disturbances have been measured at that remote location. These include anomalous light, electrical, magnetic and other physical forces which indicate the "astral body" sometimes has physically measurable properties.

1.12. GHOSTS. Modern scientific ghost hunters use magnetic, electrical, optical and thermal sensors when they survey supposedly haunted sites. In hundreds of cases, technically trained researchers have found measurable physical anomalies when ghosts are said to be present. Although some people have claimed to see ghosts, and many have reported anomalous cold spots and described a strange chill on their skin, modern ghost hunters have shown that unusual magnetic fields and strong voltages also occur in these same haunted locations. Unusual orbs have been photographed at the same time that magnetic and electrical disturbances are measured. None of these can be explained by conventional science.

These are just a few of the areas in which science is discovering very real, physical and measurable effects which violate present science. The book *The Synchronized Universe* describes this evidence in non-technical language, with many pictures, illustrations, graphs and references. It also shows how our present science can be expanded to begin to understand these mysteries. Of this book, best-selling author Brad Steiger says:

"The Synchronized Universe is a well-written and exciting presentation of the latest scientific evidence proving the existence of the paranormal. Swanson's suggestions

about how present physics can be modified to understand and explain some of these strange phenomena may go a long way to healing the ancient split between science and spirituality. The implications of this book are far-reaching."

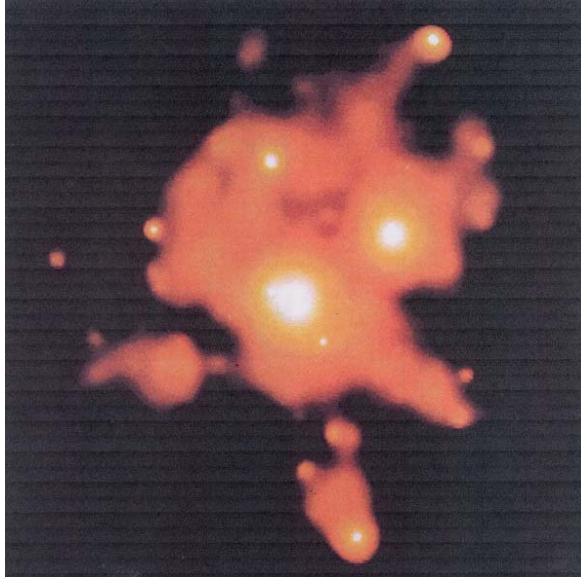
--Brad Steiger, author of *Mysteries of Space and Time*.

2. A BRIEF EXPLANATION OF THE SYNCHRONIZED UNIVERSE PRINCIPLE

A simplified explanation of how certain paranormal phenomena, such as UFOs, can be explained by science.

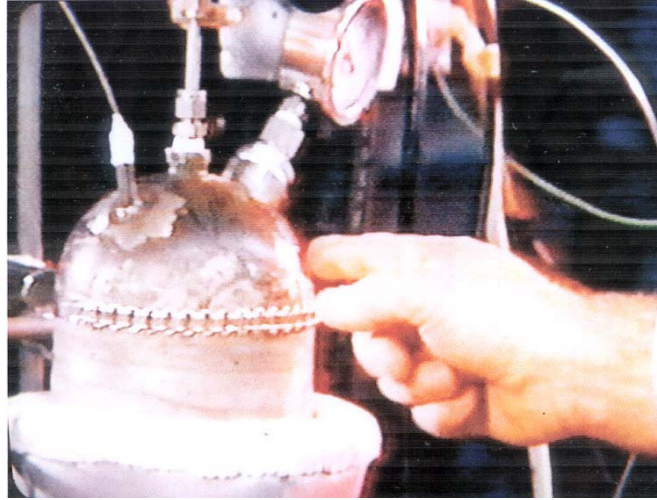
- 2.1. The synchronization principle leads to the conclusion that all the matter we see is synchronized with our own. there can be many other parallel universes superimposed upon our own, which differ only in the phase or frequency of their synchronization.
- 2.2. Each ordinary physical universe is like a single sheet of paper represented in the figure. particles (and people) move on the "sheet of paper" and believe that is the entire physical universe.
- 2.3. Other physical universes, with different synchronized frequencies or phases, are represented by other sheets of paper in the stack. to move from one universe to another, it is only necessary that the phase or frequency be shifted by a certain amount. then the object will disappear in one reality and appear in another.

3. PRESENT PHYSICS PARADIGM IS BREAKING DOWN



- 3.1. The majority of matter and energy (up to 96%) in the universe is of an unknown form: dark matter and energy. present theories do not describe it and little is known about it.
- 3.2. The photograph above shows a spiral galaxy (NGC4319) relatively nearby, and yet connected by jets of gas to three quasars which should be much farther away. Such images (courtesy Dr. Halton Arp) suggest that our theories about quasars and universe formation may be wrong.
- 3.3. Recent experiments show that light can travel "faster than light" in some circumstances. Light can tunnel through barriers at a much faster speed.
- 3.4. Experiments by Saxl and Allais show anomalies in behavior of gravity during solar eclipses, which suggest some fundamental error in present gravity theory.
- 3.5. Stability of "charge clusters" in spark discharge suggest that law of electromagnetism may be wrong in presence of high charge concentrations. It hints that "zero point energy" is modifying the expected behavior.

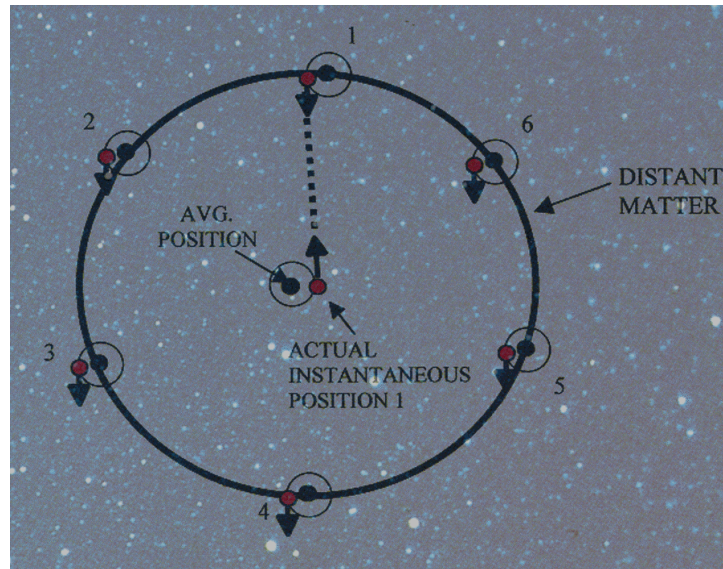
4. EXCITING BREAKTHROUGHS IN "NEW PHYSICS"



Photograph of the "case catalytic cell." This device has been demonstrated in SRI studies to generate steady energy through "cold fusion" process. Courtesy Eugene Mallove and *Infinite Energy* magazine.

- 4.1. The anomalies and breakdowns in present science make way for new discoveries and exciting new inventions.
- 4.2. One area of new physics is cold fusion, illustrated by one successful, practical device invented by Ken Case and successfully tested at Stanford Research Institute (SRI). it produces steady, economical energy from cold fusion. Navy and EPRI studies confirm the reality of cold fusion, despite ridicule by skeptics and media.
- 4.3. Another new technology, possibly related, involves charge clusters. It is based on the anomalous behavior of electrons in high concentrations. The normal repulsion of like charges seems to be "turned off" when billions of electrons are clustered close together. Many applications include bright computer displays, compact x-ray production, and nanomachining.
- 4.4. Many of the new technologies involve "engineering the vacuum." far from being empty, space is filled with energy at very small scales. The characteristics of this energy can be manipulated with remarkable results.
- 4.5. The emerging science of the paranormal will further enlarge our understanding of the universe at the deepest level, and open up new possibilities for inventions and technology. It will also expand our understanding of our ultimate identity as human beings and our connection to the cosmos.

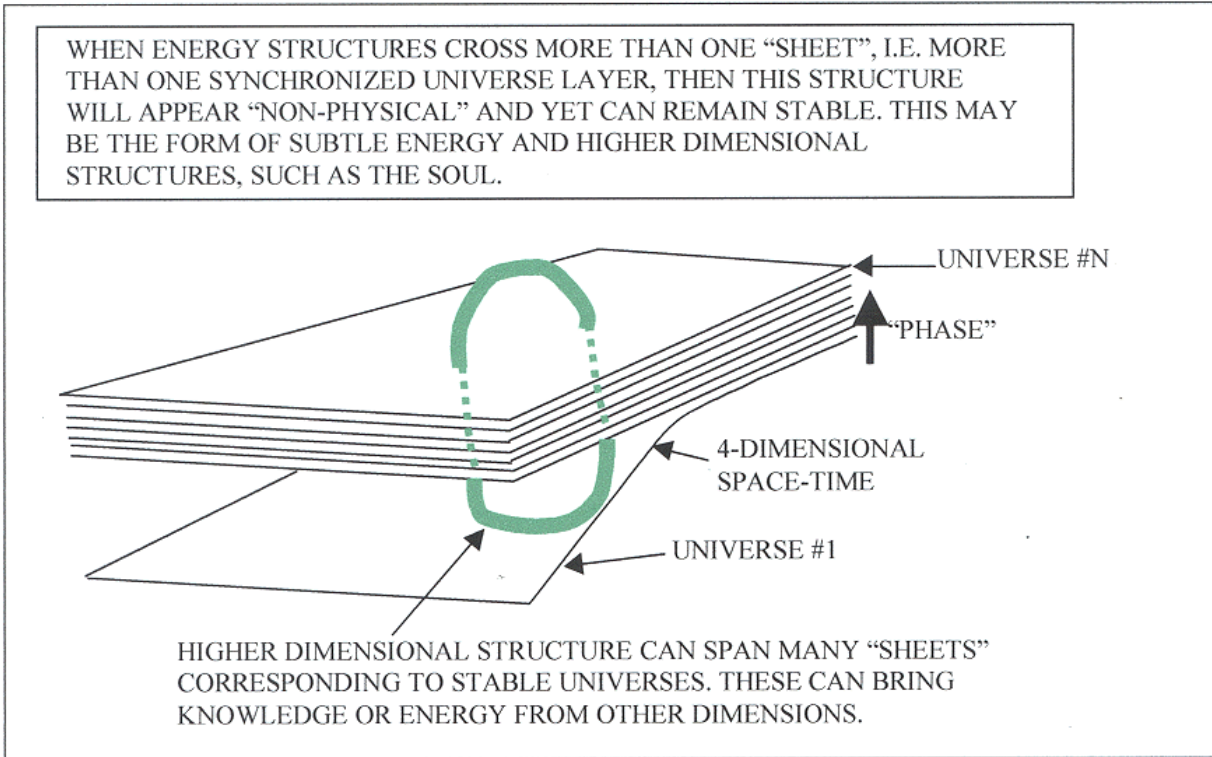
5. PHYSICS MUST BE MODIFIED TO EXPLAIN THE PARANORMAL



The synchronized universe principle proposes that particles couple across great distances of space and time

- 5.1. Proposed new theory suggests that particles interact and are coupled across great distances, so their motions become synchronized at very small scales.
- 5.2. This idea gives rise to a fundamental frequency for every particle, and explains why in quantum mechanics every particle has a frequency proportional to its mass.
- 5.3. This model also explains how paranormal effects can act over great distances and even backwards in time. All matter and energy in "our universe" is indeed coupled together. Separation is only an illusion.
- 5.4. The synchronization principle leads to the conclusion that all the matter we see is synchronized with our own. There can be many other parallel universes superimposed upon our own, which differ only in the phase or frequency of their synchronization.

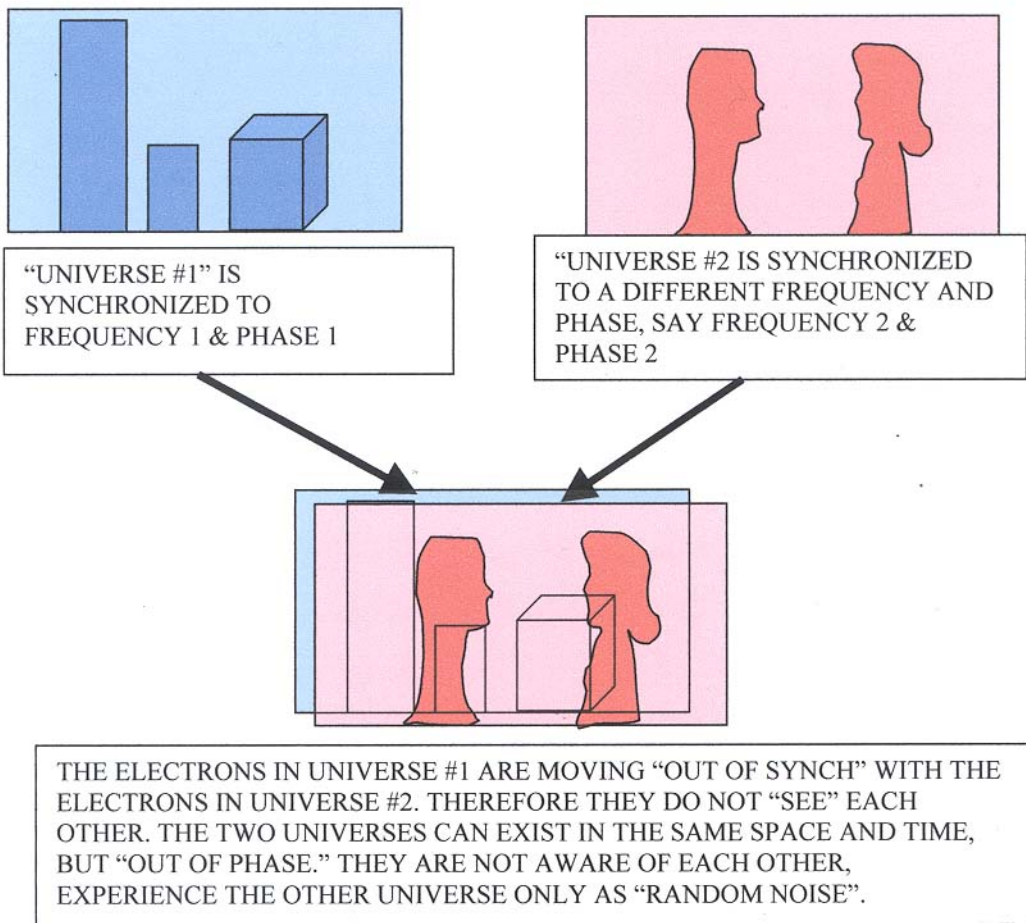
6. SYNCHRONIZED UNIVERSE PRINCIPLE LEADS TO PARALLEL UNIVERSES, HIGHER DIMENSIONS AND EXPLAINS SUBTLE ENERGY



- 6.1. The synchronization principle leads to the conclusion that all the matter we see is synchronized with our own. There can be many other parallel universes superimposed upon our own, which differ only in the phase or frequency of their synchronization.
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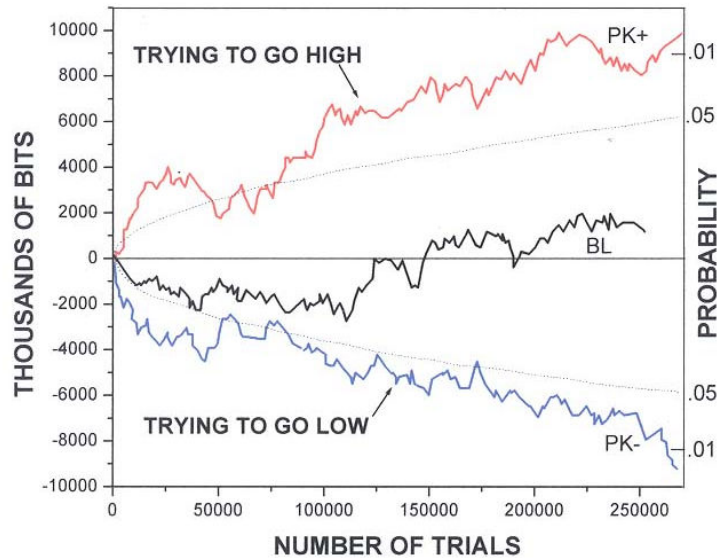
PARALLEL UNIVERSES

TWO SYSTEMS WITH DIFFERENT SYNCHRONIZATION CAN EXIST SIDE BY SIDE AND BE UNAWARE OF EACH OTHER



- 6.4. This phenomenon may be a key to how UFOs disappear instantly, and explains teleportation through walls and other cases where multiple simultaneous realities are reported.
- 6.5. "Subtle energy" arises from motions which are coupled across many of these layers, many of these parallel universes. the green loop in the top figure represents a motion which is coupled across many layers, many "realities."

7. SCIENTIFIC PROOF OF ESP AND PARANORMAL



- 7.1. The Princeton PEAR lab and other laboratories have conducted large scale statistical studies of ESP, remote viewing and psychokinesis (PK or mind over matter). They find highly significant evidence for reality of these phenomena. odds against chance are millions or billions to one.
- 7.2. The graph above shows evidence collected over many trials in which subject tries to make a random number change in a desired direction. This is analogous to making a coin always land heads by willing it. Graph shows that when operator wanted number to go high, it did so on the average. Likewise, when going low was desired, the random number generator complied. This has been reproduced in dozens of labs around the world. (data from Princeton PEAR lab)

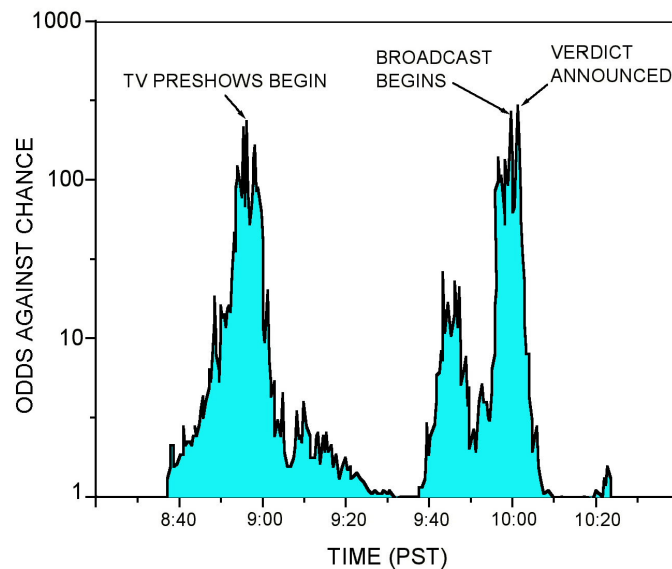
8. PHYSICAL EVIDENCE FOR GHOSTS AND ASTRAL FORMS



8.1. Recent advances in technology have made it possible to monitor voltage, heat, magnetic field and optical disturbances inside haunted houses. numerous photographic anomalies have been recorded, such as the one above.

- 8.2. These indicate that so-called "ghosts" manifest measurable physical disturbances and should be considered as a stable energy form of unknown type.
- 8.3. Spherical, rapidly moving energy forms, known as "orbs," have also been photographed in haunted areas. The physics behind such phenomena is unknown.

9. WHEN MANY MINDS FOCUS ON THE SAME THOUGHT, THE LEVEL OF QUANTUM RANDOMNESS IS AFFECTED WORLDWIDE



Data is from Radin, 1997, *The Conscious Universe*, and shows how randomness decreases when millions of people focus on a simultaneous event, in this case the O.J. Simpson trial

- 9.1. The level of quantum randomness has been found to decrease when many minds focus on the same thought or the same event.
- 9.2. This occurs when they watch a simultaneous worldwide televised event, such as the "O.J. trial" or the world trade center attack. it also occurs when they engage in worldwide synchronized prayer and meditation.
- 9.3. This phenomenon is predicted by the "synchronized universe" model. Normal quantum randomness is due to the influence of other nearby "parallel universes." because they are not synchronized with ours normally, their only measurable impact on us is random.

- 9.4. However, paranormal effects and "subtle energy" cause a synchronization across adjacent parallel universes. When this occurs, these adjacent universes become to a degree synchronized with ours. The interaction becomes more coherent, more in phase.
- 9.5. When this happens, the random part of the interaction decreases. This causes the measured level of randomness, of quantum noise, to decrease. This has been measured in the case of powerful healers, such as John of God in Brazil, as well as in global synchronized events.
- 9.6. The relationship between paranormal phenomena and decreased randomness is important confirmation of the synchronized universe theory.

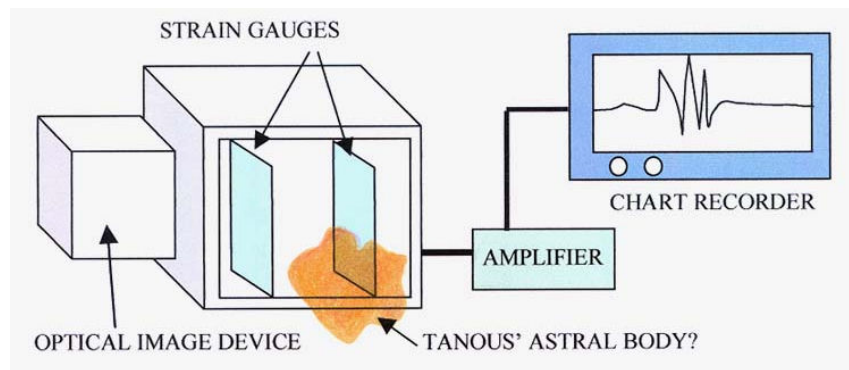
10. THE UNDERLYING UNITY BETWEEN SPIRITUALITY AND THE NEW PHYSICS



- 10.1. Aspects of religion have found confirmation in the discoveries of parapsychology: reincarnation and near-death studies, as well as out-of-body and remote viewing experiments suggest that consciousness, awareness, and even the soul, may exist outside the body and after death.
- 10.2. These findings are the beginnings of a new "physics of consciousness," which recognizes new forces and phenomena resembling the underlying teachings of religion. The power of prayer is one example which has been validated in the laboratory.
- 10.3. The drawing above depicts two famous yogis from India, Yogananda (on right) and his teacher Sri Yukteswar. Their writings point out the underlying similarity in principles between Christianity and Indian yoga, and also the potential compatibility between science and spirituality.
- 10.4. They wrote: "east and west must establish a golden middle path of activity and spirituality combined. India has much to learn from the west in material development. In return, India can teach the universal methods by which the west will be able to base its religious beliefs on the unshakable foundations of yogic science."

- 10.5. As the new physics unfolds, we are finding that its new laws support some of the universal tenets of religion: the reality and survival of the soul, the power of prayer, and the existence of other dimensions.
- 10.6. The synchronized universe model described here and in the book is consistent with this: there are many dimensions and many higher realms. Our physical reality of solid matter is an illusion. It is just the matter we are synchronized with, which is only a tiny subset of the complete universe.
- 10.7. Our universe is like "one sheet of paper in a stack." Higher dimensions correspond to beings and realities which exist across many sheets of paper simultaneously. This is similar to the eastern teaching that our reality is illusion, it is maya, and that mastery of matter only comes when we can see it from a higher perspective.

11. EMERGING "SCIENCE OF THE SOUL"™



- 11.1. Scientific studies of out-of-body experiences (OBEs), remote viewing, near death experiences (NDEs) and reincarnation indicate that consciousness can exist outside the body, and that it causes physically measurable effects.
- 11.2. Mysterious energy forms have been witnessed leaving the body at time of death, and in some cases are associated with unexplainable weight changes.
- 11.3. In remote viewing experiments, when consciousness of the viewer is at the target, based on accurate viewing, unexplained physical disturbances near the target have been measured on strain gauges, magnetic and electrical measurements. (see figure above)
- 11.4. This persistent energy form is associated with consciousness and may be associated with the "astral body." this may be the beginning of a "science of the soul."

12. ABOUT THE AUTHOR



Dr. Claude Swanson was educated as a physicist at MIT and Princeton University. During those years he worked at the MIT Science Teaching Center, Brookhaven National Laboratory and a Virginia cyclotron in the summer. At Princeton he received the National Science Foundation Fellowship and Putnam Fellowship. His Ph.D. thesis at Princeton was done in the "Gravity Group," which focuses on experimental cosmology and astronomy, and was headed by Nobel laureate Robert Dicke. His thesis advisor was Prof. David Wilkinson, who later became chairman of the physics department.

Swanson conducted postgraduate work at Princeton and Cornell Universities on the design of superconducting plasma containment vessels for fusion energy systems. He then began work for Aeronautical Research Associates of Princeton, a consulting company, and later formed his own consulting company which carried out studies in applied physics for commercial and governmental agencies, including DuPont, United Technologies, the U.S. Army and Navy, DARPA and the CIA, among many others.

For the last fifteen years, interspersed with his conventional professional career in applied physics, Dr. Swanson has pursued investigations into "unconventional physics." His principal interest has been unified field theory, the so-called "Theory of Everything" which could explain the universe at the deepest possible level. This has led him to investigate many aspects of the paranormal, which appear to be completely real phenomena which violate our present science. Paranormal phenomena, which have now been proven in the laboratory in many cases, offer a window into the deeper universe, the mysteries of consciousness, and unlock new forces and principles which conventional science has only begun to glimpse.

Among paranormal phenomena which are now known, it has been found that signals can move much faster than light, and the human consciousness and even human influence, can move backward and forward in time. Science fiction concepts such as teleportation and levitation seem

to occur in reality in paranormal events, and offer powerful evidence that this will be the new frontier of science.

At the same time, thousands of out-of-body and near-death experiences show that other dimensions and other realities do exist. This has been the domain of speculation by theoretical physics, but OBE and NDE cases indicate that parallel realities and dimensions are in some sense real. And finally, paranormal research suggests that the human soul, the center of human consciousness, can survive death and is apparently an energy form which can move and exist independently of the body. Science is discovering that, in the words of the pioneer Robert Monroe, " we are far more than our physical bodies."

Dr. Swanson has conducted extensive research in these areas, including research of the scientific literature, interviews with scientists in these fields, attended and spoken at conferences, and conducted experiments and investigations, to better understand how such paranormal phenomena can be incorporated into modern science.

This research has involved underwater archaeology in Bimini, scientific measurements in haunted houses, experiments in remote viewing and psychokinesis, and testing of new devices which can measure these strange forces. He has just published a book, *The Synchronized Universe*, which summarizes some of the new discoveries of this emerging science.

13. CHAPTER 13: BEGINNINGS OF A THEORY

Chapter 13, pp. 231-272 of Glaude Swanson (2003) The Synchronized Universe: New Science of the Paranormal, Poseidia Press, www.SynchronizedUniverse.com

"Through the results of psi research it became apparent that quantum theory has flaws in a very practical sense. Applied to systems that include human subjects the predictions of quantum theory were seen to be sometimes incorrect." -Dr. Helmut Schmidt (Schmidt, 1993)

"Conditions, thoughts, activities of men in every clime are things; as thoughts are things. They make their impression upon the skein of time and space. Thus, as they make for their activity, they become as records that may be read by those in accord or attuned to such a condition... For thoughts are things." - Edgar Cayce, (Cayce, 1971)

*"Whoever undertakes to set himself up as a judge in the field of Truth and Knowledge is shipwrecked by the laughter of the Gods.
-- Albert Einstein (quoted in Cannon, 1996)*

"If we knew what we were doing, it would not be called research, would it?" - Albert Einstein

13.1. Can Present Science Explain the Paranormal?

Modern science has given us technological marvels, and enhanced our standard of living in a thousand ways. It has provided tools to understand the atomic nucleus, crystals and metals, electricity, magnetism, and chemical reactions. It has provided useful and accurate tools for explaining and predicting the behavior of the physical world. But the important message, which is lost on students of science, is that all of this expertise applies only in certain limited areas, only for certain topics.

I often wonder how my physics education would have been different if, instead of conducting experiments on radioactivity and superconductivity, for which physics has very good theories, if I had taken the same equipment and gone to a haunted house! Or measured the energy fields around healers as they worked. Then, instead of confirming the science of the textbooks, I would have measured things that defy the textbooks. Unfortunately, my curriculum did not include such adventures, and it was twenty years later before I got around to those more unconventional pursuits.

But it is an important lesson for all scientists. Our educational curriculum is designed to convince the students that the theories in the book are true. There are no organized curricula in physics departments which encourage the student to seek out the strange places and events that break the rules.

Science has no clue about what consciousness is, for example. There is no adequate physical theory of it, and yet each one of us has one (it?). It is familiar but inexplicable. In this book we have reviewed other subjects which science cannot explain: the out-of-body experience, remote

viewing, ESP, prophecy (knowledge of the future), the effects of group consciousness, "primary communication" a la Cleve Backster, and psychokinesis (PK), to name a few. These have been proven repeatedly in laboratory experiments over decades, within the rules of scientific statistics and controls. By any objective measure, they are real phenomena.

We have also encountered strong anecdotal evidence for additional phenomena: levitation, teleportation, and the near-death experience. In many of these cases, there is indication that systematic experiments are being conducted, such as in the case of the Chinese military with teleportation, and there is testimony from top U.S. scientists that such phenomena have also been validated in the laboratory. There is a large and impressive literature on the effects of energy healers, which will be reviewed in Volume II. Chinese physicists have conducted experiments in which energy healers have altered the decay rate of radioactive substances at the distance of thousands of miles, under controlled conditions. Machines which can store and manipulate this strange new energy will also be described in Volume II [forthcoming].

The unavoidable conclusion from all of this research is that present science cannot explain these results. A few scientists working on the frontier are attempting to do so. They realize these effects are real, and are testing the limits of present scientific theory to attempt to determine just how much of this data can be explained by conventional science.

Most of the effort in this area focuses on quantum effects in living beings. Quantum mechanics have some strange features. One of the strangest is the idea that simply making a measurement can affect the experiment. This has been interpreted as meaning that the consciousness of the experimenter interacts with the experiment itself. In fact, the experiments of Schmidt (Schmidt, 1993) seem to support this, which indicates that quantum theory holds at least one of the keys to the mystery of consciousness.

This idea originated with one of the inventors of quantum theory, Erwin Schroedinger, who proposed that the quantum mechanical wave function serves as a "field of consciousness." (Schroedinger, 1967) He felt that ESP could be explained by realizing that the quantum wave function extends over the entire planet, and our minds are all immersed in it. He proposed that this may be the origin of some "group mind" effects as well as telepathy.

Recent research in Germany, Russia and China has uncovered the possibility that macroscopic, "large scale," quantum states may exist in all living things. This work is based on the discovery of the "biophoton," which is coherent, laser-like light emitted by all living cells. (Frohlich, 1968, 1980; Popp, 1979, 1989) Researchers have discovered that many molecular and cellular structures generate, conduct and store this light within their cells. DNA, for example, absorbs and emits coherent light at dozens of frequencies. It uses this coherent energy to create "force fields" around it which help maneuver other molecules into place for replication and nucleosynthesis. Other biomolecules, such as enzymes, use this coherent energy in similar ways. (Letokhov, 1974; Frohlich, 1968, 1980; Popp, 1979, 1989, 2003)

Light is coherent when all of the photons vibrate in step with one another. This is the secret of the laser, in which these photons are all in the same quantum state. This leads to the notion that

coherent, large scale quantum states permeate every living creature, and enables them to carry on essential life processes such as protein synthesis so efficiently. (Ho, 1998)

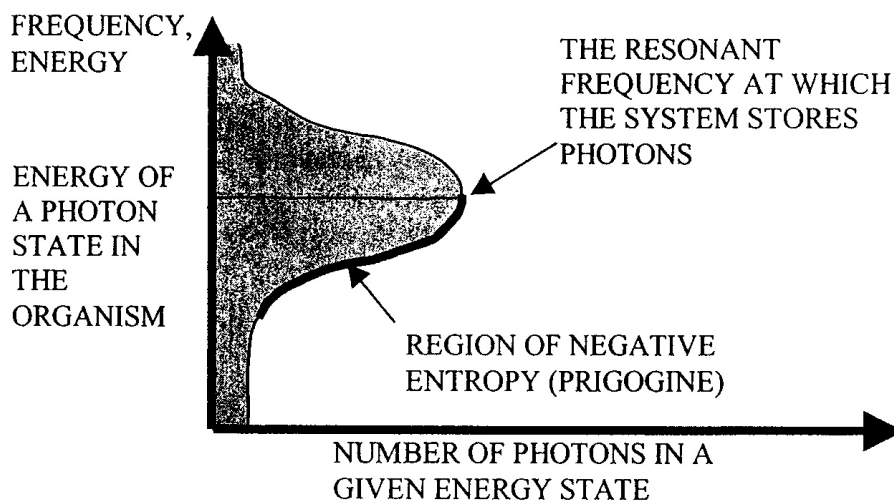


Figure 13.1. Biological systems store coherent photons. This is just like hitting a tuning fork to keep it humming, or continuously pumping a laser so it is always ready to fire. The energy is stored as photons which oscillate in step with one another, i.e. are "coherent." This makes the entire living system phase coherent, and introduces important quantum effects which help to explain life processes, and perhaps even some paranormal phenomena.

The Nobel Prize-winning physicist Dr. Ilya Prigogine has pointed out the advantage of such a system. By having a store of high energy, coherent photons, the energy state of a living organism resembles the graph in Figure 13.1, above. The peak in the graph represents the energy or the frequency of the coherent photons, which energize the system.

Prigogine pointed out that in such systems, the region on the bottom side of the bulge, where the density of states is increasing, is a negentropic region. This means (roughly) that processes can be carried out using photons from this band which actually decrease entropy, and therefore are very efficient. Entropy measures the randomness in a system. It represents energy which can no longer be used, and therefore it also measures the inefficiency of the system. When biological systems operate in the region highlighted on the bottom of the bulge (Figure 13.1), they operate in a very efficient region in which entropy does not increase. This was part of Prigogine's Nobel Prize winning work, showing how systems which operate in this way can achieve efficiencies much greater than previously expected by the Second Law of Thermodynamics.

These large-scale, coherent, resonant processes, where trillions of molecules in the body are in communication with one another and can function in resonance, brings up a new possibility: Maybe the body is a macroscopic quantum system, with a set of coherent quantum states all vibrating in step? If so, then some of the weird phenomena we have called "paranormal" might really be just quantum mechanics working its strange magic on the large scale of every day life.

This point of view has been beautifully expressed by one of the leading researchers, Dr. Mae Wan Ho, in her book *The Rainbow and the Worm*, (Ho, 1998) which is highly recommended by those wishing to explore this more deeply. However, even she does not argue that quantum mechanics in its present form has all the answers:

"A coherent space-time structure theoretically enables 'instantaneous communications to occur over a range of time scales and spatial extents. What this implies in practice is a vast, unexplored area, as the notion of non-linear structured time this entails is alien to the conventional, western scientific framework..." (Ho, 1998)

Other important research in this area has been conducted by the eminent mathematical physicist Roger Penrose, (Penrose, 1989, 1994, 1995; Hameroff. 1994) who, together with Stuart Hameroff, has examined "microtubules" and other biological structures which might carry and store quantum states within the body. There are quantum properties of neurons in the brain for example. Every synapse, which is where two nerves come together and do their "decision making," is really a quantum system. It is a tunneling junction, which is a quantum structure. Therefore, it seems very likely that quantum mechanical phenomenon take place in the body and the brain, and play an important part in life processes.

As a physicist, the possibility that quantum mechanics can explain the paranormal must be examined seriously. It is the difference between chucking the present physical laws, saying "OK, they don't work. How do we fix them?" and saying "Oh, my goodness, we CAN explain paranormal effects if we just allow for the possibility that humans, and all life forms, are permeated by macroscopic quantum states." So the question is: "Can quantum mechanics on a large scale explain some of the weird phenomena we have described thus far?"

For example, researchers such as Richard Dobrin, following earlier work in Russia, has used sensitive photomultiplier tubes to measure the biophotons emitted by humans. (Dobrin, 1977) It amounted to between 50 and 220 photons per second. He found that certain individuals were able to consciously increase their photon output by as much as 67 percent. This is similar to the process which "energy healers" use. Dobrin confirmed experimentally that the increased photon output occurred when the subject began consciously attempting to increase his "energy field." Can this be the explanation for the human "aura" that psychics see?

Researchers have found that cells are in communication all the time. The DNA molecule, for example, radiates and absorbs in the millimeter wave band. Can this be the source of the "Backster Effect," of cell-to-cell communication? It has been proven now that a "sick" cell radiates something, and when a healthy cell receives this radiation, it becomes sick. (Kaznachayev, 1967, 1981, 1982) And vice versa, sick cells can be brought back to health with radiation from healthy cells. Can this explain "energy healing?"

13.2. Shortcomings of Present Model

Before we get our hopes up too much that conventional science can explain the anomalies of the foregoing chapters [of *Synchronized Universe*], let us keep in mind some of the data we have seen so far. It may be possible, for example, that some form of quantum electromagnetic radiation from cells may cause a "healing" effect, based on the work of Kaznachayev. But those photons cannot reach half-way around the world to explain distant healing or healing inside closed rooms hundreds of miles away. (Yan, 1988, 2000, 2002) Radiation transmission and absorption between cells may play a role in cell-to-cell communication, and this may be a component of the "Backster Effect." But remember that many of those experiments, too, work over distances of many hundreds of miles and through sealed rooms and Faraday cages. What is more, the Backster effect did not weaken with distance, which argues against any normal form of radiation, such as photons, as the cause.

Therefore it is unlikely that quantum mechanics will explain away all of the paranormal puzzles of the previous chapters. A more fundamental reason can be seen in the nature of how paranormal effects manifest themselves. The best "detector" of paranormal forces in use today is the REG, the "Random Event Generator." This in itself is often based on a quantum process. It makes use of the electron noise in a resistor, or radioactive decay of a small sample of a radioactive element.

Quantum mechanics states that in these physical processes, this random noise measured by the REGs can only be described by probabilities. Once this has been calculated, nothing more can be said about the event. Quantum mechanics does not describe the nature of the noise, nor offer means for changing it. And yet this is exactly what paranormal phenomena do.

In most of the experiments described in this book [*Synchronized Universe*], the results can be summarized in the following statement: "Paranormal effects are able to alter the structure of 'random' or 'quantum' noise, thereby altering the probability of events." Although quantum mechanics does provide equations which make it possible to calculate and predict the level of quantum noise, it offers no mechanism by which consciousness could alter this noise. One of the shortcomings of quantum mechanics in the minds of many people, including Einstein, was that there was no underlying explanation of the nature of this noise. It is left as a mystery in quantum mechanics.

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Einstein and many others since him, felt that quantum mechanics was a superficial theory, that although it works brilliantly on a certain level, it glosses over a deeper layer of truth. He felt it described the universe on the average, but "there must be "hidden variables" which it neglects,

and which are evidenced by the random and unpredictable nature of the theory. Such deeper models are called "hidden variables theories" and they have been proposed by eminent physicists such as David Bohm, (Bohm, 1951)

Some physicists believe that such "hidden variable theories" have been ruled out by experiments. This is not true. A famous set of experiments called the EPR experiments, after physicists Einstein, Podolsky and Rosen (Einstein, 1935), ruled out one kind of hidden variable theory, so-called "local hidden variable theories." (Clauser, 1974; d'Espagnat, 1974, 1978) However, "non-local" hidden variable theories, in which particle motion is coupled over great distances, are not ruled out by these experiments (e.g. Cramer, 1980). This is precisely the type of theory we are proposing.

It would appear that paranormal phenomena do affect this deeper layer of physics. In psychokinesis and group prayer experiments, the level of quantum noise was actually found to DECREASE. This has NO explanation in conventional quantum theory. It requires a theory which addresses the nature of quantum noise and describes the forces which can affect it and alter it.

This is just the minimal argument for a deeper theory. Quantum theory also offers no explanation for teleportation through walls, for example. Mainstream science explains the repulsion between atoms based on quantum theory. But there is no mechanism in the theory which would show us how to turn OFF that force. Yet in teleportation experiments, seemingly that is what occurs sometimes.

This is just one of many reasons why paranormal phenomena cannot be explained away by the application of quantum mechanics. Another salient one is the time effect. The ability to affect events IN THE PAST is not part of mainstream physics, quantum or otherwise. And yet the results of the Princeton PEAR Lab (Jahn, 1987a, 1987b), Radin (Radin, 1997, 1997a) and Schmidt (Schmidt, 1981, 1989, 1993) among others have demonstrated that this is a real phenomenon.

One of the common elements in paranormal effects is the influence on the random aspects of physics, the quantum noise. In many ESP and PK experiments, the level of randomness is decreased, as measured on the REG devices. In other cases, the randomness is altered in a specific way to cause the outcome of a random process to turn out systematically "high" or "low". The common element in all of these experiments is that the quantum randomness is being altered. This can be explained if we assume that the zero-point energy of space is being altered.

The zero point energy is the random energy of space which is predicted to be there even by quantum mechanics. It is a direct result of the Uncertainty Principle. But after predicting it, it is ignored in many modern theories. It is assumed to have very little effect, and treated only as a small perturbation. An alternative view, more consistent with the concerns of Einstein, has postulated that this zero-point energy provides this deeper level understanding of quantum mechanics. (Boyer, 1969, 1973, 1975, 1984; Puthoff, 1975, 1989a, 1989b) By attempting to develop a theory of the zero-point energy, allowing quantum theory to emerge as an average of

this more profound picture, seems to offer much promise if we are to understand the way paranormal phenomena seemingly alter the zero point energy structure of space.

For these reasons, I believe that a "non-local hidden variables theory" which treats the zero point energy explicitly, is the only answer. Physicists who study such things know that the only possible form of this theory is that it must be "non-local," that is, it must involve the interactions of particles over long distances. The theory to be described next has all the right properties. It is only a "sketch" of such a theory, a beginning, and we describe only the concepts (no equations). It shows that many of the strange anomalous events which occur in the paranormal can be fit naturally into a physical theory. The quantum aspects of living beings meshes very naturally with this theory. It may be the coupling together of the quantized biophoton model with the "Synchronized Universe Model," to be described next, which offers a more comprehensive explanation of a wide range of paranormal phenomena.

13.3. Beginnings of a Theory

When I was a freshman in college at M.I.T. I used to daydream about the electron. Einstein used to say that if we could just fully understand the electron, it would probably unlock the mysteries of all the elementary particles. The electron, of course, is familiar to everyone to some extent. It is one of the smallest of the elementary particles, the building blocks of matter. It is the particle that orbits around the nucleus of atoms, giving the atom its size and shape. It is the particle that moves through wires and crystals to make our walkman work, to make our computer function, to generate TV signals. It is at the heart of most of the electronic wonders of the last 100 years.

But as a budding physicist, I wanted to understand it at a deeper level. I had discovered a series of books by the famous physicist Richard Feynman, who unravelled many of the mysteries of the electron. After reading his books, I used to daydream, close my eyes and use my imagination to try to understand what was going on at the deepest level of the electron. The picture he drew, and the picture I saw, was of a small particle zipping around at high speed in space and time.

Feynman explained how the electron probably has no mass, no weight, if we could peer deep inside it. Probably the mass it has is due to the trapped energy of the electric fields around it. He explained that, at very small distances, an electron moves at nearly the speed of light, and can zip back and forth in space as well as in time. This was amazing and exciting to me. The electron was a time traveler, at least on the very small scale!

There is the concept in physics called the "drunkard's walk" or the "random walk." You can imagine a very drunk man trying to walk in one direction. But his balance is so impaired that he keeps veering off in different directions in a random pattern. He may walk many steps but he doesn't get very far. This is a random walk. In the nineteenth century scientists peering through early microscopes saw pollen grains moving in water. These tiny grains also moved in a random pattern. It turned out they were so small, the random kicks they received from water molecules caused them to bounce around in different directions. They also did the random walk. This zigzag behavior was named "Brownian motion" after its discoverer. This random zig-zag pattern of motion is found many places in nature. And it seems the electron also moves in this way at the

smallest scales. But most fascinating to me, it did the random walk in time, going forward and backward in time, as well as in space. (see Figure 13.2)

THE ELECTRON DOES THE "DRUNKARD'S WALK" IN SPACE AND TIME

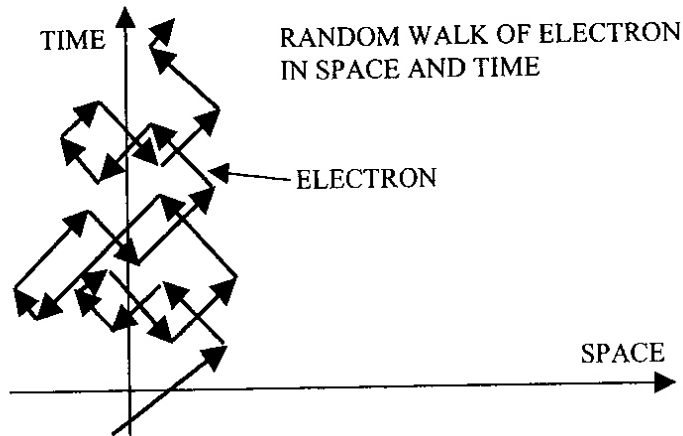


Figure 13.2 The electron zips around, moving rapidly back and forth in space and time. It has a negative electric charge, so it is repelled from other electrons, which also have negative charge. For electricity, like repels like and opposites attract. It is attracted to the positive nucleus of the atom, which is what holds atoms together. It also spins like a tiny top or a miniature planet as it zips about in a random motion.

I spent many hours trying to develop a "feel" for the electron. I did not know then that what I was doing would probably today be called remote viewing. I was just trying to understand the universe from the point of view of the electron. I was trying to see things from its perspective. This intuitive approach has a long and illustrious history in physics. Einstein got his first ideas for Relativity after trying to see the universe from the point of view of a photon, a particle of light. He imagined he was riding the light beam (see Figure 13.3), moving at the speed of light, and he struggled with the notion that time would have to stop in the outside world from that point of view. It led him to Relativity theory and a revolution in physics.

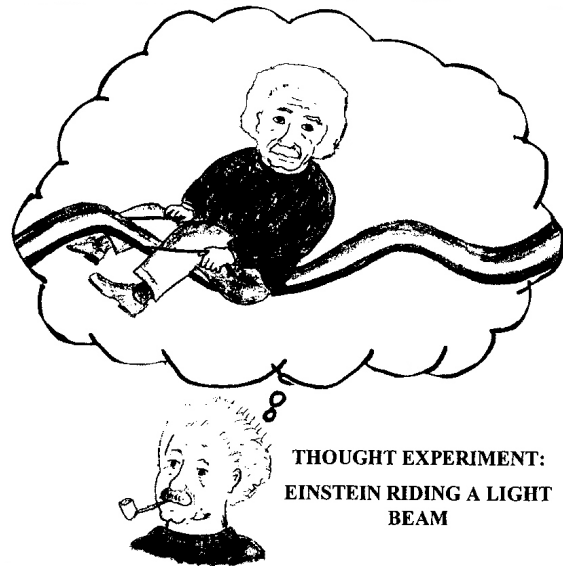


Figure 13.3. Einstein discovered the Theory of Relativity while doing a "thought experiment," which is similar to day-dreaming. He imagined he was riding a beam of light, and imagined what the world outside would look like from this frame of reference.

Einstein of course was a hero of mine, but even more so was Feynman. His physics books had a picture of him on the inside cover. His sleeves were rolled up and he was playing the bongo drums. He had gone to M.I.T., where I was going. He was full of practical jokes. He had worked on the Manhattan bomb project as a grad student at Princeton (where I also went to grad school). When he was at Los Alamos he used to crack the Top Secret safes and leave little notes inside: "Guess Who?" they read. It was said that he climbed the outside of the bell tower at the Princeton Grad college. And of course, he won the Nobel Prize in physics. What a guy!

But what I liked most about him was that he emphasized the importance of physical intuition, of visualizing and getting a feeling for the particles and forces he dealt with. In his Nobel Prize lecture, he recounted the conversation with his father when he told him he was going to Stockholm. His father had encouraged Richard all his life to explore physics. It turned out that part of the reason was that his father wanted to understand nature at a deep level. He interrogated Richard about where the photon comes from when an atom gives off light. Was the photon in the atom before it was emitted? He had many questions. He was not satisfied with a mathematical answer. He wanted to understand at a deep intuitive level. Somewhat sadly, Feynman admitted that he could not answer all of his father's questions. Today's physics has constructed mathematical formulas that describe many aspects of fundamental physics. But it is often missing a deep, satisfying intuitive picture of what is going on, and why the equations are the way they are.

Feynman has said that if all mathematics disappeared it would set physics back exactly one week. So, despite the fact that he was a very gifted mathematician, he always emphasized the importance of a physical picture, of physical intuition. This provides the guide to what ideas, what

equations to try. Without it, physicists are just guessing blind, just trying different assumptions in the dark. This often seems to describe some of the papers one sees in physics journals. In this chapter, as in the rest of the book, we stick with the intuitive viewpoint. There are no equations, only pictures. Some of these pictures have been converted to equations (elsewhere), and as this theory matures, it must one day be completely expressible mathematically. That process is not complete yet.

However, some of the concepts offered here are very deep, and they do seem to offer a way to extend current physics theory to understand and explain paranormal phenomena. The main point is that we do not have to relegate such phenomena to hoaxes or bad science. We do not have to label it as "occult" or "supernatural," thereby placing it outside of science. These are real phenomena, carefully and rigorously established.

The difficulty with any new theory in science is that it must also account for all the old data. In physics we have two centuries worth of old data. Any new theory must be consistent with the laws of gravity, the laws of electricity and magnetism, and the laws of nuclear and particle physics as we know it. At the same time, it must extend into other realms to be able to explain the paranormal and anomalous effects recounted in earlier chapters.

One of the keys is that we must go beyond quantum mechanics. Most Americans, and even most physicists, are probably not comfortable with some of its predictions. It bothered Einstein all his life. In his gut he felt quantum mechanics was an approximation. Yes, it worked beautifully at the atomic level. But he felt the randomness that was built into it was covering up our ignorance of some other processes at a deeper level.

The paradox of quantum mechanics can be understood by the "Schroedinger's Cat Paradox" (see Figure 13.4). A cat sits in a sealed box with no windows. Also inside is a pellet of cyanide. If it is released, the cat will die. Its release mechanism is triggered by a Geiger Counter, which measures the radiation from a very weak radioactive source. If it detects radiation from the source, it will release the cyanide and the cat will die.

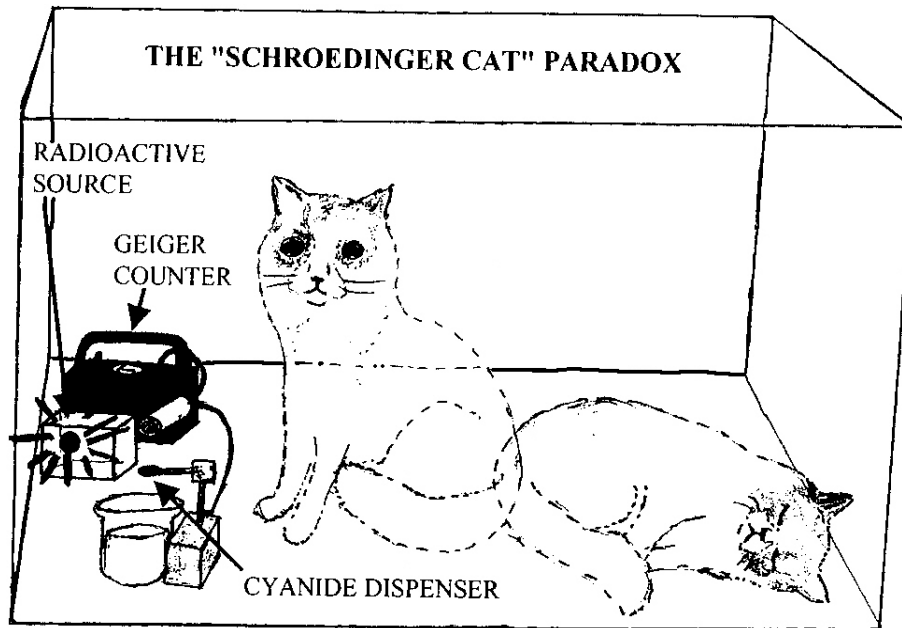


Figure 13.4. The "Schroedinger Cat" Paradox. At any given time the cat must be partially in two very different quantum states. It must be partially in the "dead" state and partially in the "alive" state. When someone peeks in, all of the possible states vanish ("collapse") except one. This is the view of real events through the lens of quantum mechanics. Among other things, it neglects to take into account that the cat is also an observer. The cat knows whether it is alive or not. The intuitive conflict is a challenge to both science and theology.

But radioactive decay is a random process. On the average, physics can predict the probability of a decay occurring. But one can never predict it exactly. Now in quantum mechanics, things are measured in probability. After one hour, let's say, the probability is fifty-fifty that a decay has occurred. But since it is fifty-fifty, quantum mechanics predicts that the cat is half dead and half alive. What it actually predicts is that there is a "wave-function" for a dead cat in there, and one for an alive cat. As long as no one looks in the box, both wave functions must continue to exist inside. It is basically saying there is a live cat and a dead cat both in there.

Then if one peeks in, it "collapses the wave function," which means that now an observer has determined which it is. One cat wave-function will disappear, and the cat will become fully the other one. This situation bothered Einstein to no end. It did not seem natural nor likely. "God does not play dice with the universe," was his response to this Las Vegas-like description of physics. But despite his qualms, predictions of quantum mechanics have held up very well. It may only be in recent years, in the face of remote viewing and ESP data, that it is coming under a serious challenge.

In these experiments we have discovered that consciousness can actually CHANGE the rate of radioactive decay. If we had enough people visualizing, we could keep the cat alive much longer!

This is no longer speculation. This is established fact as we saw in Chapters 3 and 5 [of *Synchronized Universe*]. It indicates that the probability of radioactive decay is not just some constant of nature. There is some physical mechanism which is affected by conscious intention, and it can slow down (or speed up) the decay. Therefore there must be some force or some physical connection between the mechanism of radioactive decay and the conscious mind.

It is no coincidence that some of the leading physicists investigating Zero-Point Energy have a long history of research in the paranormal. One of these men is Dr. Hal Puthoff, whom we met in Chapter One as one of the founders of the Remote Viewing Program. By the early nineteen-eighties, he had amassed so much data about "anomalous phenomena" that he began seriously exploring how to modify physics to account for the paranormal.

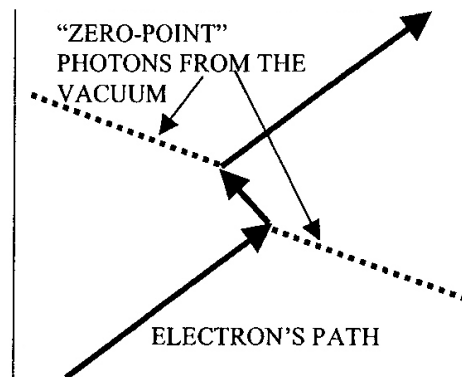
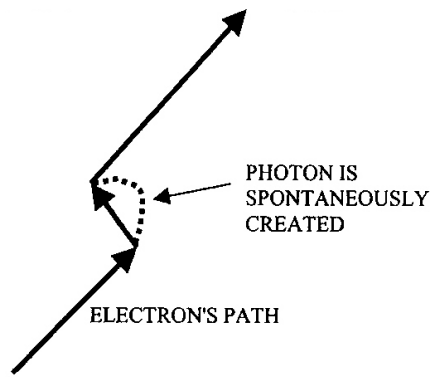
He discovered the works of T. H. Boyer (Boyer, 1969, 1973, 1975), who had gone back to basics and developed some of the first fundamental mathematics for a new theory of the vacuum. He took the notion of Zero-Point Energy, as it is predicted by Quantum Mechanics, very seriously. A basic prediction is that, because of the Uncertainty Principle, the so-called vacuum of space is actually filled with fluctuating energy, random photons which zip about in all directions.

On the average, the number of photons moving in any given direction is equal, so no force is detected. But just like the invisible water molecules knocked around the pollen grains, giving rise to Brownian motion, he theorized that this bath of random photons would kick around electrons causing them also to undergo a random walk. This offered a more satisfying model for the randomness of Quantum Mechanics. It offered a more fundamental explanation for why there must be an Uncertainty Principle.

This pioneering effort by Boyer and Puthoff, together with the work of Rueda (Rueda, 1981, 1986, 1998) and Haisch (Haisch, 1997a, 1997b, 1998) has become known as "Statistical Electrodynamics." Whereas the older, establishment theory of the electron was called "QED" for Quantum Electrodynamics, this new alternative approach became known as "SED."

The following sketch illustrates the difference in the assumptions. In Quantum Mechanics, the randomness is built-in, without any physical explanation for its origin. There is randomness, it is given by equations, and the level of this randomness is described by a constant, known as Planck's Constant after Max Planck, the original founder of Quantum Theory. As an electron moves through space and time, it will randomly give off or absorb photons which come from and vanish into the vacuum of space. The overall probability for this to occur depends on its charge, and is predicted by the equations of quantum mechanics (the "wave function").

Beyond that, no explanation is given for why or when these events might happen. It is just a random process, built into the assumptions of the theory. (see Figure 13.5)



<p>Figure 13.5. QED MODEL. The — arrows represent the electron's path, the dotted lines the photons. In QED, the standard model for the electron, photons are spontaneously and randomly created and destroyed, causing the electron to zig and zag in a random walk. This spontaneous creation and destruction of photons (and other particles) give rise to the Uncertainty Principle</p>	<p>Figure 13.6. SED MODEL. The — arrows represent the electron's path, the dotted line the photons. In the SED model, they are present in the vacuum as they "hit" the electron causing its random drunkard's walk and giving rise to the Uncertainty Principle.</p>
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SED, on the other hand, developed by Boyer, Puthoff, Rueda and Haisch, offers a deeper explanation of these random events. In their model the vacuum is filled with photons. (see Figure 13.6) This comprises the "Zero-Point energy" of the vacuum. They are real photons, but because they are randomly distributed they do not cause any average force on particles. Their random distribution gives rise to the unpredictability of quantum mechanics. The distribution of the photons is designed so it agrees with the predictions of quantum mechanics. It also, very nicely, is the one distribution which looks the same if you travel at different velocities. Therefore it is consistent with Einstein and Relativity. And, most importantly, it offers a mechanism for the randomness of elementary particles.

Whereas Quantum Theory has no way to explain how meditation can affect radioactive decay rates or electrical noise in a resistor, SED does have a way to explain this: consciousness must affect the Zero-Point energy in the vacuum. It must alter the distribution of the photons zipping through space. Somehow. At least now, we have a mechanism, a handle, on how radioactivity and other quantum processes can be affected. Still missing is any understanding of how the conscious mind might actually CAUSE such a change in the vacuum.

The theory we are presenting in this chapter builds on the SED picture. SED is a big step in the right direction. We have tried to offer the next step. SED suggested that the photons in the vacuum of space are real. We have gone the next step: we assume all those photons in the vacuum originated somewhere. Where? Why, on all the other particles throughout the universe! There are a huge number of charged particles in the universe. All of them are doing the same rapid zig-zag

dance. Therefore, they should all be radiating and absorbing photons like crazy. What happened to all the photons which were created by all those electrons in distant stars? Why, THAT IS PRECISELY WHAT MAKES UP THE ZERO-POINT ENERGY OF SPACE! (see Figure 13.7)

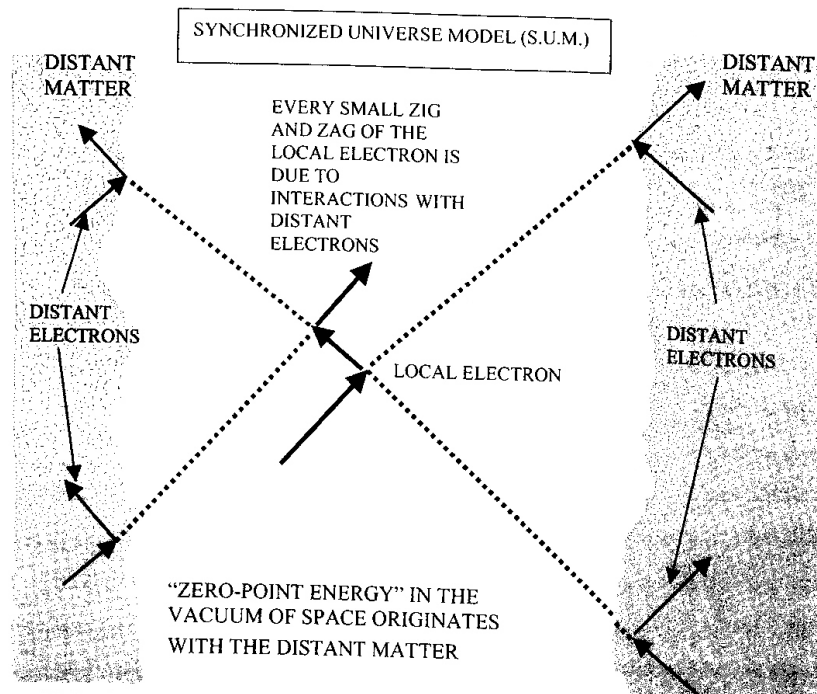


Figure 13.7. The Synchronized Universe Model (S.U.M.) assumes that all the particles in the universe interact with one another. It goes one step further than the SED model. It assumes that the local electrons are tied to the distant matter via photons. The "virtual photons" in space are assumed to be created by the motions of other electrons. Most of them are created by the "distant matter" which contains almost all the matter of the universe. Therefore every zig and zag of a local electron is really a communication between it and the distant matter. This embodies Mach's Principle: the distant matter determines local inertia and local forces.

Every time a nearby electron makes a zig or a zag, it has just absorbed or emitted a photon. Where did that incoming photon originate? Where does the outgoing photon go? Other electrons (and other charged particles) elsewhere in the universe created the photon that was just absorbed, and will absorb eventually the photon that was just emitted.

SO ALL THE ELECTRONS AND OTHER PARTICLES ARE ACTUALLY CONNECTED TO ONE ANOTHER. (See Figure 13.7). We call this the "Synchronized Universe Model" or SUM model. The random zig-zag dance they do is actually a dance with one another. Momentum and energy that is created here is absorbed there and vice versa. The local, nearby electron does not dance alone. It is therefore not a random motion that it undergoes. If we could somehow know the motions of the particles at the other end, which are in the distant matter of stars, then we could

PREDICT the detailed motions of the local electron as it zigs and zags. Of course, practically speaking this is an impossible task. But the idea that the motions of local particles and distant particles is connected is an important and fundamental insight.

In the history of physics, the first person who had this idea was Ernst Mach, the German scientist and philosopher for whom the Mach Number in high speed flight is named. Mach was convinced that the distant matter of space determined all the important forces locally here on earth. In particular, he noticed that centrifugal force is connected to the motion of stars in the sky. On a starry night one summer as a twelve-year old, I noticed this interesting phenomenon. Look up in the sky and hold your arms out. They want to fall by your side due to gravity. Now spin around. You feel a force lifting your arms and pulling them away from your sides. We call this "centrifugal force." You only feel it when the stars above you are spinning around. When they stop spinning, the force goes away.

Mach noticed this, as well as other considerations, which convinced him that the local forces described by physics have their origin in the distant matter of space. Even though it is very far away from us, there is a great deal of it. The forces from the distant matter should weaken as the square of their distance from us. But the amount of matter increases as the square of the distance away. It turns out there is enough matter out there to account for these forces. There are enough electrons out there to create the vacuum energy we measure, and to absorb all the photons produced by local particles. Therefore this picture actually does make sense. The math to back it up will not be presented in these books. However, we will try to present the intuitive pictures of how we are connected to the distant matter, and how new forces arise from this connection which explain the puzzles of the paranormal.

For when we take Mach's idea seriously, then we find that it is really possible to explain electricity and magnetism as the motions of distant matter. Modern physics always talks about a "force field" nearby, and treats this as a property of space. But we can also explain these "force fields" as being due to the imbalance of charges in the distant matter. When particles in the distant matter are displaced, they exert forces back on the local electron.

The distant matter of the universe can be displaced or disturbed in different patterns, called "modes." They resemble the vibrational modes of a bell when it vibrates after it is struck. These fundamental vibrational modes can be excited and can resonate. We will show in Volume 5 that these modes are responsible for the "subtle energies" as well as the electrical and nuclear forces. These modes have symmetries and interact with geometric shapes. This gives rise to some of the puzzling effects of pyramids and other geometric shapes. It appears likely that Mach's Principle, used in this way, can explain the variety of strange forces in nuclear physics and the subtle energies which are central to paranormal effects.

13.4. The "Round-Trip" Photon - How Electrons Interact Across Great Distances

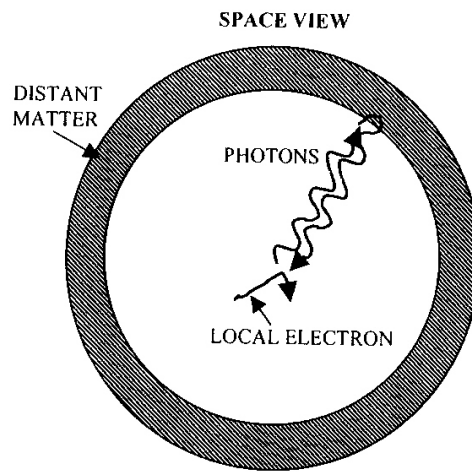
Mach's Principle is troubling to some scientists. They say that any motion of a local charge will send out waves, certainly, but it will take billions of years for that radiation to reach the distant matter. So how can there be any interaction? It just takes too long. The universe is too spread out.

Part of the answer came from Feynman and his Ph.D. Thesis advisor John Wheeler, who wrote an important paper about it in 1945. (Wheeler, 1945)

They showed that it is possible for every local, nearby, electron (and any other particle) to interact with the distant matter virtually instantaneously. They showed how radiation can travel backward in time as well as forward. Photons which travel backwards in time are called "advanced waves."

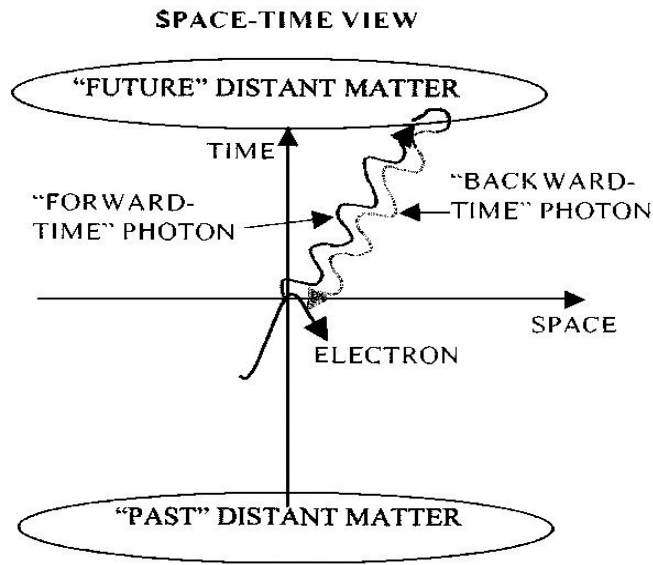
These "backward in time" or "advanced" waves are a perfectly valid solution of Maxwell's Equations, which govern electromagnetism. Evidence for such waves has been found in radiation experiments, where it is called "pre-acceleration." (Feynman, 1970) Photons which travel forward in time, the "normal" direction, are called "retarded waves."

According to the Feynman-Wheeler picture, when an electron zigs or zags it creates a photon which radiates away traveling forward in time. At some later time, it is absorbed by electrons in the distant matter. They will accelerate and in turn radiate a photon which will travel BACKWARD in time. It will converge back at the original electron's location. Because it traveled backward in time, it arrives at almost the same moment the first photon was radiated.



WHEN THE LOCAL ELECTRON INTERACTS WITH THE DISTANT MATTER, THE PHOTON MAKES A "ROUND TRIP". THE "BLUE" PHOTON GOES FORWARD IN TIME AND REACHES THE DISTANT MATTER IN THE FAR FUTURE. BUT THE RETURN LEG OF THE JOURNEY (THE "GREEN" ELECTRON) MOVES BACKWARD IN TIME (ACCORDING TO FEYNMAN-WHEELER), SO THE ROUND TRIP IS ALMOST INSTANTANEOUS.

Figure 13.8. In the Feynman-Wheeler View, all the radiation from a local electron is absorbed and reflected back from the distant matter. It converges upon the electron where it first started, with almost no time delay, giving rise to a force similar to inertia.



THE RETURN PHOTON (BACK-RADIATION) FROM THE DISTANT MATTER TRAVELS BACKWARD IN TIME (ACCORDING TO FEYNMAN-WHEELER). THE ROUND-TRIP INTERACTION WITH THE DISTANT MATTER IS ALMOST INSTANTANEOUS.

Figure 13.9. A different view of the Feynman-Wheeler (Wheeler, 1945) model. One wavy line (green) shows photons going backward in time, the "advanced" waves. The other wavy line represents photons going forward in time, the "retarded" waves. The arrows show time direction.

Therefore, by combining the two kinds of photons, one type traveling forward in time and one traveling backward in time they showed how a local electron can be in instantaneous contact with the distant matter. They also showed that this does not lead to contradictions. This is a very important insight. It has recently been further developed by Cramer (Cramer, 1980, 1983, 1986, 1988, 1997) and others.

Feynman and Wheeler showed that this concept can explain the origin of the "radiation back reaction," which is an important aspect of the electron. Although this theory has never been formally accepted or integrated into modern physics, Feynman did use the idea of pairing photons, one traveling backwards in time, the other forwards in time, in his later QED model for which he received the Nobel Prize. This became known as the "half-advanced, half-retarded propagator" .

So this idea of photons traveling backward in time and equally balanced with those going forward in time is deeply imbedded in the present physics. Even though it sounds contradictory, it really isn't. As we see, it also provides a means for instantly coupling the motions of local particles to distant particles, which is the essence of Mach's Principle.

The "distant matter" and Mach's Principle were also studied extensively by the famous astronomer, Sir Arthur Eddington. He is famous for the experiment which confirmed Einstein's gravity theory by measuring how much the sun bends a beam of light. Eddington referred to the distant matter as the "Uranoid" meaning that it is far away. He saw it as the fundamental reference frame which governs much of our physics. We shall sometimes use his term, the "uranoid," to refer to the distant matter.

We also interchangeably will use the term "celestial sphere," which comes from ancient times when the sky was believed to be a giant dome, and the stars were tiny holes through which light leaked in. It conveys the idea that the distant stars behave as though they are on a sphere far away. Mathematically, this is quite sufficient for most considerations.

This is especially true because the important reactions involve "round trip" photons. If we project all the distant matter onto a sphere having the radius of the universe (about 14 billion light years) this is not a bad first approximation.

The Feynman-Wheeler picture explains how electrons can interact instantaneously with the distant matter, despite the enormous distance. However, they assumed all the electrons moved at slow speed ("non-relativistic"). But if we peer into the smallest scale motions of the electron, we find it is moving at very high speed. So it is necessary to take the Feynman-Wheeler picture into that domain.

We assume the electrons at that scale are basically massless. This means they move at very near the speed of light. An interesting thing happens at this speed. Every time a photon is emitted, it travels straight ahead in a very narrow, focused beam, like a headlight beam from a motorcycle. It points in the direction of the electron's velocity at the moment it was emitted. The closer the electron's speed is to that of light, the narrower and more intense is the photon emitted by it.

This has been proven in huge machines called "synchrotrons" which speed electrons up to near the speed of light. The light emitted is always in a very narrow forward beam, aimed in the direction the electron is moving when it radiates. This is called "synchrotron radiation." It is a consequence of Einstein's relativity theory.

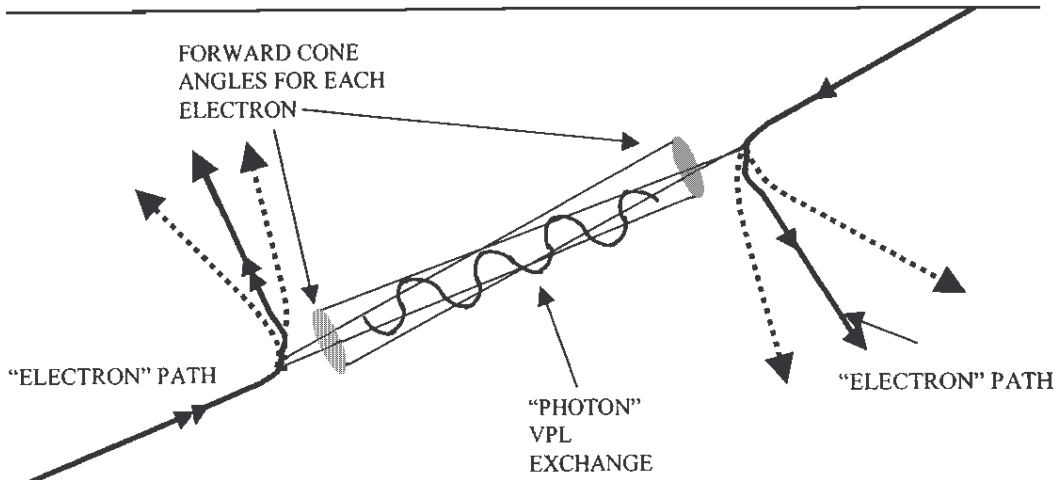
In order for two such electrons to interact, their velocities must point toward one another to a very high accuracy. Otherwise they don't "see" each other and there is no interaction at all.

This is very important: If their velocities point toward one another, there can be an interaction. Since the forward beams of energy are extremely narrow and intense, this enables them to interact over huge distances. If these beams of energy do not point at each other, because the velocities are not aligned, there will be no interaction. They will not see one another at all. It is as though the electron has "tunnel vision" and can only see straight ahead!

At these scales we have assumed the electron is massless and therefore has no inertia: it can "turn on a dime," and make extremely sharp turns. But the sharper its turn, the greater the strength of its

radiation. Can it turn infinitely sharply? No, because there will be a reaction from the other electron receiving the photon at the other end. Every emission and absorption of a photon involves at least two electrons, one at each end, one emitting and one absorbing the photon.

THE "PHOTON PULSE" ARISES FROM A MUTUAL INTERACTION OF TWO MASSLESS ELECTRONS



IF THE ELECTRON MASS BECOMES SMALLER, THE CONE ANGLE BECOMES SMALLER UNTIL IT INCLUDES EXACTLY ONE ELECTRON IN THE DISTANT MATTER.

THE STRENGTH OF THE INTERACTION COMES FROM THE COUPLING OF PHOTONS IN BOTH DIRECTIONS.

Figure 13.10. This figure illustrates how the effective mass of the electrons is determined at the very smallest scales by the strength of the two-way interaction. The force from each photon pushes the other electron backwards. The mutual interaction leads to a finite exchange of energy and momentum in the form of a very sharply spiked photon. We call this a photon "pulse." It is these photons which make up the "zero-point energy" of space.

The photons sent and received by the two electrons are coupled together. When the first electron radiates a photon outward, it almost simultaneously receives a photon coming BACKWARD IN TIME from the second electron. The interaction that results can be thought of as a consensus between the two electrons. It is a balance between turning too sharply and not turning sharply enough. The resulting photon is a combination of the advanced photon and the retarded photon. It is a very sharp, short narrow pulse and is probably a soliton. We call it a "photon pulse." It is the basic currency of exchange between electrons. Every interaction between electrons consists of one or more photon pulses.

The process is a little more complicated than this, because the energy from a photon is not always completely absorbed by the first receiving electron. Part of it may be absorbed and part may continue on in the same direction, where it is absorbed by other electrons. We are at a level deeper than the quantum level here, so the energy can split in this way. But the energy that

continues along a straight line is absorbed and reflected back by other electrons along the same path. The path of this energy is very narrow and very close to a straight line because of the narrowness of the forward light cone. In our picture we have only shown two electrons for simplicity. There may be many more along the straight-line path which become involved in the formation of the photon "pulse." But because there is an advanced as well as a retarded component to this pulse, all the electrons contribute. Therefore the pulse produced is very likely to be a soliton, and it will have the desired "half-advanced, half-retarded" character specified by quantum theory.

The picture we have painted so far applies only at the very smallest scales of motion of the electron, where we can isolate, at least in our minds, the interaction with one photon and one or two other electrons. These interactions occur at an unimaginably fast pace, and at extremely small scales. Physicists have a name for this scale of time and distance. It is called the "Planck scale." It is the scale at which the space-time structure of the universe starts to break up. Smaller distances become meaningless. In existing efforts at quantum gravity, this scale is assumed to be determined by the uncertainty principle, the quantum fluctuations of space-time. In our model, the viewpoint is slightly different but the implications are similar. At smaller scales than this, inertia and position are meaningless.

**THE "PHOTON PULSE" IS THE ELEMENTARY INTERACTION BETWEEN
ELECTRONS. IT IS A VERY SHORT, VERY SHARP SPIKE OF
ELECTROMAGNETIC ENERGY:**

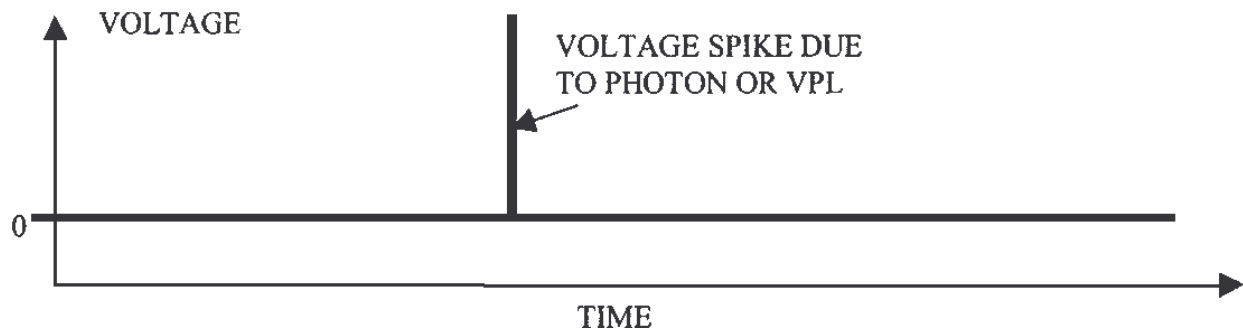
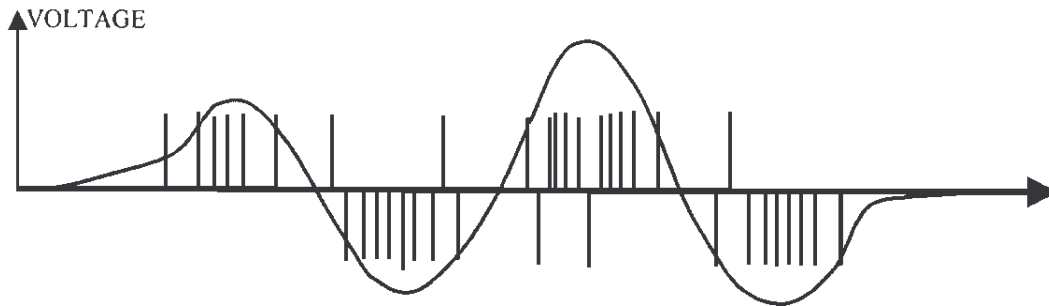


Figure 13.11. The smallest unit of energy exchange in the S.U.M. model is the photon "pulse." It is extremely short and sharp. It occurs when a pair of electrons interact. Other electrons which are in a straight line with the pulse may also take part in the interaction.

Conventional "photons" which are familiar in Quantum Mechanics, and which comprise light, are made up of many, many of these photon pulses. The synchronization in the SUM model (to be described next) insures that the phases of these pulses will be just right so they add up to the "wave train" which is the conventional quantum photon. An example of such a "quantum wave train" is shown in Figure 13.12. The conventional quantum description is of a "wave-packet" which is comprised of waves which have a finite length. The energy carried in this packet

satisfies the rules of quantum mechanics. In the SUM model this is NOT the deepest description. At a deeper level these quantized packets are actually made up of many photon pulses, which are elementary exchanges between electrons. This is illustrated in Figure 13.12.

A QUANTUM PHOTON IS MADE UP OF ELEMENTARY PHOTON "PULSES"



A QUANTUM PHOTON IS A "WAVE TRAIN" LIKE THE WIGGLY RED LINE IN THE GRAPH. IT IS THE BASIC AND SMALLEST AMOUNT OF ENERGY EXCHANGE IN QUANTUM MECHANICS. IT IS AN AVERAGE. AT A DEEPER LEVEL ARE THE VIRTUAL PHOTON "PULSES" SHOWN IN BLUE, WHICH ARE ELEMENTARY, SINGLE EXCHANGES OF ENERGY BETWEEN TWO ELECTRONS. THEY COMPRISE THE ZEROPOINT ENERGY OF THE VACUUM AND A DEEPER LEVEL OF REALITY.

Figure 13.12. The conventional quantum "wave packet" of quantum mechanics is shown by the wavy line in the diagram. The energy in such a packet is quantized, and this makes up the "photon" of conventional physics. The SUM model predicts that there is a deeper layer of reality, described by the individual photon "pulses." Each quantum photon is actually made up of many of these pulses. They also comprise the so-called "Zero-Point Energy" of the vacuum of space.

This subject is deep and important. For this reason it may also be a little confusing. The reader may feel that the detailed private life of an electron, or a photon, is a far cry from ESP and psychokinesis. But notice what the two electrons are doing: They are communicating forward and backward in TIME. And they are sending and receiving signals across the entire breadth of the universe, essentially instantly. Doesn't this sound a little bit familiar? Isn't this what is so puzzling about psychic phenomena, that it travels with ease across great distance, not weakening with distance? And the signals are transmitted backward in time, like some of the Princeton PEAR Lab experiments. It is my belief that these interactions between electrons across great distances and backward in time, are essential in understanding these puzzles.

In the next section we will talk about one of the most important concepts of the SUM model: the idea that, because electrons can communicate across the vast distance of the universe, their motions become coupled together. This leads to a very powerful effect which can explain both quantum mechanics and the existence of other dimensions.

13.5. The Synchronizing Principle

There are a very large number of electrons in the universe. In the known, visible universe there are about 10^{80} of them. That's written as 1 and 80 zeros after it! There are also other charged particles, and they are all interacting. At the smallest scales, they travel at the speed of light and basically look straight ahead with extreme tunnel vision. Because they have a charge, and are massless and move at the speed of light, something very interesting happens. They become coupled together and begin moving in a collective motion, forming small orbits around their average positions. The orbits will be in phase with one another so the motions of the electrons at the smallest scale becomes synchronized.

This is what our model predicts. It is called a "collective effect." The electrons undergo a "phase transition." Instead of each electron moving randomly and independent (I) . they begin moving in tiny little orbits which are all synchronized to one another. They are synchronized precisely because they only interact when their velocities point to one another. This only occurs at certain places in their orbits, and therefore only at certain times. There will still be random motions, but they will be superimposed upon the synchronized motions.

We will not prove this here, but it is a well-recognized phenomenon which occurs in many-particle systems. To quote physics Nobel prize-winner Dr. Ilya Prigogine:

"One might first think it would be easier to obtain a coherent oscillating process with a few particles, say 50, than with as many as, say Avogadro's number, 10^{23} , which are generally involved in macroscopic experiments. But computer experiments show that it is just the opposite. It is only in the limit of particles $N \rightarrow \infty$ that we tend to "long range" temporal order." (Prigogine, 1980)

Therefore in the case where all the electrons in the universe, 10^{80} of them, are interacting strongly at the very small scales, it is extremely likely that a collective oscillation occurs, which Prigogine calls "long range temporal order." The resulting motion of the electrons is illustrated in Figure 13.13.

THE SYNCHRONIZING PRINCIPLE

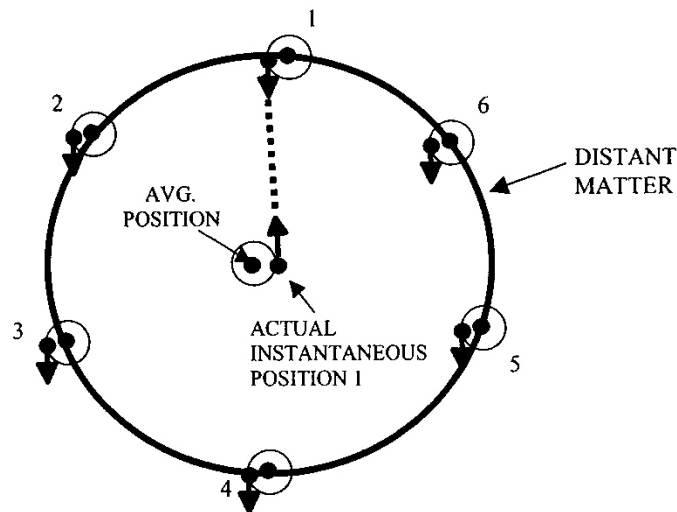


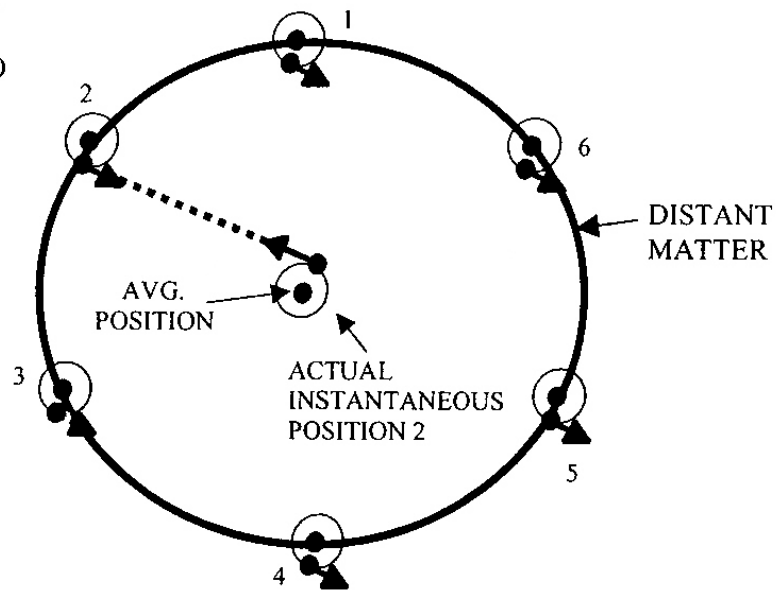
Figure 13.13. This figure illustrates the interaction between a "local" nearby electron and the huge number of distant electrons, represented schematically by the six electrons on the outer circle.

We have sketched a "local" electron in the center of a small circle. It represents a particle which is "nearby." The large circle represents the distant matter in the universe, where the vast majority of particles are to be found. The radius of this circle really represents the radius of the universe, about 10 billion light years. But because the electrons are all massless at the scale of their motions, they can still interact with one another. This is because their radiation is concentrated in a very narrow forward light cone when they travel very near the speed of light.

Figure 13.13 illustrates how the synchronization between the electrons occurs. (Real electrons do not move in simple circles, and the random walk they make further complicates their paths. For simplicity this is neglected in the figure.) All the electrons in the "distant matter" are depicted as being on a sphere at the radius of the universe. Because they all travel at the speed of light, they only interact with other electrons when their velocities point toward one another. At the moment depicted in the figure, the velocity of the local electron, in the center, points toward the distant electron # 1, and its velocity points back toward the local electron. Therefore they interact, and the interaction is such as to keep each electron turning in its circular orbit.

If the electrons in the distant matter also move in similar orbits, and with phase 180 degrees out of phase with the local electron, then this circular motion of the local electron will be maintained. But EACH electron is local in its own frame, surrounded by distant electrons in the same picture. We find from this that there is a self-consistent motion, a collective effect, in which all the electrons can interact with one another resulting in this "phase locked" circular motion.

THIS SAME
PICTURE
APPLIES TO
EVERY
ELECTRON



EACH ELECTRON WILL ALSO APPEAR TO BE IN THE CENTER OF THE DISTANT MATTER, FROM ITS POINT OF VIEW.

Figure 13.14. This figure depicts the electron positions a short time later. The central electron has progressed part way around the circle so its velocity points to electron #2. Because of the synchronization of the motions, the velocity of electron 2 at this moment points toward the local electron so they interact. This interaction, or energy and momentum exchange, continues to turn each electron in its self-orbit. Note that all the phases of the distant electrons are the same. They are all at the same point in their circular orbits. The central, local, electron, orbits in the opposite direction and is 180 degrees out of phase with the electron it interacts with. This condition can be shown to lead to one of the deepest principles of quantum mechanics, the exclusion principle, which applies to electrons. It is another example of how the SUM theory can offer an intuitive, physical explanation for some of the assumptions of quantum theory.

A moment later, (see Fig. 13.14) the velocity of the central electron has rotated a small amount, and is aiming at electron 2. At this point the velocity of electron 2 must be pointing at the center for a stable coherent oscillation to occur. This is a "synchronized system," where the interactions of all electrons are in phase and reinforce one another. (Real orbits are more complex than just circles.)

All the electrons in this synchronized system will interact. Electrons out of phase with this motion will not be in this "universe." They will not interact with this coupled system except randomly, as "noise." These pictures apply for every electron in the system. Each electron is a local, central electron from its point of view, and the other electrons are far away, on the average.

In this model, each particle will see itself in the center, surrounded by the distant matter. The electron in the center only "sees" an electron out at the edge when their velocities line up and this only occurs when they are "in sync." This is the key. They are said to be "in phase" or "in sync" when their periodic motions remain in step with each other.

Therefore as the central electron orbits around in a circle, the electrons on the periphery must do the same. In fact, they must all orbit at the same speed to keep together. This is called "synchronization," or phase-locking. When this happens all the electrons in the coupled system orbit around their average position at the same frequency. This is the birth of quantum mechanics.

The frequency they orbit at is their "self energy frequency" in quantum mechanics. It is the frequency which corresponds to the effective mass of the electron. Particles with very small mass and very little energy have low frequencies. Particles with more mass and more energy have more interactions per second, and higher fundamental frequencies for their orbits.

Even though they are massless, and are zipping around at the speed of light, the synchronized forces cause them to orbit around fixed points, which represent their average positions. This average position only changes slowly with time. Hence the electron looks to the outsider as having a mass and moving slowly. He does not see the inner workings, but only the "fuzzy ball" of probability on the outside.

The phase to which all the electrons become locked is a very important phase. It is characteristic and unique to all the particles in this "universe." It is probably related to what physicists call the "Higgs' Phase." It is a choice of a single phase from all possible phases. Before the electrons become synchronized, it does not matter where they are in their orbit. But once they become phase-locked they give up this degree of freedom. This is called "dynamical symmetry breaking." Once a phase is chosen, all the particles in "the universe" are locked to it. It gives rise to the masses of the particles. This is true for the Higgs' phase and also true for the present model.

This picture is reminiscent of a very ancient picture, propounded at the very birth of physics. Giordano Bruno, a contemporary of Galileo, proposed that the stars in the sky were similar to our own sun, and were encircled by planets similar to those in our solar system. From the point of view of each particle, it would seem to be the center of the universe. He even proposed that matter has an active "conscious" nature, and that it interacts with all other matter. In his words:

"We can assert with certainty that the Universe is all center, or that the center of the Universe is everywhere and the circumference nowhere. "--Giordano Bruno (Mendoza, 1995)

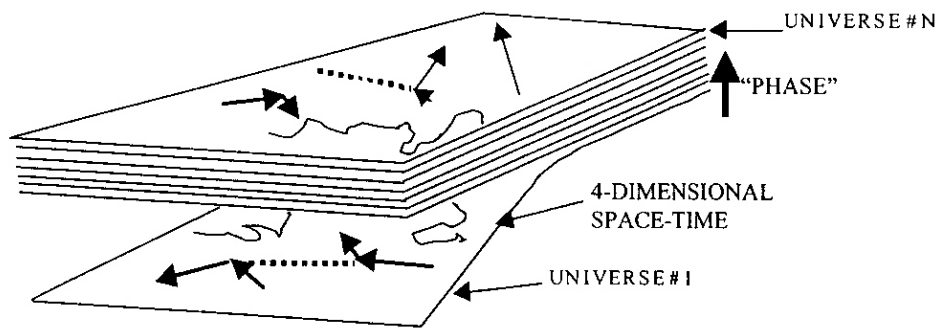
His cosmology is reminiscent of present cosmology. He envisioned an infinite universe with no boundaries, not very different from the modern view. For his insights, he was burned at the stake by the Catholic Inquisition, which illustrates again that new ideas, no matter how correct, are not always welcomed by the prevailing intellectual establishment.

We have omitted from this discussion an important point, which is the time delay between sending and receiving a signal. The presence of advanced AND retarded waves allows one electron to interact mutually with another one far away. But still they exist and move at different times, so there is a phase difference and a time difference for the different electrons.

When this is combined with the "synchronized principle" described above, it leads to the requirement of the quantization of space. The phase conditions for stable orbits will only be right at certain spots, and not at others. The places at which stable orbits can occur will form a regular array resembling a "crystal structure" at very small scales in space, so electrons actually "jump" from one such point to another. This is actually a desirable feature, but for the sake of brevity this will be described in Volume II [forthcoming].

Figure 13.15 illustrates how one synchronized "universe" relates to the others. Each set of electrons which becomes phase-locked or "in sync" acts as one complete, self-interacting system. It is represented in the figure by one sheet of paper in a stack of paper. Consider "universe # 1" on the bottom of the stack. It is really a four-dimensional system, based on space-time, but it also has a fifth dimension, phase, which distinguishes it from the other sheets of paper in the stack. They represent other "universes" which have different phases.

SEPARATE "UNIVERSES", I.E. PHASE-LOCKED SYSTEMS,
ARE LIKE SHEETS OF PAPER (BUT IN HIGHER DIMENSION)
EACH SHEET CORRESPONDING TO A DIFFERENT PHASE.
CROSSTALK CAN OCCUR BETWEEN SHEETS, BUT IT WILL
APPEAR "RANDOM".



THE "PHASE" OF THE SYSTEM IS A 5TH DIMENSION

Figure 13.15. A single synchronized universe is represented by one sheet of paper in a stack. Each sheet has its own unique frequency and/or phase which characterizes the synchronized motion of the electrons in that system. Other sheets represent "parallel realities" or other "parallel dimensions" which may cohabit the same space and time and yet be unaware of one another. The model suggests how one can cross between such dimensions, by altering the phase of one "universe" to allow coupling and cross-over to another one.

For each sheet of paper, any particle on the sheet is phase-locked to the other particles on the sheet. Therefore it interacts with them in the synchronized manner we have described. "Phase" acts like a fifth dimension which distinguishes one parallel reality, one "universe," from another. It is clear from this model that particles which are phase locked and therefore on the same "sheet" interact in a synchronized manner and exert significant forces upon one another. Particles which are on different sheets have different phases, and only interact sporadically and by chance. They contribute to the random quantum noise of adjacent sheets, but do not exert a consistent repetitive influence on the dynamics of other sheets.

In quantum mechanics each particle has a "self-frequency." It is just given as a rule, based on the mass of the particle: Take the energy corresponding to the electron's mass, and convert it to a frequency using Planck's constant. That is how energy is equivalent to frequency in quantum mechanics. But there is never any explanation for what this frequency means, or its origin. In the SUM model, we see that frequency has a very definite physical meaning. It is the rate at which the electrons (and any other particles) orbit their center of mass location.

The electrons which are all in perfect phase with one another will keep each other in line, so they all continue to move in periodic orbits. But what about some other electron that happened to be in the wrong phase, the wrong point in its cycle when the electrons all became coupled? Such an electron is never pointing in the right direction at the right time. Therefore, it will not exert dependable, regular forces on the other electrons. It will only exert a force at random, when its velocity by coincidence happens to line up with another electron. Because it does not interact regularly with the other electrons, it becomes invisible to them.

Consequently the universe divides up into electrons which are in phase, and therefore can "see" and interact with each other, and all the other electrons in the universe, which are out of phase and therefore invisible.

However, there can be a great many such electrons. There can be enough that they become coupled among themselves and become phase-locked at their own frequency and phase. This frequency and phase will be different from the first system. Therefore the electrons of one such phase-locked system will not interact regularly with electrons from a different phase-locked system, even if the electrons from the two sets are very near each other.

The electrons and the other particles of one phase-locked system act as a universe unto themselves. They are all "in sync" with one another, and therefore interact and exert forces on one another. They "see" each other and would say to the other electrons phase-locked to them: "You are in MY universe." Likewise the particles in the second phase-locked system interact among themselves in the same way. The forces between particles in such a system do not seem to be sporadic, but regular and dependable. But since, at the fine scale, electrons in one system never "see" the particles of the other system, except through random chance, the two systems are oblivious to one another. They do not exert forces on one another, except as random noise. This is the origin of parallel universes and parallel realities. Figures 13.16 and 13.17 illustrate this further.

THE SYNCHRONIZED UNIVERSE PRINCIPLE: PARTICLES THAT ARE NOT IN "SYNCH" WILL BE INVISIBLE. THEY WILL NOT INTERACT. THEY WILL APPEAR AS "NOISE"

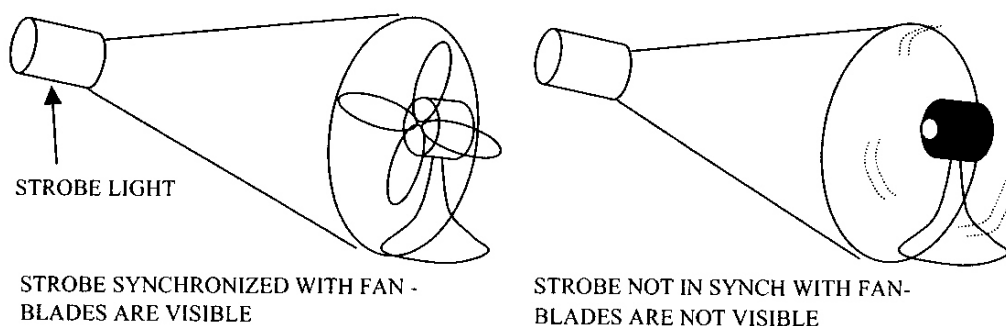


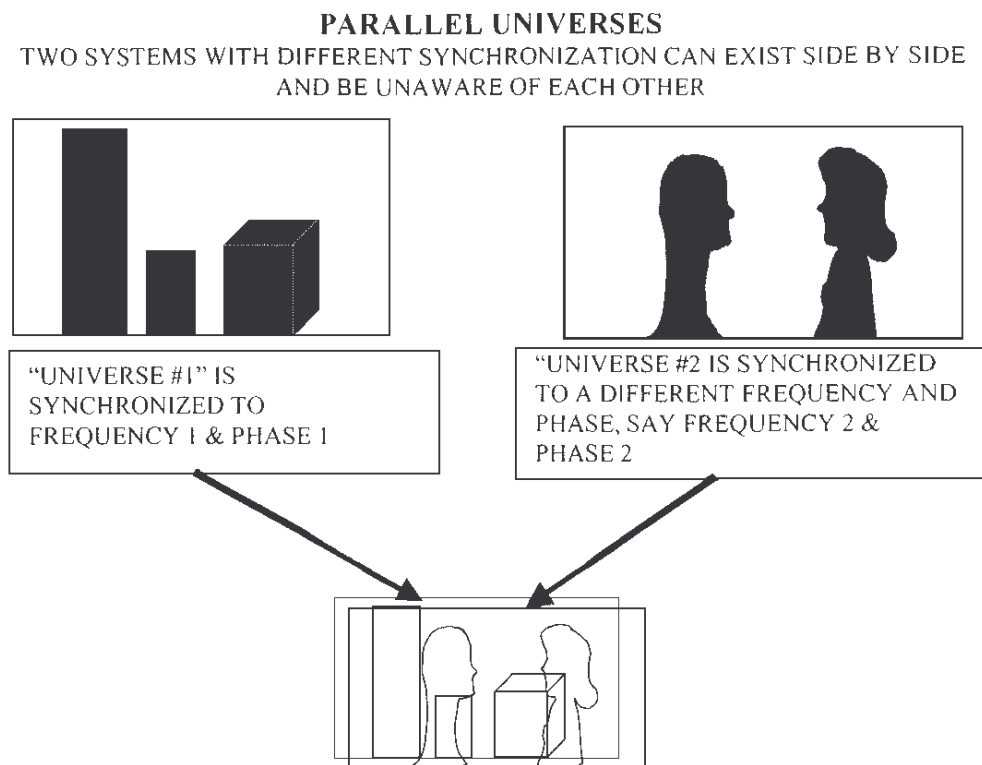
Figure 13.16. The Synchronized Universe concept works just like a strobe light shining on a rotating fan blade. When the strobe light is "in sync" with the fan blade motion, then the blades appear to stand still. They appear solid, because every time the strobe fires, another blade has taken up the position of the last one. When the blades are out of with the flashes, they blur and disappear, because they are in different positions on every flash. The strobe light is analogous to the emission of a photon by one electron as it goes around in its orbit. If there is another electron whose velocity is pointing back along the same line at the same moment, the photons are exchanged. If they are in sync, then every time one electron comes back to that point in its orbit, the second one does too. Therefore they are always "in sync" to exert a force on one another, and it is exactly this force which maintains their orbits. This is analogous to the fan blade being in the same place for every flash.

If the strobe flash and the fan blade rotation are synchronized, or "in phase" then the blades seem to be stationary and "solid." Every time the strobe flashes, another blade has moved into the place of a previous one, and the fan blades seem to be standing still. This is true even if the fan is actually turning rapidly. In that case we see the fan blades and they appear solid and "real." If the flash rate of the strobe is not synchronized with the fan blade rotation, then the blades disappear in a blur. They become invisible and, just from looking, we would say they are not there.

In the same way, particles only see one another if their orbits are synchronized so their velocities are in the same direction at the same time in their orbits. In this way, particles which are synchronized "see" each other and say "you are part of my universe." They are able to exert forces upon each other. Particles that are not synchronized exchange forces only rarely and by chance. This appears to be "quantum noise." Thus other nearby parallel dimensions normally only interact with ours through quantum noise.

The implications of parallel realities are illustrated in the figure 13.17. Two such parallel systems are depicted. Each one is a complete universe. It has many particles which interact and they will exert precisely the forces which are familiar to our science. Therefore atoms, molecules, planets,

suns and even life would be expected to appear in each of these parallel universes. We illustrate this with examples of "universe #1" and "universe #2". Each system is oblivious to the other.



THE ELECTRONS IN UNIVERSE #1 ARE MOVING "OUT OF SYNCH" WITH THE ELECTRONS IN UNIVERSE #2. THEREFORE THEY DO NOT "SEE" EACH OTHER. THE TWO UNIVERSES CAN EXIST IN THE SAME SPACE AND TIME, BUT "OUT OF PHASE." THEY ARE NOT AWARE OF EACH OTHER, EXPERIENCE THE OTHER UNIVERSE ONLY AS "RANDOM NOISE".

Figure 13 .17. Illustration of parallel dimensions or parallel realities. Illustration of two physical realities existing in the same space and time. They do not interact normally, and are not aware of one another under normal conditions. The synchronized universe model can explain how these realities can exist. They are separated by a phase or a frequency which is common to all objects in one reality, and different from the synchronization of the other reality.

Both realities can coexist in the same region of space-time and still be totally unaware of the other. We have illustrated this by overlaying the two parallel systems. The only expected physical interaction between the them is random noise, so-called "quantum noise." However, it may be possible to enter a higher dimensional state in which one's consciousness can be aware of these other parallel systems. This amounts to crossing between the sheets of paper, or straddling several

sheets at one time. Many of the "out-of-body" experiences reported by Robert Monroe, founder of the Monroe Institute, suggest that he was indeed in some sort of parallel reality. Obviously our knowledge of these matters is in its infancy.

Consciousness interacts across these parallel dimensions. Thus it can affect and reduce the quantum noise. It can even synchronize motions between parallel realities. In this way higher forces (subtle energy) can be created, and energy can be extracted from these other dimensions.

It is a basic hypothesis of the SUM model that, when particles are synchronized and remain on the physical sheet corresponding to their "universe," they obey the current physics laws to a good approximation. This includes the laws of quantum mechanics. It is when a coherent coupling of motions occurs across sheets, across parallel realities, that the most dramatic paranormal effects are expected.

Subtle energies, for example, may be understood as a coherent structure which crosses several of these parallel realities, and therefore is "higher dimensional." This can be described in a precise mathematical way, and therefore probably leads to a well-defined mathematical description of the various forms of subtle energy. This concept is illustrated in Figure 13.18.

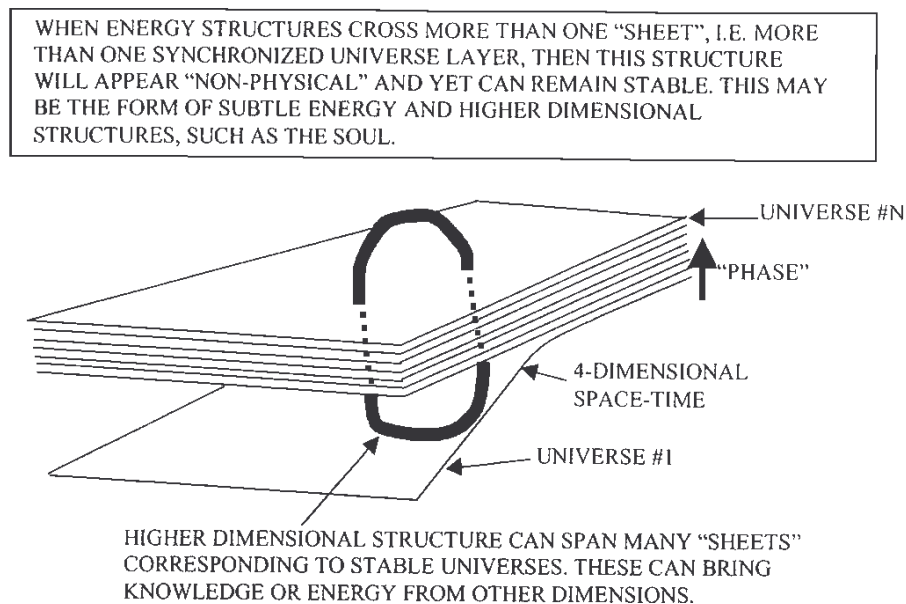


Figure 13.18. Higher dimensional structures which cross the planes of several "universes" may provide a model for some types of paranormal phenomena.

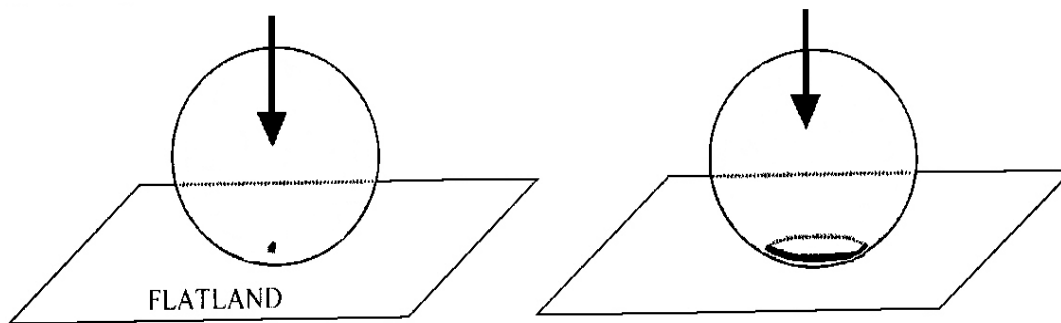
The thick circle passes through several parallel reality sheets. It represents a coherent, stable structure on a higher dimension. It is probably the basic underlying explanation for various forms of subtle energy, as well as coherent, persistent higher dimensional structures. Since it crosses the sheets of parallel realities, each sheet would judge the structure as "nonphysical," and yet since it impinges on each structure, it would affect the physics and dynamics in that "universe."

This type of structure, or coherence, may explain what happens in the presence of a very powerful spiritual healer or someone able to manifest effects like metal bending or psychokinesis. He would bring a lot of coherence into the system, by introducing correlations between parallel realities. This has the effect of reducing the noise in the system. It has been shown in many measurements that the noise fluctuations as measured by an REG, for example, are reduced. This figure illustrates how this might occur, because the person is affecting these other parallel universes, or the other systems, by getting a phase-locking between them. This reduces the amount of noise and introduces more cooperation, more coherence, between the parallel sheets, the adjacent universes.

This type of coherence between parallel realities can also be thought of as a hyperdimensional structure which crosses these dimensions. It would be considered nonphysical and yet have physical manifestations. Such higher dimensional structures could be designed and are stable due to their shape and topology. Such forms would be possible models for consciousness and the soul.

This model finds a perfect analog in the charming book *Flatland*, (Abbott, 1998) a classic tale written for children of all ages, about a land in which everything was two dimensional. All the beings lived on, or in, a two-dimensional plane similar to a sheet of paper. The only objects the Flatlanders knew about were two dimensional, like the square, the rectangle, the line and the circle. They lived in peace, thinking they understood everything about the universe. Then one day a very strange event happened. One of the Flatlanders noticed a single point appear out of nowhere. He went closer to investigate, but as he did to his amazement the point turned into a circle. As he pointed this out to others, the circle unaccountably grew larger. After it reached its maximum size, it grew smaller again, eventually shrinking again to a point and then disappearing completely. This was an "anomalous event" in Flatland, just as strange as ghosts are to us. It appeared from nowhere and disappeared just as easily.

As we wise "three-dimensional" beings can easily comprehend, the explanation is that a sphere had passed through the plane of Flatland! A sphere is three-dimensional, and when it passes into a lower dimensional space such as Flatland, it will appear out of nowhere and can change size in contradiction to all the rules the Flatlanders knew. This is a simple example of how higher dimensional structures can seem contradictory to those existing in a lower dimension. In the same way, it is very likely that "subtle energies" and the other physics of the paranormal involve higher dimensional, or "hyper-dimensional" structures.



AS THE SPHERE FIRST REACHES FLATLAND, IT TOUCHES IT AT ONE POINT. TO THE FLATLANDERS, IT IS ONLY A POINT OBJECT AT THAT MOMENT. AS THE SPHERE PROCEEDS TO MOVE THROUGH THE PLANE, IT NEXT APPEARS AS A CIRCLE, WHICH INCREASES IN DIAMETER. TO THE FLATLANDERS THIS IS A VERY STRANGE ANOMALY OUTSIDE THE EXPERIENCE OF THEIR SCIENCE.

Figure 13.19. Illustration from *Flatland* of how a higher dimensional structure can break all the familiar rules and defy the "common sense" of a lower dimensional world. Such anomalous experiences could, as they did in Flatland, give rise to occult or supernatural explanations. As we who live in the three-dimensional world can easily see, their anomalous events were simply due to some higher dimensional science that they had not yet conceived of. A *Flatlander* Einstein would be able to see that the event had an easy explanation when viewed from a higher dimensional perspective.

It is our proposal that this is exactly the case. These higher dimensional structures are "made" out of the network of phase which permeates the universe.

We presume they would have much more complex topological structures than the simple circle or sphere in these illustrations, but the basic principle that they extend across dimensions and are stable, seems to be suggested by the data. Clearly, this science is in its infancy, but these ideas do offer a theoretical and scientific approach to understanding these important subtle phenomena.

The key thing to understand is: WHAT MAKES UP THESE HIGHER DIMENSIONAL GEOMETRICAL STRUCTURES? The answer is that it is the phase variations in the space-time which make up these structures. Normal space is "in phase" from point to point at this deep level, but it experiences small departures from the common resonant phase of all particles. These departures can become systematic, and when mapped in space-time can form three-dimensional and higher dimensional geometric structures.

These "phase structures" can cross several parallel universes, and become the physical basic for "subtle energy." Each point in space (space-time) has a particular phase associated with it. This phase advances with time so all the points in one universe remain in phase. Forces arise when there are slight differences in phase between different regions. Phase differences cause a net

motion of any particle located there. The particle moves to try to stay phase locked with the entire system (the "universe" layer). It is possible to create surfaces in space where the phase is shifted slightly. These surfaces can have geometric shapes (topology) that will influence the motion and behavior of particles which encounter it. This model accounts for electromagnetic forces as well as the "subtle energies." This model will be described in greater detail in Volume II [forthcoming], which deals specifically with the physics of the subtle energies.

13.6. Four-Dimensional Holography - Radiation Balance of Past and Future

One of the basic principles of electromagnetism is that a charged particle, like an electron, radiates electromagnetic energy whenever it changes velocity or direction. In physics this is called "acceleration." One of the simplest examples would be the radio waves produced by an antenna. If you have ever used a cell-phone or a cordless phone, you made radio waves. The phone produced tiny electrical currents in its antenna. As the currents flowed back and forth in the antenna, they were changing direction. Therefore they were "accelerating." Each time this happens electromagnetic waves are produced. The waves flow out into space at the speed of light. This is how you communicated with your friend at the other end.

Electrons and every other charged particle do the same thing. Electromagnetic radiation from the countless other particles is hitting them all the time. Because they are very small and lightweight, they accelerate, and in turn will produce electromagnetic waves of their own. These waves will flow out into space and be received and absorbed by other particles far away.

This constant flow of electromagnetic radiation carries with it a force. It causes the particles to move. It is responsible for the forces and motions which occur in our universe. These motions must be in balance. Every time an electromagnetic wave is produced somewhere, sooner or later it must be absorbed somewhere else.

In the SUM model this is the reason that momentum and energy are conserved. In other words, for every action there is a reaction. It is this exchange of electromagnetic energy which carries the momentum and energy and force from place to place in the universe. And we remember that electromagnetic waves are really just a collection of many photons, so when we speak of electromagnetic waves, we are speaking of photons, and vice versa.

One of the basic principles is that energy flowing in must equal energy flowing out. In other words, we can think of an electron as a small box in which there is some energy trapped. This gives it its mass, its weight, its energy. We know the electron's mass doesn't change. Therefore the energy inside the box must stay constant. If energy enters the box, say by the reception of a photon, then equal energy must leave the box. This means the electron must radiate a photon to balance the energy of the one it received.

Thus, if we could see the energy field around the electron, we would see radiation constantly pouring in and flowing out. On the average it must be in balance. There is a very specific pattern to this flow. An electrical engineering professor named Dr. Dale Grimes (Grimes, 1969) discovered that if he just assumed that the radiation was in balance and the electron moved in a

random walk, he could derive Quantum Mechanics. In other words, he concluded that the electron moves the way it does, going forward and backward in a seeming random pattern in space and time, in order to balance all the radiation coming in and flowing out. This is a very deep and beautiful insight.

It also fits perfectly with our Synchronized Universe model. The tiny self-orbits in this model serve to balance the incoming and outgoing radiation. Therefore, when we allow the synchronized electrons to have some random motion, which they naturally will, then they will satisfy the equations derived by Professor Grimes. Radiation into and out of the electrons will be in balance.

We can picture this motion as similar to a hologram. In a hologram, there is radiation in and radiation out. Usually the radiation is produced by a laser, which means it is coherent light. The photons are all in phase. The laser light passes through a photographic film which has wavy lines on it. This changes the phase of the photons, so when they are brought together they add up to produce a three-dimensional image.

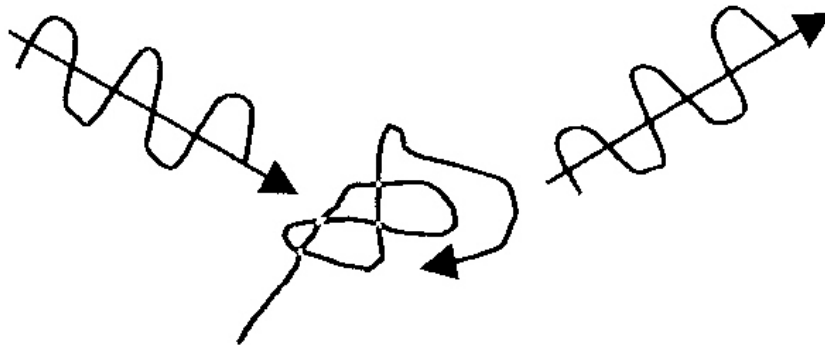


Figure 13.20. Radiation in and out must be in balance. This must be true for every frequency, and every radiation pattern (mode).

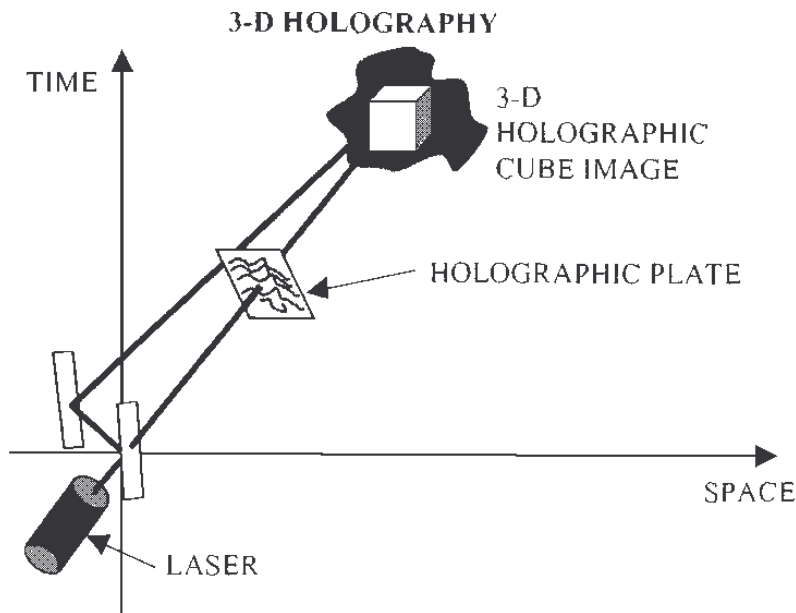
This is a 3-D picture, a hologram. It really just consists of photons with a specific pattern of phases, passing through a region of space. But to our eyes it generates a 3-D image. It is made from the regions of "constructive" and "destructive" interference. That is, in some places the laser light is in phase, so the photons are all in step and add together. This is called "constructive" interference. The energy in this region will be stronger. In other places, the photons are out of step by 180 degrees. Then they cancel. This is called "destructive" interference.

The 3-D pattern of energy created by these regions of interference is what we see as the image. In the same way the electron, and every quantum particle, is at the center of a pattern of constructive and destructive interference. It is caused by the radiation coming into the particle and being radiated away by the particle. The total interference pattern of energy created by this process is what we call "the particle." What we really interact with and "see" is the radiation pattern formed by the particle. Therefore, in a certain sense we can say the electron, and every particle, is a

"hologram." And we see that it is produced as a result of the actions of the electron to preserve the balance of energy.

There is only one problem with such a hologram. It *looks* like a 3-dimensional object. But when you touch it, your hand goes right through it. Then you realize that it is only light. It is not really matter. But suppose you wanted to make a hologram that had more "substance" to it, like the holograms on the "Holo-deck" of *Star Trek*? Is there a way to do that? In the present scientific paradigm the answer would be "no." But there might be a way.

If we look at a hologram and observe the radiation flowing into and out of it, we see that the light is coming from the PAST, flowing through the image and then on out into space where it is absorbed in the FUTURE. (See Figure 13.21) This may be a key. The energy only flows one way, from the past to the future. But for electrons and other real particles, we have seen that it flows both ways. As in the old Feynman-Wheeler model, when it is absorbed by distant matter in the future, it is reflected and radiated back in time. These resulting photons flow backwards in time until they reach the present. There they combine with the original photons to create the energy field around a real particle. In the process they also create *inertia*, which is the key to mass.



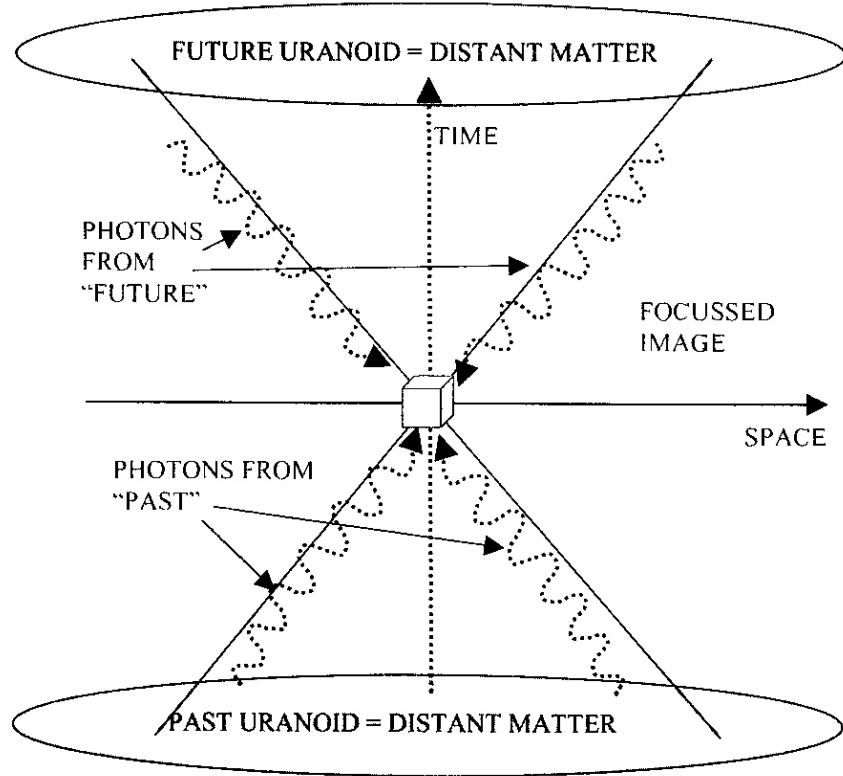
CONVENTIONAL 3-D HOLOGRAPHY (SIMPLIFIED). INTERFERENCE PATTERN OF LIGHT BEAMS CREATES IMAGE OF CUBE. ALL PHOTONS ARE MOVING FORWARD IN TIME (RETARDED PHOTONS).

Figure 13.21. A conventional 3-D hologram is created by light waves which pass through a holographic plate. These lines create an interference pattern when they combine with the reference laser beam. They interfere constructively in some locations, and cancel in others, creating a 3-D pattern of light intensity resembling the initial object.

Therefore to make the hologram act as though it is real, as though it has mass, we must include the photons traveling backwards in time from the future. It is the combination of these photons plus the original ones from the past, which may allow the hologram to act as though it is real matter. We call this the 4-Dimensional, or 4-D, hologram. It is an integral aspect of every particle and every real physical object.

Figure 13.22 below illustrates that the 4-D hologram is an image which involves focusing both the advanced and retarded waves. The advanced waves propagate backwards from the future where they combine with the "retarded" waves traveling forward from the past. They mix together just like normal light waves do, forming the 4-D hologram. In this case the object is an orange cube. It appears to exist at the focal point of the hologram. If the wave fronts are shifted in phase by a small amount, the position of the cube will be shifted in space and in time.

4-D HOLOGRAPHY



CONVENTIONAL HOLOGRAPHY CREATES 3-D IMAGES USING ONLY PHOTONS FROM PAST. THESE HAVE NO "SUBSTANCE" TO THEM: JUST LIGHT. REAL MATERIAL PARTICLES, LIKE ELECTRONS, ARE 4-D HOLOGRAMS IN WHICH PHOTONS FROM FUTURE ARE ALSO PRESENT.

Figure 13.22. 4-D Holography would involve waves from the "future" (i.e. phase conjugate waves) as well as the past.

And here is the other exciting aspect of this: If we want to manipulate the particle, the electron or whatever, all we need to do is manipulate its 4-D hologram! It is well-known that a conventional holographic image can be easily moved or shifted. If a holographic image of an apple is hovering in space, simply shift the laser beam, or put it through a lens, or change the phase of the light in some way and instantly, the holographic image will shift. By the same principle, if we shift the phases of the waves making up the 4-D hologram, the position of the corresponding "image" will also shift. But in this case the "image" is a real physical object.

Therefore if we can cause a shift in the phases of the radiation coming in from the past celestial sphere ("retarded uranoid") and from the future matter ("advanced uranoid") then we may be able to cause the particle or the object to instantly move somewhere else! Does this sound like "teleportation" ? Does it sound like the "Warp Drive" on Star Trek? Yes, it does. That is what it is.

The behavior and position of matter is dependent on its radiation field, which keeps it in place, gives it inertia and allows it to interact with the other matter in the universe. If we shift the phases of the radiation coming into the particle and coming out of it from the past and the future, we may be able to shift its position. This appears to be the key to teleportation and to a form of "hyperdrive" that has a chance of really working!

The real difference between this explanation and the common popular models is the difference between a 3-D hologram and a 4-D hologram. Wonderful books like *The Holographic Universe* (Talbot, 1991) have shown that some paranormal phenomena have holographic characteristics. The brain has a holographic structure which might make it an ideal antenna for receiving holographic wave patterns. This may be the key to sending and receiving "thought-balls," for example. These may be holograms which are ideally suited for coupling to the brain's structure. But 3-D holograms only exist for as long as the laser is on. It takes time for the image to be created, and is limited by the speed of light. It can exert no force and therefore cannot mimic matter. Such holograms are also shielded by Faraday cages, while we know that "thought-balls" are not.

By contrast, 4-D holograms can exactly match the radiation patterns of real matter, and therefore can appear like matter, and probably can cause forces and movement of matter. The difference is they involve the advanced, backward time-traveling waves, as well as the normal light waves. Both types of waves must be affected at the same time. To create and manipulate 4-D holograms, it is necessary to create advanced and retarded photons which are coupled together, which are "in synch" with each other. These create interference patterns which shift the 4-D hologram as desired.

We will see later that the DNA molecule, with its double helix, may be perfectly suited for generating waves which can do this. This may explain how ESP can take place in single living cells with the Backster Effect, as we saw in Chapter 4 {of *Synchronized Universe*}. It should also be mentioned that Dr. William Tiller, former Professor at Stanford University, has been developing a theory of subtle energies and paranormal effects. (Tiller, 2001) His model appears to have a number of areas of overlap and agreement with our viewpoint. It suggests that the holographic properties of space are key to understanding the effects of consciousness. This will be discussed further in later volumes [forthcoming].

13.7. The Holographic Brain

There is considerable physiological evidence to support the theory that the brain processes information holographically. This tends to support the idea that the brain could be a sender and receiver of holographic signals. Dr. Karl Pribram pioneered this idea, based on extensive research in neurophysiology. He pointed out that the old model of the brain, as a network of neurons hooked up like wiring in a computer, just did not agree with neurological science. He quoted neurophysiologist Karl Lashley: "I sometimes feel, in reviewing the evidence on the localization of the memory trace, that the necessary conclusion is that learning is just not possible at all.

Nevertheless, in spite of such evidence against it, learning does sometimes occur." (Pribram, 1969)

Pribram cited experimental evidence in the laboratory: "... rats could remember and could perform complex activities even after major nerve pathways in the brain had been cut, and after as much as 90 percent of the primary visual cortex had been surgically removed... Robert Galambos of the University of California at San Diego has severed up to 98 percent of the optic tract of cats without seriously impairing the cats' ability to perform skilfully on tests requiring them to differentiate between highly similar figures." (Pribram, 1969) The holographic model of the brain was proposed by Dr. Pribram to attempt to explain how it is that, even without most of the brain, organisms are often able to function almost normally:

"In a hologram the information in a scene is recorded on a photographic plate in the form of a complex interference, or diffraction, pattern that appears meaningless. When the pattern is illuminated by coherent light, however, the original image is reconstructed. What makes the hologram unique as a storage device is that every element in the original image is distributed over the entire photographic plate. The hypothesis is attractive because remembering or recollecting literally implies a reconstructive process..."(Pribram, 1969)

These observations spurred Pribram and others to investigate how memory is stored in the brain and how it is processed. It has been discovered that each memory, in fact each image, is stored over the entire brain, so the recall of a particular memory will involve stimulation and activity of widely distributed neurons. He postulated that, at the synapses where nerves meet, some kind of long lasting change takes place in the proteins and other large molecules. When nerve impulses arrive at a synapse, an electrical response occurs there. Associated with one nerve fiber are dozens if not hundreds of junctions, and the electrical responses can create an electromagnetic standing wave. Pribram postulated that this wave interacts with other similar waves in other overlapping junction systems, to make long-lasting changes in the molecules of the synapse so the memory can be stored and recovered at a later time.

The attractive feature of the model is that it explains how such a memory can be recovered from a brain even after much of it has been destroyed. This is because a small part of a hologram contains the entire image, in this case the entire memory. Of course there is a price. Some of the details of the memory may be lost. But much of the general outlines of the memory will be retained. This holographic model can be extended to explain how the brain can act as a holographic transmitter and receiver so it interacts with the outside world by receiving and transmitting signals of some sort, that can be "stored" and "accessed" through this external system. This may explain some of the extraordinary abilities of brain-damaged individuals, "idiot savants," described in Chapter 9 [of *Synchronized Universe*].

In our proposed model, these signals would not be conventional electromagnetic waves, but a 4-dimensional holographic pattern of electromagnetic energy. This is still consistent with the holographic structure of the brain, but allows for explanation of backward- in-time effects and

penetration of shielding, as well as the direct and instantaneous communication of images and other anomalies which occurs in paranormal events.

13.8. The Synchronized Universe Model Explains Assumptions of Quantum Mechanics

The SUM model predicts that electrons, and all particles in the universe, undergo tiny orbits around their central, average location. All electrons take the same amount of time to make one orbit. This is called the "period" of the orbit. The number of orbits per second is called its "frequency." All electrons will have the same frequency because of the way they interact.

We have assumed the electrons all travel at the speed of light at the very small scales. Therefore, if they go around in a circle at the speed of light, and take a certain amount of time (their period) to do so, this determines how big their circular path must be. It will be the same for every electron. The longer the period of the orbit, the bigger the radius of the orbit. The frequency is just 1 divided by the period, so the bigger the frequency, the smaller the orbit. In quantum mechanics this radius is called (roughly) the "Compton wavelength."

This is illustrated in Figure 13.23a. The electron encounters several photons as it goes around in a circle. Each photon deflects the electron by a certain amount. Therefore these photons must arrive fairly regularly to produce evenly spaced orbits. This will happen because these photons are produced by the synchronized electrons in the distant matter, and they all orbit in step. Therefore the photons they produce will come at regular intervals as shown in the figure. The photons are represented in the figure by the fine dotted lines.

Now consider some other particle, such as the proton, which interacts with other things besides photons. (We use a very simple "proton" here. It has only twice the mass and frequency of the electron. Real ones are 1836 times as massive. For the scientist reading this, it is a highly simplified discussion to put forward the intuitive concepts.) In modern physics, these "other things" are mostly "gluons," which carry the basic forces of the nucleus, like the strong and weak forces. In Figure 13.23b below, these are represented by the dot-dashed lines.

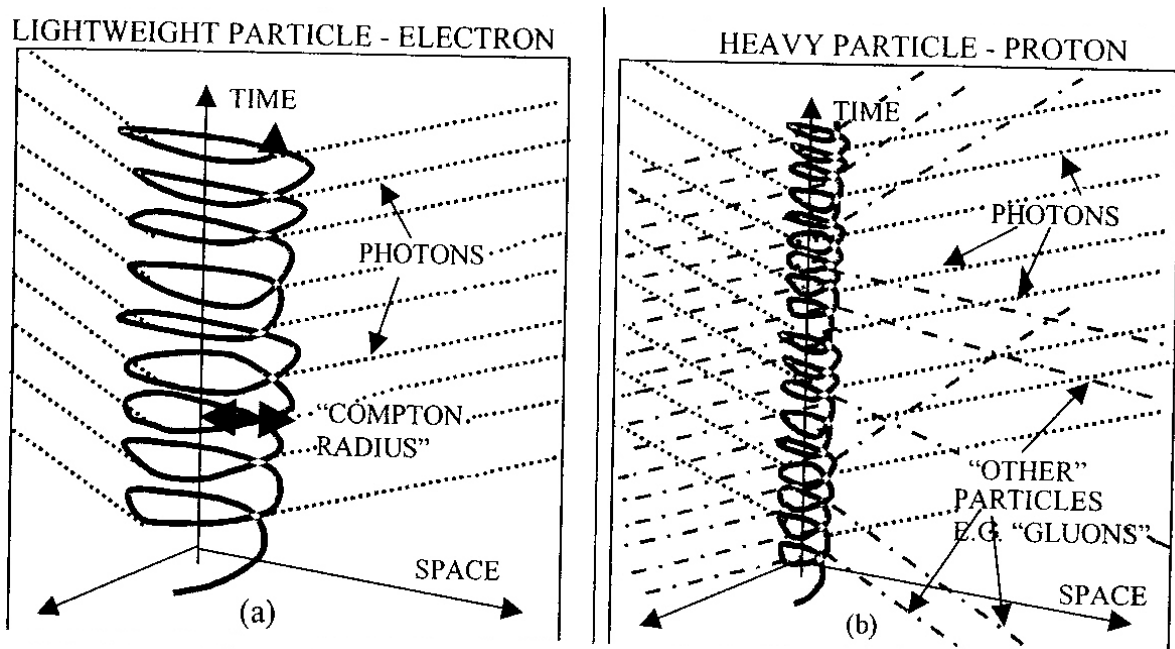


Figure 13.23. Some of the basic principles of quantum mechanics arise naturally from the synchronized universe model (simplified illustration). This figure illustrates how the Synchronized Universe Model explains the "size" of particles. In Quantum Mechanics this size is called the Compton wavelength, and is inverse to mass and frequency of the particle.

Please remember this is an oversimplified discussion, but it illustrates the main points. If there are as many gluons hitting the central particle as there are photons, then there will be twice as many interactions per second. Half are due to the photons, half to the gluons. The net result of twice as many interactions is that the particle will turn twice as quickly. If it is also traveling at the speed of light, as we assume, then the radius of its orbit will be twice as tight. Its radius will be half as big as the electron. Its frequency will be twice that of the electron.

This is an example where an additional force has been added. The effect of the extra force due to the "gluons" is to cause the particle to orbit more quickly, have a smaller radius and a higher frequency. And each turn or bend counts as an interaction with a force field and therefore raises the total energy of the particle. So we find that when the orbit radius gets smaller, the frequency and energy go up. Since it has just as many lines to photons as the electron did, its charge will still be the same as the electron's. But the other interactions with the gluons have given it extra mass. Along with this comes higher frequency and smaller Compton radius.

This very simple, intuitive model explains, in a natural way, the following basic rules of quantum mechanics:

- (1) Each particle has a fundamental frequency.
- (3) This frequency is proportional to its mass.
- (4) This frequency is inversely proportional to its "Compton radius", the size of its orbit.
- (5) Additional forces will raise the mass of the particle and increase its frequency.
- (6) Frequency is proportional to energy.
- (7) This is true for all particles, not just electrons.
- (8) Forces arise when particles are out of phase (Gauge Principle).
- (9) Frequencies change due to particle velocity.

In these illustrations we see how the quantum principle arises naturally from the "self-orbit" of the particle, a central hypothesis of the SUM model. The more interactions per second, the tighter the orbit, the smaller the Compton radius, the higher the frequency, the shorter the wavelength, and the greater the mass. In Quantum Mechanics, many of these relationships must be put in as assumptions. In the SUM model they arise naturally from the synchronization and the self-orbit.

Please note that the depiction of the particle orbit as a circle, making a spiral in space-time, is also an oversimplification to illustrate the point. Real particles, like electrons, make circles in FOUR DIMENSIONS, not two. For example, they move forward and backward in TIME as well as going around in circles in space. For the heavy particles like protons, there are three particles in the middle orbiting (quarks) not just one as shown in the figure on the right. In addition, the orbits, instead of being smooth, resemble a random walk in which the paths appear chaotic, so the orbital motions shown only represent the average motion. These and other refinements will be presented in later books. The pictures shown here are to illustrate the intuitive ideas. It turns out that the quarks are very important and deeply connected to some of the paranormal effects, but this will be discussed in later volumes.

The SUM model also has a relationship to Superstrings, because there are internal motions of the electron and other particles which are analogous to the internal dimensions of a Superstring. In that model there are six or seven internal dimensions, which can be described intuitively as giving rise to small "orbits" of the particle on a surface of very small diameter. In conventional QED, the path of an electron is modeled as a line of zero width, shown on the left in the Figure 13.24. It is this vanishing diameter which gives rise to certain mathematical problems.

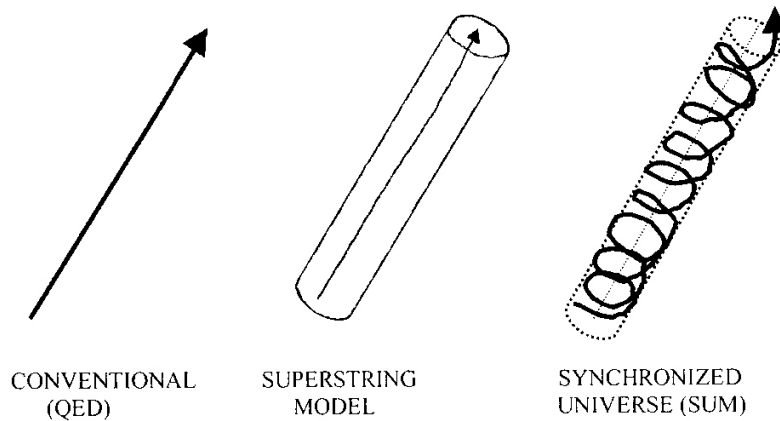


Figure 13.24. Illustration of similarity and differences between the conventional QED model invented by Feynman, the newer "Superstring" model, and the proposed SUM model.

The superstring model converts this line into a tube of finite radius, as shown in the middle illustration in Figure 13.24. The radius corresponds to the radius of motion of the internal dimensions of the string. The analog for the SUM model is shown on the right in the figure. It also assumes a "particle" of vanishing dimension, but this particle moves in tiny periodic orbits around its central, average position. This is analogous to moving on the surface of the tube as in the superstring theory. The SUM model does predict a number of internal degrees of freedom which will raise the dimensions of the model, and may bring it even closer to the Superstring as the SUM model matures.

13.9. Bose Statistics and the Paranormal

One of the keys to understanding psychokinesis and the power of visualization is something called "Bose Statistics." This is the law of physics which says that photons, which are called "Bose particles" or "bosons," all like to be in the same state. When several photons are in the same state, it increases the probability that other photons will shift into that state as well. Photons have a collectivist mind-set. They like to go along with the crowd.

This is how lasers work. Get a few photons in a certain state, and they will trigger others to join them in the state. This is also called "photon pulling," because photons are "pulled" into the state which is most densely populated.

Living organisms use this principle. In the cell structure of the body there are membranes which act as conductors of infrared and visible light. Recent research has shown that these structures "store coherent photons." This means they are able to build up a supply of photons, excited vibrations, which are all vibrating in step with each other and can be stored in the cells in this form.

The body is filled with this form of structured and coherent energy. It is one of the keys to how we use chemical energy so efficiently. The scientist Dr. Hans Frohlich (Frohlich, 1983) was one of the early pioneers in this research. He discovered that coherent vibrations and electromagnetism play a fundamental role in life processes, as we briefly sketched earlier. Dr. E. A. Popp at the Max Planck Institute in Germany (Popp, 1979, 1989) has been another leader in this research, which has been beautifully described by scientist Dr. Mae-Wan Ho in a recent popular book. (Ho, 1998)

Our bodies use light and coherent vibrations to carry out many of life's processes. Since a store of coherent photons is always available in the body, they can be shaped and controlled to affect external photons and external vibrational patterns. The Bose principle means that, if we create energy within our bodies in a certain pattern and form, this makes it more likely that other photons will join and reinforce this pattern. Because of Bose statistics, these patterns or structures of energy will stimulate other "mirror" structures in the distant matter.

If we energize ourselves before carrying out this process, we will presumably increase the number of coherent photons in the body are carrying carry this visualized pattern. By increasing the density of stored photons carrying this pattern, the probability of affecting other photons increases as the *square* of the number of photons. This may explain why energy healers and those performing PK practice specialized breathing, in which they increase their oxygen intake and presumably increase their stored energy.

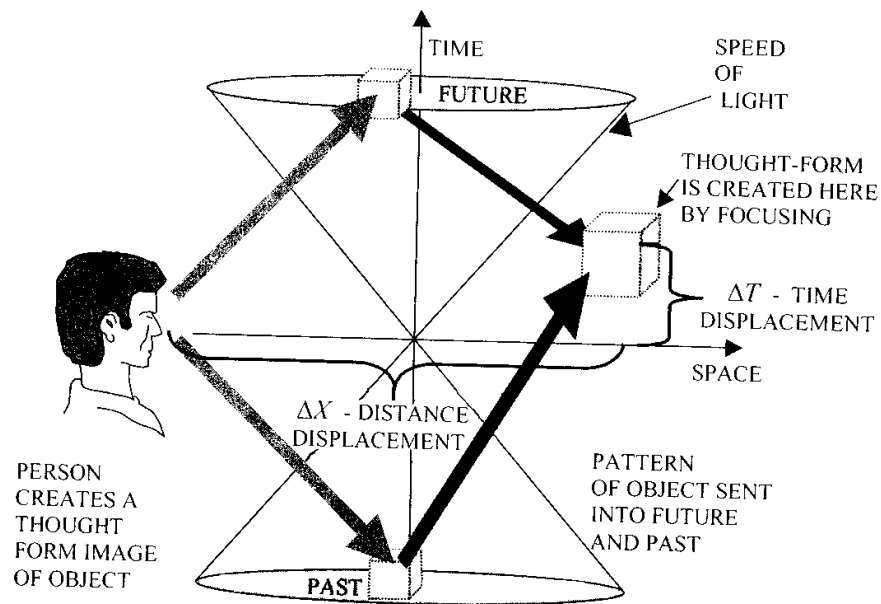


Figure 13.25.4-D Holographic Projection can cause the focused image to occur virtually anywhere in space-time. Here we show it appearing at a distance ΔX away from the source, and at a time ΔT later. The velocity at which this image "moves" as it is projected from its source would be calculated as distance divided by time, which can be much faster than the speed of light.

If a coherent set of these photons is transmitted both into the past and into the future, then it will refocus at some other location in space-time, forming a 4-D hologram. The background zero point energy at the focal point can be strongly affected. In this way it may be possible to project thought-forms and visual patterns which affect distant events. Figure 13.25, above, illustrates how this may be done.

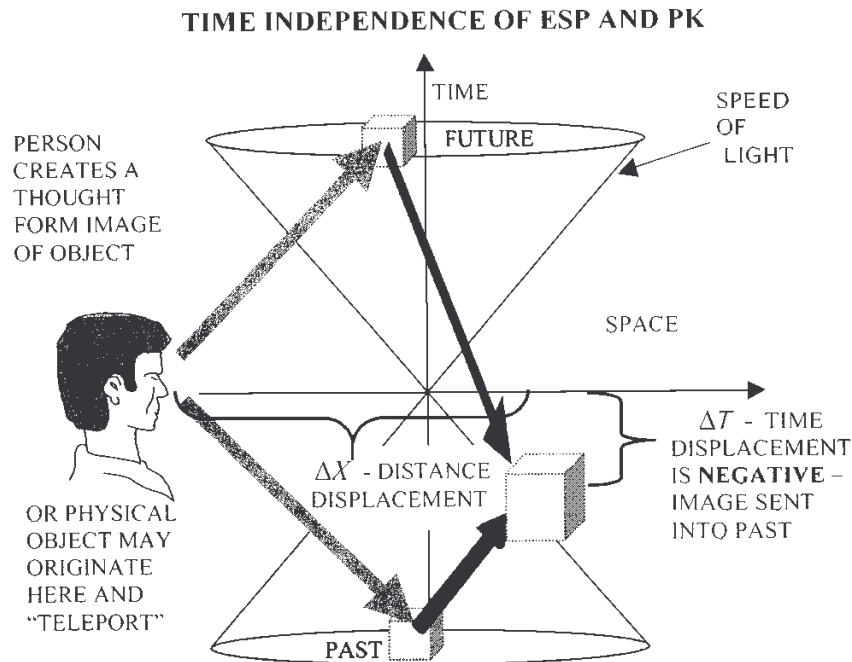


Figure 13.26. The same principle of 4-D Holographic project can be used to send objects, or at least images of objects, into the past. This can be in the form of visualization, such as in the Princeton PEAR Lab experiments when an outcome was affected on a PREVIOUS day. This method also suggested that teleportation may be accomplished into the past under some conditions.

Because the refocusing of the photons involves both backward and forward time-traveling photons, they can focus to create the image almost anywhere in space AND time. (see Figure 13.26) In other words, we can visualize an event which we see happening YESTERDAY just as easily as an event to occur TOMORROW or RIGHT NOW. This is the key to the unusual time behavior of PK and ESP. The phenomena don't seem to care about time. We can send a psychic message to be received yesterday or tomorrow, and it works just as well as one to be received today.

When personal trainers like Tony Robbins ask us to visualize a future event we would like to happen, this may be the "explanation" of what we are doing. We are modifying the photon background in the space-time vicinity of the event, which has the effect of increasing the probability that the event will occur. In the simplest cases, such as the REG [Random Event Generator] experiments conducted by parapsychologists, the event being influenced is the random

motion of electrons in a circuit or the random decay of a radioactive atom. In these simple cases, it has been proven that visualization of the event increases the likelihood that it will happen.

Using this principle, it may be possible to teleport objects, as well as thought-forms, from one place to another. It is simply necessary that the patterns of radiation on the past and future uranoid be modified. These patterns, which hold the object in place, are similar to holographic patterns. Their phases can be altered by the right kind of incident radiation which is coherent on both the past and future uranoids. Therefore, teleportation has much in common with psychokinesis and visualization. Bi-location, by which yogis are reported to have projected their body, or caused a "second body" to appear elsewhere, may also be achievable in this manner.

The mechanism we are describing here may be the key to the physics which connects visualization with manifestation. The human body is able to generate a store of coherent photons. If these photons take up a spatial pattern, then from Bose statistics, it may indeed increase the probability of such a structure appearing. Regardless of the explanation, there is ample experimental evidence that this process works. One of the great lessons to be learned from these discoveries is that we need to pay attention to our thoughts, and especially the thoughts we put energy into. Thoughts, prayers and wishes really do have power to affect reality. Or, as the great American psychic Edgar Cayce said:

"Conditions, thoughts, activities of men in every clime are things; as thoughts are things. They make their impression upon the skein of time and space. " (Cayce, 1971)

The application of this idea to ESP or telepathy is straightforward. If the sender can cause energy or information to refocus at some other point in space-time using the 4-D holographic principle, then it can be received if a person is there to sense the thought-form. This can be made much more reliable when the receiver also enters the proper, relaxed, meditative state so his conscious mind becomes quiet. In actual ESP experiments, it has been found that the best results occur when the sender and receiver's bio-rhythms become coupled together, that is, synchronized. Heart beat and brain wave pattern, as well as breathing, show synchronization between sender and receiver when telepathy is most effective. Of course, the participants may be thousands of miles apart, so the only way they can get into the same rhythm is if their bodies are already in telepathic contact at the autonomic level. This further supports the notion that synchronized processes are key to understand ESP and other psi phenomena. This is illustrated in Figure 13.27.

13.10. Teleportation

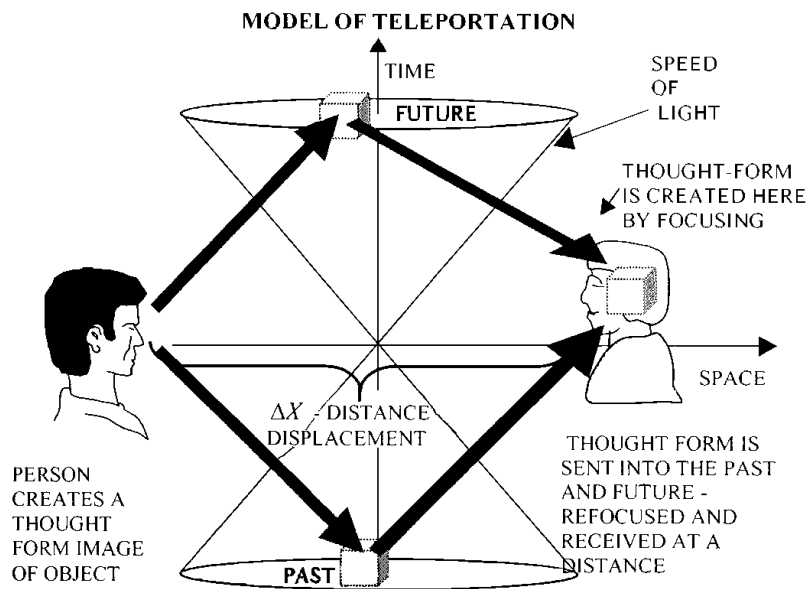


Figure 13.27. This figure further illustrates the process of ESP, in which a "receiver" and a "sender" communicate by "4-dimensional holography" using "advanced" and "retarded" photons. The convergence of the two patterns at a distant point in space-time makes it possible to send information which arrives at either an earlier or later time than it was sent. When a receiver is present, the path of the waves is "reciprocal" meaning that the receiver and the sender are actually in resonance with one another. This explains observations in Prof. I. M. Kogan's laboratory in Russia that the heart rate and brain patterns of sender and receiver become coupled together during telepathy. Given the large separation distances and the presence of shielding, it is difficult to explain this effect in any other way.

The concepts just described illustrate how a force can be applied to an object, even at a distance, and how random processes can be affected by affecting the distribution of photons making up the "Zero Point" energy of space. But in teleportation experiments, objects are sometimes made to pass through walls, as in the case of Zhang Baosheng in China (see Chapter 7). How can our proposed theory explain that?

Actually, it's very easy. In the Synchronized Universe Model, every electron rotates on a very small scale so that its motion is in phase with all the others in "its" universe. It only exchanges force, i.e. photons, with other electrons when their velocities line up in just the right way on every cycle. Otherwise, there is no force exchanged. The narrow forward light cone, which limits the direction of interaction, just will not line up properly if the electron's motion is too much out of phase.

So, walking through walls is easy. Just apply a strong, high frequency electromagnetic field to the particles which shifts their phase or their frequency in their orbits. An oscillating electromagnetic field of a high frequency will cause their orbital frequency and phase to begin to shift. It is just like the strobe light and the fan. Let the strobe light pulse rate begin to differ from the fan blade rotation, and suddenly the fan blades disappear! In the same way, the forces between electrons in the object and the electrons in the wall will no longer be synchronous. They will be out of phase, and therefore seen as just random noise. This will allow the object to pass through a wall! Because there is a random residual left over, we may expect there to be a slight force after an object shifts phase in this way.

13.11. OBEs

The process of passing through physical walls is similar to the description of people who experience OBEs, out-of-body experiences. When they pass through walls or ceilings, for example, they feel a slight resistance, very slight, which they can penetrate by exerting a small force with their minds. There is a large literature on this subject, but the experience is fairly accurately portrayed in the fictional movie *Ghost*. Patrick Swayze goes through an educational process as he learns how to affect the physical dimension, and he finds that, with a slight force, he can walk through walls. This is consistent with a large body of research on real cases.

For simplicity here, and because I do not have a better understanding of this subject, I am referring to this component as the "soul body," which we also identify with the seat of consciousness, and also with the component which makes up ghosts and astral projections. There are a great many similarities among these manifestations, so for simplicity we will assume that they have a similar origin and makeup. This "soul" substance is of great importance. It may be the key to what makes us alive. It may contain the mystery of what consciousness really is. This important subject, with the evidence as well as theoretical ideas, will be described in much greater detail in Volume III of this series [forth coming].

But for the moment, we will say only that esoteric traditions, as well as the accounts of healers and those able to "see" subtle energies, describe several layers of such energy surrounding the physical body. These layers of subtle energy are said to be of different types: etheric, astral, causal and mental. They often report that the "soul body" seems to be comprised of elements of the etheric and the astral energy.

The etheric is often described as a "duplicate" to the physical. It is often described as having the same shape, or as being a shadow body. In German this body is referred to as the "Doppelganger." It may be the component of the biophoton radiation field which maintains radiation balance for the body, and enables the biological processes to be so efficient. The etheric body is said to be closely tied to the physical, and may be thought of as a "time-reversed" or "phase-conjugate" mirror image of the physical body.

By comparison, the astral seems to be a higher dimension, not a parallel copy of the physical dimension. These are subtleties and complexities which will be discussed in more detail in later volumes [forth coming]. Western science is just beginning to take its first faltering steps to

understand these issues. Any model proposed must be considered extremely hypothetical. At the same time, it is interesting that the "soul body" or "astral body" during an OBE is sometimes reported as resembling the person who is projecting. The Wilmot and Landau OBE cases are good examples of this. At other times the OBE form is seen as a small, rapidly moving orb. Is it possible that these two forms of appearance are related to the presence of the two kinds of energy? Is it possible that the etheric energy may preserve and project the physical appearance of the individual, while his astral form may appear more as a moving orb?

13.12. Physics Of Meditation and Prayer -The Power of the Phased Array

Meditation is often considered to be a "quieting of the mind," because the talking part of the mind becomes quiet. The verbal and analytical processes cease. But brain wave (EEG) studies show that actually the brain becomes more "coherent" in meditation. This means that the firings of the billions of neurons in the brain occur more "in step" with one another. The electrical impulses from all the cells become less random, less independent. It is as though they begin to march in step with one another.

This state of mind has enormous power to affect reality, based on the synchronized 4-D holographic model we have presented. In order to affect reality, we must send a coherent, "in step" pattern of photons into the future and into the past. This pattern must be so clear that when it interacts with the distant matter and refocuses, it retains the desired image.

The DNA in our cells can naturally produce waves of this type, which contain both forward-time traveling waves and matching backward-time traveling waves. Matched waves of this type are called "phase-conjugate" waves. In the last decade laser scientists have learned to make and control these waves for certain applications. But the double helix structure of DNA suggests that our cells may have been making such waves for a much longer time. They are ideally suited for generating coupled photons which radiate out along the axis of the double helix in both directions. (see Figure 13.28).

If this is the case, then each cell is a tiny radio transmitter which is capable of sending phase conjugate waves into the past and into the future. This is probably why individual cells have been shown able to send and receive ESP messages, as in the Backster Effect (Chapter 4 of *Synchronized Universe* "The Backster effect: Cell to cell communication"). But to send a complex message, or to achieve a more impressive result like teleportation, requires that a great many cells act in unison. The real power of DNA and the use of phase-conjugate waves, which is just a matching pattern of advanced and retarded waves, occurs when millions or billions of cells transmit in phase. When this happens, the strength of the pattern increases as the square of the number of cells which are acting in unison. Therefore, a million cells transmitting their desired visualization in unison will have a thousand billion times more power than a single cell.

DNA DOUBLE HELIX IS IDEAL FOR CREATING PAIRS OF PHASE CONJUGATE PHOTONS

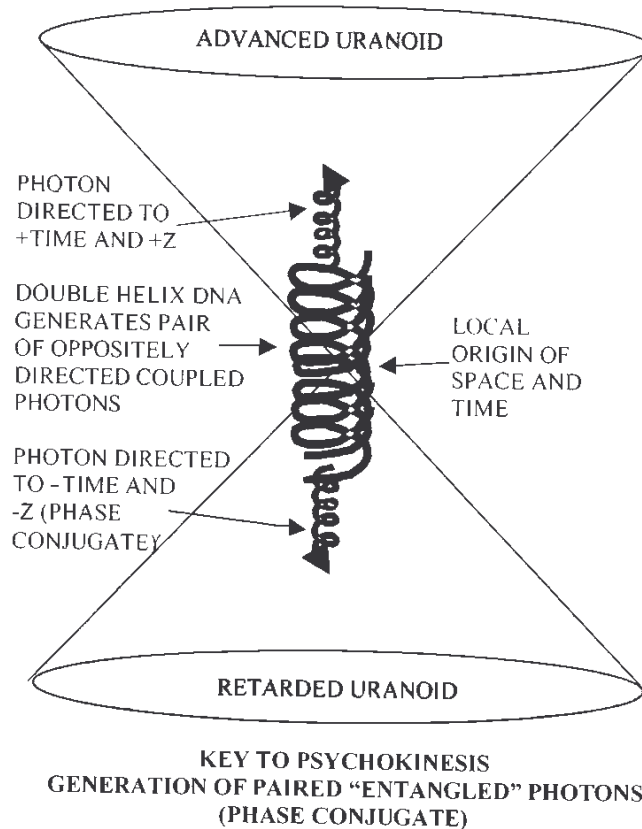


Figure 13.28. The double helix of DNA has been shown to be capable of both receiving and transmitting coherent photons (laser-like light). It has been speculated that its structure might be ideal for generating a pair of photons, phase conjugate to one another. If so, this would be an effective means to generate 4-D holographic type signals, and might explain how individual cells are capable of what Backster has called "primary communication."

It is this power of coherence, of synchronization, which enables some gifted individuals to achieve astounding paranormal feats. A million DNA cells broadcasting at random just produces noise. All the signals cancel out. But a million DNA cells broadcasting coherently and in unison generates a power that turns "ordinary" humans into supermen.

One of the goals, or at least one of the goals, or at least one of the by-products, of the education of the adept is to develop control over the mind and body, so this kind of synchronization of the cells can be achieved at will. Entering deep meditation states causes a synchronization of the vibrations of the DNA in the body, and it is very likely that this is one of the keys to "psychic superpowers." This is why meditation is a central element in all esoteric practices, whether it be a Buddhist monk, a yogi, a *qi-gong* martial artist, or an energy healer.

As we will see in later volumes [forth coming], this form of synchronization also gives the adept access to other dimensions, including the subtle dimensions such as the astral plane, which are not accessible in the normal consciousness state. The high degree of synchronization which comes from deep meditation makes it possible to access those domains. This opens up entire realms of physics and new phenomena which are familiar to adepts, but are closed to the rest of us. The ability to access these domains, which cut across the "stack of paper" of parallel universes illustrated in Figure 13.18, enables the adept to perceive and act from a higher perspective.

When the remote viewer moves freely in space and time, his consciousness moves in this higher dimension. It can easily see the future and the past from this perspective. By synchronizing vibrations across these planes it is possible to bring energy into our physical plane. This is one of the secrets of PK. It explains why and how the "random quantum background" can be changed by meditation. It explains how radioactive decay can be altered by visualization. It also has applications in so-called "free-energy" devices which can tap this energy across these planes to generate abundant clean, cheap energy.

Ever since the Cold War of the 1950's, huge radar stations have towered above the prairie in the upper Midwest of the United States. The antennas of these radars resemble huge curved walls many stories high. Protruding from these walls are thousands of smaller antennas arranged in a regular grid-like pattern. These structures are called "phased array" radars. The walls do not move. The radar shifts the direction of its beam by varying the phase of the radar signal as it is fed into each of the thousands of tiny antennas. Each antenna radiates a small signal, similar to the DNA of a single cell. But the phases are designed so that all of the radiations from all of the antennas add up coherently in a particular direction. In that direction, the radar beam will be strongest. By varying the phases of each antenna, the radar beam can be rapidly swept across the horizon in a search for incoming Intercontinental Ballistic Missiles, which the radar is designed to detect.

It is likely that the DNA molecules of each cell can be brought into coherence in a similar way. This would enable the brain, when it is quiet and coherent, to combine together the signals of many DNA molecules. In this way, the desired image, which is being visualized, can be brought into being. This is probably one of the reasons that positive visualization works. It may also be one of the keys to the success of prayer, distant energy healing, distant PK, and teleportation. If the 4-D image which is being created is not a physical object, but an idea or a thought, then "thought-balls" can be transmitted this way. Therefore this is one type of ESP.

When there is a receiving brain at the other end, (see Figure 13.29 *not in the book*) where the orange cube or other concept is focused, then this illustrates the reception of an "idea." The "Eureka" experience, when a flash of insight suddenly hits, may correspond to the reception of one of these patterns.

13.13. Summary

We have described here just a few of the ideas which make up the "Synchronized Universe Model" (SUM). Any model in physics must be reduced to mathematics, and must undergo a rigorous process of testing and comparison to data, before it can be considered a successful theory. The SUM is only at the beginning stages of such a process, and must be considered as a collection of interesting and promising ideas which have not yet been proven.

The model seeks to describe the Universe at a deeper level than Quantum Mechanics. At very small scales the electron has no mass and zips around at the speed of light, buffeted by photons from other electrons throughout the universe. Because of the "tunnel vision" of electrons traveling at light speed, they only see one another when their velocities point directly at one another. This leads to a mutual interaction across great distances. As the electrons throughout the universe interact in this way, they take up periodic orbits due to their collective interaction. Thus each electron resembles a tiny atom, with a center and a periodic orbit. This is the origin of the basic frequency every particle has. It explains one of the more puzzling features of quantum mechanics: why a particle has a self-frequency proportional to its mass. In the SUM model, this arises naturally from a fundamental physical idea.

One group or electrons will become synchronized to a particular phase and frequency. These will "see" each other and interact. They form the basis of what we call "our physical universe." We have offered the analogy that the resulting motions of the particles can be described as moving on a single sheet of paper within a stack. But there are many other sets of electrons and other particles which find different phases and frequencies at which *they* couple together. Consequently they form parallel universes which do not interact with ours except randomly. They provide the "quantum noise" so familiar to physicists. Because they are out of sync with "our universe" we see no pattern to this noise.

But when processes occur which cut across the parallel universes, which synchronize them in some way, as consciousness does, then it affects the quantum noise. It changes it. This has been seen in all of the consciousness experiments involving random event generators (REGs). It is one of the ways in which consciousness affects quantum physics.

This model provides a beginning for understanding the subtle energies. In the SUM model, they consist of modes of vibration of the distant matter which cut across the various parallel, synchronized universes. They couple together different "dimensions," different "sheets of paper," as we illustrated in Figure 13.18. Because of this, the subtle energies will have effects which violate the predictions of conventional physics.

Energy forms of this kind have been known and described in Eastern medicine for thousands of years. They are called "prana" or "chi" and are basic to all life. This model also provides a way of understanding "higher" energy forms, such as the "astral" energy which is central to the out-of-body experience, and which may be key to understanding the soul. Our scientific understanding of these energies will be described in greater detail in later volumes forth coming].

Since this is a physical model, we should be able to use it to predict and understand the kinds of subtle energies which can exist. We need not wave our hands and retreat into vague generalities. The model may also be useful in understanding the other important physical forces, such as nuclear forces and quarks, and it may help us to understand their relationship to the subtle energies.

At the core of the SUM model is the synchronous interaction of particles across great distances and times. If this idea is correct, then it can be used to explain how paranormal effects can be seemingly immune to time and space displacements. It may help us understand how two minds can be linked when separated by vast distances of space and time. And it offers a way to connect paranormal effects to changes in quantum noise, which is one of the central mysteries facing the new physics.

Most importantly, the model offers a way to understand consciousness. Paranormal research and consciousness studies suggest that our consciousness is not limited to the physical brain. It can leave the body and travel in space and time. When it does, we say "we" travel with it. The experiencer describes the event from where his consciousness is, not where his body is. And physical experiments, such as those of Drs. Karlis Osis, Keith Harary, and Janet Mitchell, show that there are measurable physical effects in the presence of consciousness. We provisionally call this the "soul" although this may be an oversimplification. But whatever it is, it seems to be the essence of a human. It is not the body. It is this consciousness or soul where awareness takes place. "We are much more than our physical bodies," as Robert Monroe used to say. This places us on the threshold of awareness of the much larger universe which is out there, and a much grander conception of who we are as humans.

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