

Heaviside's Quanta as the Carriers of Extrasensory Perception Phenomena

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ABSTRACT

In this paper we developed the model for the Extrasensory Perception Phenomena (ESP) phenomena. We locate ESP phenomena in *subatomic space-time*. We argue that the ESP phenomena are generated by the same source with temperature $T = 10^{-15}$ eV which emits brain waves. The ESP are created by the Heaviside *quanta* - charge particles with mass $< 10^{-15}$ eV and charge = electron charge (light electrons) and velocity $v > c$, the light velocity. Interacting with *brain medium* the Heaviside particles generate ESP phenomena. The nature of Heaviside particle with velocities $\gg c$ can be investigated by the transmission electron microscope (TEM) of brain matter.

Key Words: ESP phenomena, Heaviside *quanta*

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"The spark of ESP is glowing brighter than ever before, but enlightenment is fleeting and fragile. It's risky exploring unnamed realms. But what's life worth living for? Pushing the horizons of science invariably involves risk and controversy, but the potential of real discovery always makes those risks worthwhile. Be bold. Cultivate that spark of curiosity. Courage!"

Dean Radin, *Entangled Minds*

Introduction

In this paper we investigate the *Extrasensory Perception Phenomena* (ESP) phenomena with the help of the contemporary elementary particle physics. We assume that ESP phenomena are rooted in *subnuclear* physics. First of all supported by the results of the Oliver Heaviside we conclude that special relativity is not in opposition to the existence of the particles with *finite mass and velocities greater than light velocity*. The spark of ESP phenomenon in "source" subject is created by the emission of the new particle- antiparticle *Heaviside quanta*, which consists of *Heaviside particles* with mass of the order of 10^{-15} eV, which propagate with velocity greater

than the light velocity. The recombination of the Heaviside pair generates the additional hydrogen atom in the brain medium of the receiving subject.

1. ESP data

The type of data which can be acquired in ESP phenomena can be summarized as:

- 1) The overall ambience of the scene is accurately perceived.
- 2) Certain details are accurately identified; others are misconstrued or totally ignored.
- 3) A feature which is impressive to the agent is not necessarily so to the percipient, and vice versa.
- 4) The composition of the scene may be distorted by errors in scale, relative positions of key objects, or total right-left inversions.
- 5) The aesthetic aspects, such as colors, general shapes, degree of activity, noise

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level, climate, and other ambient features tend to be more accurately perceived than more analytical details such as number, size, or relative positions.

- 6) The perception is not necessarily centered on the defined target, and may even provide accurate information on adjacent areas external to the target, unnoticed by the agent.
- 7) *The fidelity of the perception seems to be independent of the remoteness of the target, up to distances of several thousand miles.*
- 8) *The time of the perception effort need not coincide with the time the agent is at the target. Perceptions obtained several hours, or even days, prior to the agent's visit to the target, display at least as high a yield as those performed in real time.*

The philosophical and practical implications of items 7 and 8 are clearly substantial. If the data are valid, the most parsimonious explications would require access of the percipient's consciousness to other portions of the space-time grid than that in which it is currently immersed, or that it can reach by normal processes of communication or memory. These same items also seriously delimit the potential physical mechanisms for such access.

In this paper we develop the new model for ESP phenomena based on *pre-Einseinian* relativity theory. The model we developed takes into account that relativity theory not precludes existence of the particles with finite mass and velocity greater than light velocity in vacuum. Oliver Heaviside formulated the theory of superluminal particles in XIX century (Heaviside, 1885). Following the Heaviside's theory we postulate the new charged particle with mass $m=10^{-15}$ eV, Heaviside particle which is responsible for the ESP phenomena. The pilot Heaviside particle emits Heaviside electric field (velocity= c) in very narrow angle θ ,

$$\text{Tan}(\theta) = \frac{1}{\sqrt{\frac{u^2}{c^2} - 1}}$$

In a sense the subject (emitter) "sees" the subject (receiver).

2. Physics of the ESP

Action at distance First of all we will discuss the basis for ESP given by physics. Let's start with action at distance (points 7 and 8) Ampere was, indeed, a man of genius, but even after his work on interacting electrical currents there were still great, puzzles to be addressed. The major difficulty was that of the *nature* of the interaction between currents (or electrically charged bodies). This interaction involved, obviously, forces bodies, but these forces were not produced by anything obviously pushing or pulling on bodies. It was *action-at-a-distance*. Action-at-a-distance was nothing new in physics Ampere's time, as Newton himself had been faced with the same concern in his theory of masses interacting gravitationally and instantaneously across the empty vastness of spaces. Newton was not happy about action-at-a-distance, and indeed his gravitational theory attacked by many who claimed it was a reversion to "explaining" Nature by invoking powers. Unable to suggest anything else in place of it he contented himself with his famous passage (Newton, 1693):

That Gravity should be innate, inherent and essential to Matter, so that one body may act upon another at a Distance thro'a Vacuum, without the Mediation of anything else, by and through which their Action and Force may be conveyed from one to another, is to me so great an Absurdity, that I believe no Man who has in philosophical Matters a competent Faculty of thinking, can ever fall into it. Gravity must be caused by an Agent acting constantly according to certain Laws; but whether this Agent be material or immaterial?

The Eather

The nature of all forces known to Newton and his contemporaries by direct *t~* experience seemed always to be that of contact, i.e., a push or a pull by the intimate interaction of one thing (via a rope, or a stick, or one's hand, etc.) with another. Gravitation action-at-a-distance (whether instantaneous or not) is most mysterious if acting in a meets way through a vacuum which is truly empty. But suppose that even a vacuum is filled *i* substance that can transmit forces, a substance something like air but ever so much thin:



penetrating, a substance that can slip through all of ponderable matter and fill every no cranny of the universe. Suppose the universe is embedded in an ocean of this mist called (or *aether*)—then what? Interacting bodies, even though *apparently* separated by the empty gulf of a vacuum then be imagined as actually still in mechanical communion via stresses and strains in the ether. So attractive is this idea, in fact, that the ether concept can be traced to ancient at least as far back as Aristotle. The price paid for this imaginative idea, however, was one—for every sort of apparent action-at-a-distance phenomenon it was necessary to correspond ether until, as Maxwell complained (Niven, 1890); “Aethers were invented for the swim in, to constitute electric atmosphere and magnetic *effluvin*, and so on, to sensations from one part of our bodies to another, and so on, till all space had been filled or four times over with *aethers*.”

This *aether* was thought able to transmit wave motion (from the interference experiment Thomas Young it was generally known by 1801 that light is a wave phenomenon), as gas conducts sound waves. Sound waves, however, are longitudinal waves, with the “waving” back-and-forth along the direction of wave propagation. The initially puzzling fact that light can be polarized was, however, incompatible with longitudinal or “back-and-forth” compression waves. Then Young and Augustin Fresnel, in 1817-18, showed how polarization can be explained by *transversal* waves, with the medium “waving” in a direction *perpendicular* to the direction of the wave propagation. This, in turn, made a gaseous ether unthinkable, as it would be unable to support the shear stresses required by a transversal wave. The *aether* could not, in fact, be a gas at all, but instead must be an elastic, jellylike solid, a bit of imagery due to William Thomson's old friend, G. G. Stokes. The required mechanical properties of such an *aether* are fantastic, to say the least.

This jelly had to be both thin enough for “the planets to swim in” without any observable retardation or deviation from Newton's laws of motion and rigid enough to propagate waves (light) at a speed of 300,000 per second. To imagine such a substance is not easy, yet in 1854 William Thomson wrote (1884):

That there must be a medium forming a continuous material communication

throughout space to the remotest visible body is a fundamental assumption in the undulatory Theory of Light. Whether or not this medium is (as appears to me most probable) a continuation of our own atmosphere, its existence is a fact that cannot be questioned...

The XIX/XX position in respect to *aether* was perhaps put best by Heaviside when he wrote (Heaviside 1893):

As regards the ether, it is useless to sneer at it at this time of day. What substitute for it are we to have? Its principal fault is that it is mysterious. That is because we know so little about it. Then we should find out more. That cannot be done by ignoring it. The properties of air, so far as they are known, had to be found out before they became known.

This passage shows an increase in either Heaviside's optimism or desperation, as earlier in 1885 (Heaviside, 1885) he had written,

Ether is a very wonderful thing. It may exist only in the imaginations of the wise, being invented and endowed with properties to suit their hypotheses; but we cannot do without it... But admitting the ether to propagate gravity instantaneously, it must have wonderful properties, unlike anything we know.

and then a few months later

The actual constitution of the ether is unknown. It never can be known.

3. Beyond Special Relativity

The original version of relativity, the so-called special theory, is actually a law and a rather simple one at that, being not an equation of motion at all but a property of that equation, symmetry. The most mature form of relativity is a speculative post-Newtonian theory of gravity motivated by this law. Einstein, who discovered early in his career that the public was more interested in the mystical aspects of relativity than the physical ones, encouraged the growth of his image as a seer even though he was not a seer at all but a professional with a razor-sharp mind. However, Einstein's writing is characteristically well-reasoned, direct, and open. He was capable of being wrong, just like the rest of us, but he rarely hid his mistakes in abstruse mathematics. Symmetry is an important, if often abused, idea in physics. An example of symmetry is roundness. Billiard balls are round, and this allows one to make some predictions about



them without knowing exactly what they are made of, for example, that they will roll in straight-line paths across the table when struck with a cue. But roundness does not cause them to move. The underlying laws of motion do that. Roundness is just a special property that sets billiard balls apart from arbitrary rigid bodies and is revealed by the unusual simplicity and regularity of their motion. Symmetry is especially helpful in situations where one does not know the underlying equations of motion and is trying to piece them together from incomplete experimental facts. If, for example, you knew that all billiard balls were round and were trying to guess their equations of motion, you could eliminate certain guesses on the grounds that round things could not possibly do this. Situations of this kind are the rule rather than the exception in subnuclear physics. For this reason there is a tradition in physics of ascribing to symmetries an overriding importance even though they are actually a consequence, or property, of the equations of motion.

The symmetry of relativity involves motion. Einstein and other early twentieth-century figures came upon this symmetry through thinking about electricity and magnetism, whose equations had just been worked out by James Maxwell and were rapidly leading to the invention of radio. Rotational symmetry requires the behavior of billiard balls on a round table to appear qualitatively the same regardless of where one stands on the perimeter. Relativistic symmetry requires their behavior to appear the same regardless of how one is moving. That being the case, the equations of electricity and magnetism would have to appear the same on the two trains, and thus the speed of light must also be the same. One then encounters a logical contradiction unless some common ideas about simultaneity and measurement on the two trains are wrong. All of these musings and their fascinating logical implications, including the weight gain acquired by objects moving at high speeds and the equivalence of mass and energy, are now routinely verified in laboratories all over the world, and have passed into history as self-evident truth.

The story of Einstein's triumph is so romantic it is easy to forget that relativity was a discovery and not an invention. It was subtly implicit in certain early experimental

observations about electricity, and it took bold thinking to synthesize these observations into a coherent whole. But no such boldness would be required today. An unsuspecting experimentalist armed with a modern accelerator would stumble upon the effects of relativity the first day and would probably figure the whole thing out empirically in a month. Relativity is actually not shocking at all. The ostensibly self-evident worldview it supplanted was simply based on incomplete and inaccurate observations. Had all the facts been known, there would have been no controversy and thus nothing for Einstein to prove. The popular view of relativity as a creation of the human mind is wonderfully ennobling but in the end incorrect. We believe in relativity today not because it ought to be true, but because it is measured to be true.

Einstein's theory of gravity, in contrast, was an invention, something not on the verge of being discovered accidentally in the laboratory. It is still controversial and largely beyond the reach of experiment. Its most important prediction is that space itself is dynamic. The equations Einstein proposed to describe gravity are similar to those of an elastic medium, such as a sheet of rubber. Conventional gravitational effects result when this medium is distorted statically by a large mass, such as a star. When the source oscillates rapidly, however, such as when two stars revolve around each other in tight orbit, there is a new effect: outwardly propagating ripples of gravity. Conventional gravity is thus like the dimples under the feet of a water skimmer, and gravitational radiation is like the disturbances generated by the skimmer when it scampers away. There is much indirect evidence that the prediction of gravitational radiation is correct, the strongest being the steadily diminishing orbital period of the famous binary pulsar discovered by Joseph Taylor and Russell Hulse in 1975. There is as yet no direct evidence. Detecting gravitational radiation directly is one of the key goals of modern experimental physics, but most physicists are already persuaded by other evidence that Einstein's theory of gravity is probably correct.

It is ironic that Einstein's most creative work, the general theory of relativity, should boil down to conceptualizing space as a medium when his original premise was that no such medium existed. The idea that space



might be a kind of material substance is actually very ancient, going back to Greek Stoics and termed by them aether. Ether was firmly in Maxwell's mind when he invented the description of electromagnet-ism we use today. He imagined electric and magnetic fields to be displacements and flows of ether, and borrowed mathematics from the theory of fluids to describe them. Einstein, in contrast, utterly rejected the idea of ether and inferred from its nonexistence that the equations of electromagnetism had to be relative. But this same thought process led in the end to the very ether he had first rejected, albeit one with some special properties that ordinary elastic matter does not have.

The word aether has extremely negative connotations in theoretical physics because of its past association with opposition to relativity. This is unfortunate because, stripped of these connotations; it rather nicely captures the way most physicists actually think about the vacuum. In the early days of relativity the conviction that light must be waves of something ran so strong that Einstein was widely dismissed. Even when Michelson and Morley demonstrated that the earth's orbital motion through the ether could not be detected, opponents argued that the earth must be dragging an envelope of ether along with it because relativity was lunacy and could not possibly be right. The virulence of this opposition eventually had the scandalous consequence of denying relativity a Nobel Prize. (Einstein got one anyway, but for other work.) Relativity actually says nothing about the existence or nonexistence of matter pervading the universe, only that any such matter must have relativistic symmetry.

It turns out that such matter exists. About the time relativity was becoming accepted, studies of radioactivity began showing that the empty vacuum of space had spectroscopic structure similar to that of ordinary quantum solids and fluids. Subsequent studies with large particle accelerators have now led us to understand that space is more like a piece of window glass than ideal Newtonian emptiness. It is filled with "stuff" that is normally transparent but can be made visible by hitting it sufficiently hard to knock out a part. The modern concept of the vacuum of space, confirmed every day by experiment, is a relativistic aether. But we do not call it this because it is taboo.

How Einstein came to conclude that space was a medium is a fascinating story. His starting point was the principle of equivalence, the observation that all objects fall under the pull of gravity at the same rate regardless of their mass. This is the effect that causes astronauts in near earth orbit to experience weightlessness. The pull of gravity is not significantly smaller in low orbit than on earth, but the effect of this gravity is simply to make them and their spacecraft fall together around the earth. Einstein inferred from this effect (more precisely from versions of it he imagined in 1905 when there were no astronauts) that the force of gravity was inherently fictitious, since it could always be turned off by allowing the observer and his immediate surroundings to fall freely. The important effect of a nearby massive body such as the earth was not to create gravitational forces but to make free-fall paths converge. Astronauts falling straight down onto the earth (an unfortunate experiment) might at first think they were in deep space, but after a while would notice that objects traveling with them were slowly getting closer. This is because all the nearby free-fall paths are directed toward the center of the earth and eventually meet there. Einstein was struck by the similarity between this effect and the convergence of lines of longitude at the north and south poles. In that case, the tendency of some straight-line paths to converge is a consequence of the curvature of the earth—a medium made out of conventional matter. Then, in a flash of insight that leaves us breathless even today, he guessed that free-fall paths actually are lines of longitude on a higher-dimensional surface, and that gravity occurs because large masses stretch this surface and cause it to curve. He then made a second, masterful guess about the specific relation between mass and curvature known to us today as the Einstein field equations. These respect relativity and thus contain the same paradoxes of simultaneity found in the original version of relativity. For this reason they are more accurately described as a relation between stress-energy and the curvature of four-dimensional space-time. Their prediction that space can ripple in addition to stretching is a consequence of its obeying relativity, symmetry of motion. It is consistent with our physical intuition, however, since it is basically the same thing as a propagating seismic wave on the surface of the earth generated by an earthquake.



The clash between the philosophy of general relativity and what the theory actually says has never been reconciled by physicists. On the one hand, we have the view, founded in the success of relativity, that space is something fundamentally different from the matter moving in it and thus not understandable through analogy with ordinary things. On the other, we have the obvious similarities between Einsteinian gravity and the dynamic warping of real surfaces, leading us to describe space-time as a fabric. Their curiosity is, however, neither naive nor inappropriate. The closet of general relativity contains a horrible skeleton known as the cosmological constant. This is a correction to the Einstein field equations compatible with relativity and having the physical meaning of a uniform mass density of relativistic ether. Einstein originally set this constant to zero on the grounds that no such effect seemed to exist. The vacuum, as far as anyone knew, was really empty. He then gave it a small nonzero value in response to cosmological observations that seemed to indicate the opposite, and then later removed it again as the observations improved. A nonzero value is again in fashion due to the development of a new technique for measuring astrophysical distances using supernovae. However, none of this adjustment addresses the deeper problem. Given what we know about radioactivity and cosmic radiation, there is no reason anyone can think of why the cosmological constant should not be stupendously large—many orders of magnitude larger than the density of ordinary matter. The fact that it is so small tells us that gravity and the relativistic matter pervading the universe are fundamentally related in some mysterious way that is not yet understood, since the alternative would require a stupendous miracle.

The view of space-time as a *non-substance* with substance-like properties is neither logical nor consistent with the facts. It is instead an ideology that grew out of old battles over the validity of relativity. At its core is the belief that the symmetry of relativity is *different from all other symmetries in being absolute. It cannot be violated for any reason at any length scale, no matter how small, even in regimes where the underlying equations have never been determined.* This belief may be correct, but it is an enormous speculative leap. One can imagine moon

people applying similar reasoning and chastising their brightest students for asking what the earth was made of on the ground that its roundness made the question moot. This would clearly be an injustice, since the earth is not absolutely round but only approximately so. On length scales smaller than the naked eye can easily discern from the moon, there are troublesome little details such as the Mount Everest. Advances in observation technology would eventually vindicate the students, at least the ones who remained defiant. It would be discovered that the earth is not perfectly round, and moreover is approximately round for the reason that the rocks from which it is made become plastic at the high pressures found underground, so that large objects on the surface slowly sink.

Despite its having become embedded in the discipline, the idea of absolute symmetry makes no sense. Symmetries are caused by things, not the cause of things. If relativity is always true, then there has to be an underlying reason. Attempts to evade this problem inevitably result in contradictions. Thus if we try to write down relativistic equations describing the spectroscopy of the vacuum, we discover that the equations are mathematical nonsense unless either relativity or gauge invariance, an equally important symmetry, is postulated to fail at extremely short distances. No workable fix to this problem has ever been discovered.

Thus the innocent observation that the vacuum of space is empty is not innocent at all, but is instead compelling evidence that light and gravity are linked and probably both collective in nature. Real light, like real quantum-mechanical sound, differs from its idealized Newtonian counterpart in containing energy even when it is stone cold. According to the principle of relativity, this energy should have generated mass, and this, in turn, should have generated gravity. We have no idea why it does not, so we deal with the problem the way a government might, namely by simply declaring empty space not to gravitate. It also demonstrates the severity of the problem, for one does not resort to such desperate measures when there are reasonable alternatives. The desire to explain away the gravity paradox microscopically is also the motivation for the invention of *supersymmetry*, a mathematical construction that assigns a special complementary partner to every known elementary particle. Were a *superpartner* ever



discovered in nature, the hope for a reductionist explanation for the emptiness of space might be rekindled, but this has not happened, at least not yet.

The belief of Lorentz and Poincare day was *aether*, or more precisely the naive version of *aether* that preceded relativity. The unsubstantiated belief of our day is relativity itself. It would be perfectly in character to reexamine the facts, toss them over in his mind, and conclude that beloved principle of relativity was not fundamental at all but emergent—a collective property of the matter constituting space-time that becomes increasingly exact at long length scales but fails at short ones. This is a different idea from Lorentz, Poincare, Heaviside original one but something fully compatible with it logically, and even more exciting and potentially important. It would mean that the fabric of space-time was not simply the stage on which life played out but an organizational phenomenon, and that there might be something beyond.

John Bell suggestion (Bell, 1964) is like going back to relativity as it was before Einstein, when people like Lorentz and Poincare thought that there was an *aether* - a preferred frame of reference - but that our measuring instruments were distorted by motion in such a way that we could not detect motion through the *aether*. Now, in that way we can imagine that there is a preferred frame of reference, and in this preferred frame of reference things do go faster than light. But then in other frames of reference when they seem to go not only faster than light but backwards in time, that is an optical illusion. Behind the apparent Lorentz invariance of the phenomena, there is a deeper level which is not Lorentz invariant. This is not sufficiently emphasized in textbooks, that the pre-Einstein position of Lorentz and Poincare, Larmor and Fitzgerald was perfectly coherent, and is not inconsistent with relativity theory. The idea that there is *anaether*, and these Fitzgerald contractions and Larmor dilations occur, and that as a result the instruments do not detect motion through the *aether* - that is a perfectly coherent point of view. I think that the idea of the *aether* should be taught to students as a pedagogical device, because I find that there are lots of problems which are solved more easily by imagining the existence of an *aether*. The reason me must to go back to the idea of

an *aether* here is because in these EPR experiments there is the suggestion that behind the scenes something is going faster than light. Now, if all Lorentz frames are equivalent that also means that things can go backward in time. That is the big problem. And so it's precisely to avoid these that I want to say there is a real causal sequence which is defined in the *aether*. Now the mystery is, as with Lorentz and Poincare that this *aether* does not show up at the observational level. It is as if there is some kind of conspiracy, which something is going on behind the scenes which is not allowed to appear on the scenes. That's extremely uncomfortable. The *aether* in 21st century physics is a continuum theory, generally non-classical, which interprets fundamental activity in terms of space time geometry or action in medium (Duffy, 2006).

4. Model of the ESP phenomena *Signaling models*

In producing a physical theory of psi, we need to decide whether we are demanding a new paradigm of physics or merely tinkering with the current one. It is natural to start off by trying the second (less radical) approach, and there are many reviews of 'tinkering' models. However, the danger is that one will end up grafting so many extra bits onto the old paradigm (like adding epicycles to the Ptolemaic model of the Solar System) that it becomes hopelessly complicated. There is also the problem of testability: there are actually many models for psi and, by adding enough bits to the standard paradigm, one can doubtless explain anything. However, a crucial requirement of a scientific theory is that it should be falsifiable and, as emphasized by many theories are inadequate in this respect. Nevertheless, it will be useful to start off by reviewing less radical approaches, since some aspects of these may still feature in the new paradigm. The discussion below, groups theories of psi into three general categories: field or *signalling* models, quantum models and higher-dimensional models.

Many theories of ESP can be viewed as *signalling* models, in the sense that they involve the transmission of information or energy via some sort of particle or field (these concepts being linked in modern physics). Often the field involved is already part of the current paradigm. This includes, for example, explaining ESP in terms of electromagnetic



waves or neutrinos It also includes explaining PK in terms of electrostatic forces.

Models which explain precognition in terms of *tachyons* or *advanced waves* might also be regarded as being within the current paradigm, even though they involve rather exotic aspects of it. Even more extreme are models which adopt the spirit of the current paradigm but invoke particles like *psitrons* or *ESP waves* with the specific purpose of explaining ESP. All these approaches might be regarded as tinkering with the current paradigm.

Generally speaking, the experimental evidence indicates that ESP can occur at great distances and does not decline with distance. These findings do not fit well with most hypotheses that physical energies mediate the transmission of extrasensory information. Indeed, the information transmission model may itself be erroneous.

However, as discussed below, even if signalling models cannot work in four dimensions, they may still be viable in higher dimensions, since the viewer and the viewed may become contiguous in the higher-dimensional space. This is a crucial feature of my own proposal.

There are also many theories which invoke some form of biophysical field, even though the status of such fields is questionable from a physicist's perspective. Mesmer's early ideas on animal magnetism and *vitalistic fluids* might be included in this category. Unfortunately, none of these approaches has gained general acceptance among *paraphysicists* and all of them have been criticized on the grounds that they are ad hoc and *unfalsifiable*. On the other hand, the link with biology is important and reflects the growing interaction between physicists and biologists in orthodox science. It also raises the issue of whether psi is involved in some forms of complementary medicine and in reincarnation cases, and whether it is a feature of mind alone or life in general.

Quantum theory — which for present purposes we regard as part of the current paradigm — provides at least some scope for an interaction of consciousness with the physical world. It also completely demolishes our normal concepts of physical reality, so it is not surprising that some physicists have seen in its weirdness some hope for explaining psi.

Indeed, E. H. Walker (1984) has argued that only quantum theory can explain ESP. The most concrete realization of the quantum approach is 'observational theory', according to which consciousness not only collapses the wave-function but also introduces a bias in how it collapses. In this picture all psi is interpreted as a form of PK which results from the process of observation itself (i.e., there must be some kind of feedback). For example, clairvoyance is supposed to occur because the mind collapses the wave-function of the target to the state reported. This process can even explain retro-PK), since it is assumed that a quantum system is not in a well-defined state until it has been observed. Another feature of observational theory is that the brain is regarded as being akin to an REG. Thus an ordinary act of will occurs because the mind influences its own brain, and telepathy occurs because the mind of the agent influences the brain of the percipient. Of course, there is still the question of how consciousness collapses the wave-function (Stapp, 1993). One possibility is to modify the Schrodinger equation in some way (Marciak-Kozłowska and Kozłowski, 2013). Observational theory has the virtue that it can make quantitative predictions. For example, one can estimate the magnitude of PK effects on the basis that the brain has a certain information output and the results seem comparable with what is observed in macro-PK effects. On the other hand, observational theory also faces serious criticisms. One can object on the grounds that psi sometimes occurs without any feedback. For example (Beloff, 1988) has pointed out that there are pure clairvoyance experiments in which only a computer ever knows the target. One can also question the logical coherence of explaining psi merely on the grounds that one observes it and there are alternative models for retro-PK. Finally, David Bohm (1986) has cautioned that the conditions in which quantum mechanics apply (low temperatures or microscopic scales) are very different from those relevant to the brain.

Nevertheless, many physicists back some form of quantum approach some proposals exploit the non-locality of quantum theory, as illustrated by the famous EPR paradox. An atom decays into two particles, which go in opposite directions and must have opposite (but undetermined) spins. If at some later time we measure the spin of one of the particles, the



other particle is forced instantaneously into the opposite spin-state, even though this violates causality. This non-locality effect is described as 'entanglement' and) tried to explain this in terms of hidden variables, which he invoked as a way of rendering quantum theory deterministic. Experiments later confirmed the non-locality prediction (Aspect, 1982) and thereby excluded at least some models with hidden variables (though not Bohm's). Indeed, John Bell, who played a key role in developing these arguments (Bell, 1966) and was much influenced by Bohm's ideas, compared the non-locality property to telepathy. Einstein made the same comparison, although he intended it to be disparaging!

Although quantum entanglement has now been experimentally verified up to the scale of macroscopic molecules, it must be stressed that it is not supposed to allow the transmission of information (i.e. no signal is involved). For example, attributing remote viewing to this effect would violate orthodox quantum theory. Theorists have reacted to this in two ways. Some have tried to identify what changes are necessary in quantum theory in order to allow non-local signalling (Valentini, 2002). For example, (Josephson and Pallikariviras, 1991) have a model in which entanglement can be utilized biologically. More generally, Jack Sarfatti (1998) has argued that signal non-locality could still be allowed in some form of 'post-quantum' theory which incorporates consciousness. He regards signal locality as the micro-quantum limit of a more general non-equilibrium macro-quantum theory. The relationship between micro and macro quantum theory is then similar to that between special and general relativity, with consciousness being intrinsically non-local and analogous to curvature. His model involves non-linear corrections to the Schrodinger equation and may permit *retrocausal* and remote viewing effects. Others accept that there is no *signalling* but invoke a 'generalized' quantum theory which exploits entanglement to explain PSI *acausally*. This is also a feature of the model of pragmatic information, which interprets psi effects as meaningful non-local correlations between a person and a target system. This model may account for many of the observed features of psi, including the difficulty of replicating psi under laboratory

conditions). It may also be relevant to homeopathy (Radin, 2006) has argued that entanglement is fundamental to ESP. This is because he regards elementary-particle entanglement, bio-entanglement (neurons), sentient-entanglement (consciousness), psycho-entanglement (psi) and socio-entanglement (global mind) as forming a continuum, even though there is an explanatory gap (and skeptics might argue an evidential gap) after the second step. If the Universe were fully entangled like this, he argues that we might occasionally feel connected to others at a distance and know things without use of the ordinary senses. This idea goes back to (Bohm, 1980), who argued that there is a holistic element in the Universe, with everything being interconnected in an implicate order which underlies the explicit structure of the world: The essential features of the implicate order are that the whole Universe is in some way enfolded in everything and that each thing is enfolded in the whole. This implicit order is perhaps mediated by ESP. Most mainstream physicists regard such ideas as an unwarranted extension of standard quantum theory, but one clearly needs some sort of extension if one wants to incorporate mind into physics.

There are various other quantum-related approaches to explaining ESP. Some of these exploit the effects of 'zero point fluctuations vacuum energy. This is a perfectly respectable physical notion, so it is not surprising that some people have tried to relate this to the traditional metaphysical idea that there is some all-pervasive energy field which connects living beings (eg., *chi, qi, prana, elan vital*). Indeed (Puthoff, 2007) views the zero-point-energy sea as a blank matrix upon which coherent patterns can be written. These correspond to particles and fields at one extreme and living structure at the other, so some connection with psi is not excluded. A related proposal is that the radiation associated with zero-point-energy might be identified with *subtle energy fields* These allegedly involve some form of unified energy of such low intensity that it cannot be measured directly In the electromagnetic context, this idea was introduced to describe the quantum potential and maybe relevant to Bohm's (1986) implicate order.

Although these ideas might be regarded as being on the fringe of the standard



paradigm, the recent discovery that 70% of the mass of the Universe is in the form of 'dark energy'—most naturally identified with vacuum energy — is stimulating interest in this sort of approach. For example, (Sarfatti, 2006) has a model which associates both consciousness and dark energy with the effects of vacuum fluctuations, although he does not explicitly identify them.

It should be cautioned that the literature in this area comes from both expert physicists and non-specialist *popularizers*, so it is important to discriminate between them (Clarke & King, 2006). Although quantum theory is likely to play some role in a physical model for psi, my own view is that a full explanation of psi will require a paradigm which goes beyond standard quantum theory. Of course, nobody understands quantum theory anyway, so claiming that it explains psi is not particularly elucidating—it just replaces one mystery with another one. Also, many of the above proposals already deviate from standard quantum theory, so this raises the question of how radical a deviation is required in order to qualify as a new paradigm. In my view, most of those mentioned above are insufficiently radical and one need a new approach —perhaps of the kind envisaged by Bohm—that can explain both psi and quantum theory. One also suspects that the new paradigm will incorporate the idea of *retrocausality* discussed earlier, since proposed tests of this all involve some form of EPR effect (Cramer, 2006).

In this paper we present theoretical model for the emission of the Heaviside type wave model for the remote viewing phenomena. In our earlier papers we developed the quantum model for the emission of the brain waves. In order to put forward the classical theory of the brain waves we quantize the brain wave field. In the model (Marciak-Kozłowska and M.Kozłowski, 2013) we assume (i) the brain is the thermal source in local equilibrium with temperature T . The spectrum of the brain waves is quantized according to formula;

$$E = \hbar\omega \quad (1)$$

where E is the photon energy in eV, \hbar = Planck constant, $\omega = 2\pi\nu$, ν - is the frequency in Hz. (iii). The number of photons emitted by brain is proportional to the (amplitude)² as for classical waves. The energies of the photons

are the maximum values of energies of waves for the emission of black body brain waves we propose the well know formula for the black body radiation.

In thermodynamics we consider Planck type formula for probability $P(E) dE$ for the emission of the particle (photons as well as particles with $m \neq 0$) with energy $(E, E+dE)$ by the source with temperature T is equal to :

$$P(E)dE = BE^2 e^{(-E/KT)} dE \quad (2)$$

where B = normalization constant, E = total energy of the particle, k = Boltzmann constant = $1.3 \times 10^{-23} \text{ J K}^{-1}$. K is for Kelvin degree. However in many applications in nuclear and elementary particles physics kT is recalculated in units of energy. To that aim we note that for $1K$, kT is equal $k1K = K \times 1.3 \times 10^{-23} \text{ J} \times K^{-1} = 1.3 \times 10^{-23} \text{ Joule}$ or kT for $1K$ is equivalent to $1.3 \times 10^{-23} \text{ Joule} = 1.3 \times 10^{-23} / (1.6 \times 10^{-19}) \text{ eV} = 0.8 \times 10^{-4} \text{ eV}$. Eventually we obtain $1K = 0.8 \times 10^{-4} \text{ eV}$, and $1\text{eV} = 1.2 \times 10^4 K$

$$\frac{dN}{dE} = BE_{\max}^2 e^{(-\frac{E_{\max}}{T})} \quad (3)$$

where, B is the normalization constant, T is the temperature of the brain thermal source in eV. The function $\frac{dN}{dE}$ describes the energy spectrum of the emitted brain photons.

For the ESP phenomena we argue the emission of ESP signal by the source with temperature $T = 10^{-15} \text{ eV}$ the charged particle with charge = electron charge and mass $< 10^{-15} \text{ eV}$ which propagates in *aether* with velocities greater than the light velocity and emits the Heaviside type waves.

Heaviside (1895) claimed never to have been seduced by increasing mass with velocity:

I will not go so far as to say, that the view which is popular now, that "mass" is due to electromagnetic inertia, is a mere Will o' the Wisp. I will however say that the light it gives is somewhat feeble and uncertain, and that it eludes or evades distinct localization. The mere idea, that electromagnetic inertia might account for "mass", occurred to me in my earliest work on moving charges, but it seemed so vague and unsupported by evidence, that I set it on one side. It explains too much, and it does not explain enough.

One curious feature of the predicted mass variation with speed is the infinity that results at the speed of light. This is a result we interpret today to mean that nothing with



mass can travel fast as light (in a vacuum). Light can travel (obviously) as fast as light because photons are massless. Heaviside writes;

The argument ... seems to be that since the calculated energy of a charged body is infinite ... at the speed of light, and since this energy must be derived from an external source, an infinite amount of work must be done, that is, an infinite resistance will be experienced. There is a fallacy here. One easy way of disproving the argument ... is to use not one, but two bodies, one positively and the other negatively charged to the same degree. Then the infinity disappears, and there you are, with finite energy when moving at the speed of light. And *When mathematicians come to an infinity they are nonplused, and hedge around it We must not be afraid of infinity.*

It must be admitted that O. Heaviside was well aware of the Einstein relativity.

Oliver Heaviside in a hand written letter to Prof. Bjerknes, discussed Einstein's compulsory shift to position from claiming that the aether was superfluous to stating directly that the aether was fundamental to Einstein's theory: "I don't find Einstein's Relativity agrees with me It is the most unnatural and difficult to understand way of representing facts that could be thought of."

Heaviside was absolutely right about his claims for hyperlight motion the medium is something other than a vacuum, such as water. Then the speed of light is less than it is in a vacuum, charged particles can exceed the speed of light, and, in fact, Heaviside's conical, electromagnetic shock wave is observed today we call it Cherenkov radiation after the Russian physicist P. A. Czerenkow who exhaustively studied it experimentally in the 1930s, although Madame Skłodowska Curie apparently the first to notice, in 1910, this radiation effect in radium solutions (but she did not appreciate its true origin).

Oliver Heaviside (Heaviside, 1902), showed that a point charge q in steady rectilinear motion along the axis of z , at a speed u , less than c , was associated with the potential

$$V = \frac{q}{4\pi\epsilon [z^2 + \gamma^{-2}(x^2 + y^2)]^{\frac{1}{2}}} \quad (4)$$

where γ^{-2} is a fraction ranging from 1 to 0, as u increases from 0 to c . Here it is to be understood that V is the potential at the point x, y, z when the origin is at the charge, so that V accompanies q in its motion. It is further to be understood that the electric force E is derived from the potential in the manner specified by

$$E = -\nabla V \quad (5)$$

The question now to be considered is what occurs when u is greater than c . Are the formulae still valid? We can see immediately that some reservations are necessary, even though no change of formula may be required. For γ^{-2} is now negative; and V , and also E and H are made imaginary when

$$z^2 < \left(\frac{u}{c}\right)^2 (x^2 + y^2) = \cot^2 \theta (x^2 + y^2) \quad (6)$$

This means that V is real inside the two cones to right and left of the moving charge whose angles are 2θ , equation (6), but unreal in the intermediate region outside the cones.

But next, seeing that disturbances are propagated only at speed c , whilst the charge q moves at the greater speed u , the locus of the spherical waves sent out by the charge as it moves along forms the left conical surface only. So we must reject the right cone altogether, if we are considering a charge brought from rest up to speed u .

So far is rejection without change. But closer consideration will make it probable, if not certain, that a change in the formula is wanted as well. For, assuming that equation (1) is correct when γ^{-2} is negative, provided we keep to real values; it still belongs to both cones. Now it was standardized so to make the total displacement leaving the charge be q . This was with $u < v$, when the displacement emanated in all directions. As we employ now the same formula, the same property should hold good, keeping to the real values, however. But V is symmetrical. At corresponding points in the two cones V is the same. So the displacement leaving q for the right cone can be only and similarly for the left cone. The practical meaning is that if we reject the right cone, and still have the charge at the apex of the left cone represented by q , we must double the right side of equation (1). Similarly, the right members of the formula for E and H , true



when $u < c$, must be doubled when $u > c$. At any point P inside the cone, we have

$$V = \frac{q \tan(\theta)}{2\pi\epsilon [z^2 \tan^2(\theta) - (x^2 + y^2)]^{\frac{1}{2}}} \quad (7)$$

So V is a minimum on the axis, and increases to infinity on the cone. Outside the cone V is zero. Deriving the electric force by equation (7), it will be found that E is radial, and is directed towards the charge. This is inside the cone. Its size is

$$E = \frac{qr \tan(\theta)}{2\pi\epsilon l^2} \quad (8)$$

at distance r from the apex, where l is the geometrical mean of the distances of the point P from the surfaces of the cone. The conical surface is the seat of a sheet of displacement away from the apex. This follows because V suddenly drops to zero outside the cone.

In recent years (Boyd, 2009; Gehring, 2006; Wang, 2000) the physics community has come to realize that studies of the properties of light can be used to address deep questions that lie at the foundations of physics. Under certain circumstances, light pulses are observed to propagate with velocities that exceed the velocity of light in vacuum c. We then review theoretical arguments showing that the principle of causality limits the maximum velocity with which signals can be transmitted to the velocity of light in vacuum. This apparent contradiction is resolved by arguing that the velocity at which the peak of a pulse moves through a material (known as the group velocity) is not the same as the velocity at which information is transmitted through a material. Finally, we speculate on what it would mean to live in a universe in which the principle of causality could be violated. One broad conclusion to be drawn from work of this sort is that studies of the properties of light can shed insight on questions of a fundamental and philosophical nature.

As was mentioned above, recent research has shown that it is possible to find situations in which pulses of light can propagate with velocities greater than the velocity of light in vacuum c or even with negative group velocities. Such behavior is certainly counterintuitive. But from a more formal point of view, these results are disturbing in that at first glance they seem to be at odds with some well-established features of the special theory

of relativity. In particular, a direct consequence of the special theory of relativity is that the transmission of information at a speed greater than the velocity of light in vacuum would allow one to violate the principle of causality but is not the case. The probability of the emission of particle with mass m by the source with temperature T is governed by Boltzmann factor,

$$P\left(\frac{m}{T}\right) \sim P\left(\frac{m}{T}\right) \approx \text{Exp}\left[-\frac{m}{T}\right] \quad (9)$$

From formula (9) we conclude that the source with temperature T emits the particles of mass m of the order of T (temperature and mass in energy units). The theoretical spectra are presented in Fig 1. The emitted particle with velocity u propagate through the aether and emits the electric field E (6). The electric field, *Heaviside quanton* interacts with subject brain and create the ESP phenomena. The comparison of the Heaviside wave, E, with experimental data of ESP;

- In accordance with points 7 and 8 the Heaviside particle with mass m reaches the subject brain at once (velocity $u \gg c$) and generates electric field E in brain cells
- The field E is concentrated in very narrow angle θ . In a sense the subject (source) sees the receiver subject
- The field E does not depend on the distance of the subjects.

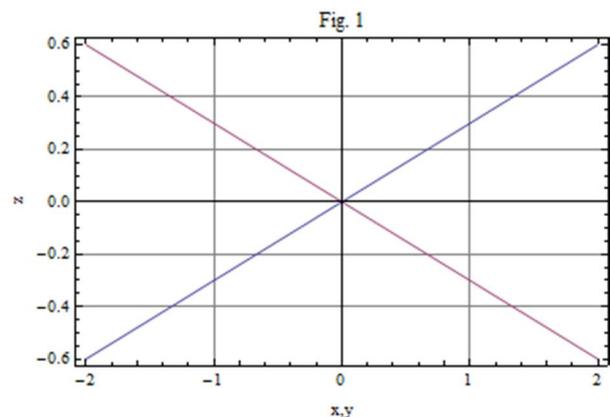


Figure 1. The cross section of the cone of the Heaviside electric field E. The charge q is located in point with coordinates $x=y=z=0$.

5. Hypothesis, Elusive Heaviside Particles: H^+ , H^-

In our paper we argue that the new particle called *Heaviside (H)* particles are the carriers of ESP phenomena. The *Heaviside* particle are



proposed in the frame of the new law *electroweak baryogenesis*

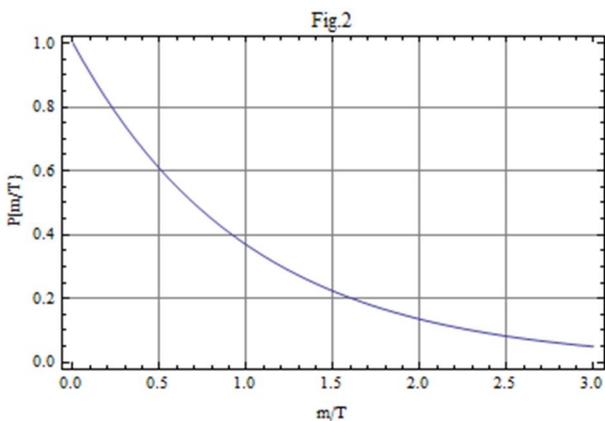
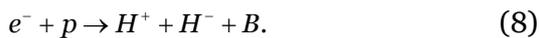


Figure 2. The probability emission $p(-m/T)$ of the quanton with mass m by the source with temperature T .

The word *baryogenesis* refers to the generation of *baryons* (particles such as *protons and neutrons*) and *leptons* (particles such as *electrons and neutrinos*) out of energy states. But in physics, a process can be reversed. Tipler (2007) assumed that the process worked in reverse- *baryons and leptons* ($p+e$) annihilate and produced the pair ($\nu+\bar{\nu}$). Recently *baryogenesis* is in front of the elementary particle physics (Shu Jing, 2011). In *arXiv* portal exists over ten thousand preprints with word *baryogenesis*

In our hypothesis of EPS phenomena instead of the *neutrinos* the new particles (*antiparticles*), for the moment *nonobservable* are produced in the reaction, formula (8)



In formula (8) B is the hydrogen binding energy, the masses of, $H^{+,-}$ are equal $m_{H^{+,-}} = 10^{-15} eV$, the charge of Heaviside particle

$q_{+,-}$ = charge of electron. If *the weak baryogenesis* exists the *quantons* $H^{+,-}$ with very high energy will cause the subjects brain atoms to recoil and so the recoiling atoms would leave the tracks. The tracks can be observed in brain matter with transmission electron microscope (TEM). The ESP phenomena are rooted in subnuclear physics. First of all supported by the results of the Oliver Heaviside (1850-1925) we conclude that special relativity is not in opposition to the existence of the particles with *finite mass and velocities greater than light velocity*. The spark of ESP phenomenon in “source” subject is created by the emission of the new particle-antiparticle *Heaviside quantons*, which consists of *Heaviside particles* with mass of the order of $10^{-15} eV$, which propagate with velocity greater than the light velocity. The recombinations of the Heaviside pair generate an additional hydrogen atom in the brain medium of the receiving subject. It is worth to mention that recently the search for new minicharged particles was undertaken (Dobrich, 2012).

Conclusions

In this paper we formulated the model for ESP phenomena based on pre-Einstein special relativity. Following classical results of the Heaviside theory we argue that ESP phenomena are the results of the emission and absorption Heaviside`s particles. We consider the Heaviside particle with mass $10^{-15} eV$ witch propagate with velocity $u \gg c$ and emits the electric field E (6). The *Heaviside* waves resemble the Czerenkow radiation. The nature of Heaviside particle with velocities $\gg c$ can be investigated by the transmission electron microscope (TEM) of brain matter.



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