

Rational Quantum Physics

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“There is good reason to assume the existence of a sub quantum-mechanical level that is more fundamental than that at which the present theory holds.” David Bohm, 1957

Professor Dimitri Mendeleev was the “father” of the Periodic Table of the Atomic Elements, which he composed in 1869. In this first publication, Mendeleev placed a special “Zero Group” of atomic elements, which preceded the Nobel gases. The quality of chemical inertness was assigned to the Zero Group gases, to explain their “non-reactive” character, and the difficulty of discovering the Zero Group gases chemically. The lightest of the Zero Group gases, the first in the Periodic Table, was assigned a theoretical atomic weight 100,000,000 times lighter than hydrogen. The kinetic velocity of this gas was calculated by Mendeleev to be 2,500,000 meters per second. Nearly massless, these gases were assumed by Mendeleev to permeate all matter, rarely interacting chemically. The high mobility and very small mass of the trans-hydrogen gases would result in the situation, that they could be rarefied, yet appear to be very dense. Mendeleev was so confident that these atomic elements would be discovered, that he included them in his original publication of the periodic chart of the atomic elements, although there was no physical evidence for their existence available at the time. (Mendeleev also predicted the existence of several other of the atomic elements, including gallium and germanium, many years before they were actually discovered.)

Mendeleev later published a theoretical expression of the aether, which satisfied many of the contradictions which existed in physics at that time, in a small booklet entitled, “A Chemical Conception of the Ether”, in 1904. (His expressions may well serve to help us eliminate many of the difficulties we are faced with in physics today.) His 1904 publication again contained two atomic elements smaller and lighter than hydrogen. He treated the “aether gas” as an interstellar atmosphere composed of at least two lighter-than-hydrogen elements. He stated that these gases originated due to violent bombardments internal to stars, the sun being the most prolific source of such gases. According to Mendeleev's booklet, the interstellar atmosphere was probably composed of several additional elemental species.

Nikola Tesla later found Mendeleev's “Zero Group” gases, and several more, by experiments involving high dv/dt explosive discharges of electricity, acting in the manner of a stone dropped into a pond, sending an out-bound shock wave into the local media.[1] In Tesla's apparatus, shock waves released by the explosive unidirectional discharges of fast-acting high voltages, behaved as gaseous shock waves having electrical characteristics. Tesla found that these behaviors were caused by the dissociation of electrons, into their constituent aether particles, due to the speed and magnitude of the electrical discharges he used. Tesla found that the colors stimulated by the discharges' shocks waves varied according to the durations of the pulses he applied, at threshold voltages exceeding 500KV. According to the duration of the discharges, the various gases innate in the media were stimulated to luminescence. Tesla observed discharge colors such as blood red, sky blue, peach, and white. He stated that the various colors were due to the excitation-born releases of the various constituent gases of the aether, according to the pulse duration. (The gas spectra he observed by these experiments have no equivalent in the colorations of electro-luminescent discharges of any of the presently known gases.) Tesla devoted the last 30 years of his life exploring the behaviors and properties of the Zero Group gases.[2]

In the late 1700's La Sage proposed an explanation for Newton's gravity. It took the form of a proof that

an inverse square attractive force generated by two bodies shadowing each other, from an all pervasive background motion of microscopic bodies, constantly impacting on the larger bodies. LaSage showed that as these smaller bodies become arbitrarily small and as the size of the shadow becomes smaller, relative to the separation of the bodies, an inverse square relation is produced. This background of small impacting bodies constitutes an aether. From this basis, La Sage produced a mechanism similar to General Relativity for Newtonian gravity. La Sage then developed a differential form of Special Relativity for accelerating frames, preceding Einstein's Relativity. Later, Einstein produced the "Equivalence Theorem" whereby gravity was proposed to be equivalent to an accelerating frame of reference (matter affecting the hypothetical "space-time"). La Sage would have answered to the expressions of Einstein, that gravitation alters the path of photons in the same manner as it acts on all other entities. The three spatial dimensions and the variable of time mean that the curved photon trajectories existing in this early differential form of general relativity (a kind of Galilean relativity) produce the same effects currently attributed to "curved space-time". La Sage's model generates the same results as General Relativity without resorting to any new spatial dimensions, using only 3-D geometry, the conservation of momentum, and a differential form of general relativity.[3]

About 1853, the Marquis de LaPlace developed a model for gravitation which was an improvement and extension of the previous work done by La Sage. In this model, gravitation is caused by the pressure of a ubiquitous gas composed of "infinitesimal particles", each of which has an intrinsic velocity of millions of times the speed of light. This model for gravitation produces all the results of Relativity theory, while describing the actual cause of gravitation without resorting to any more than 3 Euclidean dimensions, nor requiring the mathematical fabrication of a "metric". [4] (Relativity theory only describes what happens as a result of gravitation; that is to say, what gravity does. Relativity theory does not tell us what causes gravitation, nor what gravity actually is.)

Einstein identified the existence of gravity with the inertial motion of accelerating bodies, whereas contemporary physicists identify the existence of gravity with space-time curvature. This interpretation of gravity as a local curvature in space-time is an interpretation Einstein did not agree with. When we examine Einstein's expressions regarding curved space-time, we are reminded that Einstein held the view that any space-time curvature would only occur at cosmic scales, not locally. Many have been led to believe that the 1935 experiments involving observations of a star during a total eclipse, which should have been obscured by the mass of the sun, represent evidence of a local space-time curvature (gravity well) in the vicinity of the sun. In fact, exactly the same results will be incurred if we place a density gradient of one of the Zero Group gases around the sun, which density increases as we approach the stellar body. The altered path of light which is observed in these circumstances, is then simply due to refraction, the change in the refractive index of space in the vicinity of the sun, due to the presence of a density gradient of gases, which causes any light which enters into the region of the density gradient to be bent away from its normal path, in the manner of an optical lens.

Because gravitation is the result of the constant inflowing of (subquantum) gases we are calling an aether, it seems that gravitation can be temporarily locally neutralized by applications of very fast, positive-going electrostatic field discharges, exceeding 500,000 statvolts, to the object. This can happen because such discharges result in out-bound aether fluxes which intersect with, and effectively block, the incoming gravitational aether stream, because the local aether pressure, out-bound, is stronger than the local gravitational aether pressure, which is in-bound. This was first demonstrated by Piggot in France in July 1920. Piggot was able to suspend 1/2 inch diameter solid silver balls, and other materials, in the space between an electrostatically charged sphere, and a concave grounded plate, when his generator was charged at 500,000 statvolts. Were this simply an electrical phenomenon, then the mere presence of the grounded plate would have instantly destroyed the effect. Interestingly, when the

power was turned off, the objects were observed to remain suspended for quite some time.[2] Nikola Tesla's work on what he called "electro-radiant impulses", which he considered to result from his "disruptive discharges", is outlined in detail in the London Royal Society lectures of February 1892. Fundamentally speaking, the effects of his "disruptive field impulses" exceed the effects of any manner of electron-based electro-inductive effects by several orders of magnitude. Tesla considered these aether impulses to be electrostatic in nature. In 1892 Crookes upheld Tesla as the discoverer of a new kind of electrical force. Tesla held that electric and magnetic forces are manifestations of this more primal aether-electricity, which he viewed as streamlines of aether particles in gas-like flows. His "radiant electricity" was a gaseous emanation, an aetheric motion, according to his empirical experimental results.

Maxwell also held the view that force lines were longitudinal, dynamic flow-lines, and wanted to know, "What substance are these flow-lines composed of?" Henry and Faraday had the notions that, since force lines were made of a "flowing charge substance", then there must be some means of placing contacts on charged masses to obtain electrical power forever. Later, Tesla, Stubblefield, T. T. Brown, and others, found various ways to accomplish this feat in actual fact. For Tesla, the method involved applications of very fast rise time (high dv/dt) D.C. voltage impulses from a high voltage D.C. source, by way of a magnetically controlled plasma switch which could produce millions of repetitions per second. Exact specifications of his apparatus are given in the London Royal Society Lectures of Feb. 1892. In Tesla's view, his "radiating electricity" is composed of a "space-flowing current" that is not made of electrons. Something in the aether, perhaps one of the Zero Group gases, produces something that looks very much like charge. Tesla named this something the "effusive aether". He found that the velocity of the electric-like effusive aether-gas discharges far exceeded the velocity of electrons in any medium he tried, including vacuum. Tesla said that these effusive aether fluxes were inherent in standard electrical discharges. When liberated from the electrical flow by explosive discharge events, Tesla found that the resulting aether flux would conduct through any material whatsoever.

When he constructed devices which were specifically designed to completely stop the passage of any fluctuating or transient E/M, Tesla found that such circuits actually served to amplify the effusive flux of the aether. Such circuits were measured as passing zero current, yet these circuits were conducting enormous amounts of power at inordinately high voltages in the form of electrostatic discharges. Tesla remarked that the electrostatic potentials along the coil surfaces, measured from end to end, could be as high as ten thousand volts per inch of winding. A ten inch coil of Tesla's design would easily produce discharges of more than one hundred thousand volts. In his later, improved designs, he was able to attain discharge voltages on the order of 100,000,000 volts. Yet, never was any current measurable in these circuits. Tesla obtained better results when the few turns of copper he would put on a cylindrical form had rather large gaps between the turns, as this prevented energy losses due to sparking and brush-type discharges. By this, it seems that properly constructed Tesla Transformers conduct aether, rather than electrons. [5]

Tesla found experimentally, that explosive discharges of electricity, approaching the ideal of the Dirac delta function (the infinitely fast rise of an infinitely high voltage), cause the dissociation of electrons into their component aether particles, which then stream away from the discharge site in superluminal ever-expanding shells. Similar processes are probably occurring all the time in the bodies of the stars, resulting in aether emanations from the various stellar bodies. It is possible that localized processes can also occur in interstellar space, which can also result in subquantum particle fluxes. Stellar and interstellar plasma processes involving subatomic particle dissociations as the result of high dv/dt charge separation events in stellar and interstellar plasmas can be the origin of this constant in-streaming of subquantum particles which can easily attain superluminal velocities by such plasma

dissociation events. When these anisotropic superluminal subquantum entities encounter pre-existing matter, they are refracted and slowed down by interactions with the pre-existing matter. The reaction which occurs is experienced by matter as the pressing-down force we call gravitation.

Tesla realized through experiment that certain of these incoming aether flux "waves" were arriving with unflinching regularity. He realized that the instances where he had obtained zero output readings were those cases where his applied pulses were 180 degrees out of phase with the incoming aether waves, and of course, strongest when the pulses were applied in-phase with the incoming flux peaks. This situation provided evidence that aether flux from interstellar space is not a constant and smooth value, but varies with time. He realized that the Earth, as a massive whole, was modulating parts of the aether flux. He discovered a large number of various periodicities within the aether fluxes. He found the sources of all these various flux rates had several causes. Space-sourced aether pulses entered the Earth at rates apparently related to mysterious processes occurring in the deepest reaches of outer space, many such interstellar processes generated pulsations having nothing to do with Earth. Other rates had to do with processes in space involving properties of the interstellar medium itself. Yet, there existed a class of pulse rates definitely related to the nearby sun and to the Earth as a resistive mass. Tesla found that the Earth's rocky crust represented a resistance to the otherwise smooth passage of aether flux pulsations through interstellar space.

Tesla found that the resistance of the Earth's crust to the passage of aether, caused a local intensification of the aether flux to occur. He observed that a self-magnifying, self-collimating, property occurred when the aether fluxes encountered the massive body of the planet. The so-resisted aether then self-focused into the locally resistive medium comprising the planet, resulting in locally intense aether flux bombardments in the resistive media, which resulted in locally explosive emissions of showers of subatomic particles. One of the principle emissions was numbers of electrons. It appeared that electrons would spontaneously appear in the matter of the planetary body due to such resistivity to the aether flux. The resulting electrons acted as an aether "contaminant" which would choke off the normally smooth and unencumbered aether flows. In other words, the process of the conversion of aether particles, into electrons, due to the resistivity of the Earth's crust, acted to further retard the aether flows, in addition to the resistances inherent in the materials of the Earth's crust.

On the terrestrial scale, the results of these processes were observed to be enormous in scope. Tesla found, for example, that these processes were responsible for the molten core of the planet, and for the constant excesses of electrons which give the planet a constant net negative charge. Tesla also found a direct correlation between the local aether resistivity of the earth's crust and the local rate of lightning discharges, in regions which were notable for locally prodigious lightning activities.[1]

Indeed, the slowing of the aether fluxes by interactions with electrons, in particular, results in the formation of additional electrons, where electrons are modeled as whirlpools composed of subquantum aether particles, perhaps similar to the Kerr-Newmann Vortex model developed by Smith and Sidharth. [6] The continuous formation of electrons within the Earth's crust appears to be the result of these gravitational aether fluxes, which process is the actual cause of the internal heating of planetary bodies, and the reason for the constant excess of negative electrical planetary charge, which cannot be accounted for by the solar wind model, since the solar wind is a neutral charge-balanced plasma.

When one examines the original data, recorded during the Michaelson-Morley experiments, one can easily discover that large variations in the speed of light were recorded by the research staff, as measured by the instrumentation. The records show marked variations in the measured speed of light, both on an irregular basis, and in terms of periodic variations. Some of these data records show

variations in the speed of light as large as 3000 meters per second, well outside of the margin for error of the measurement apparatus, and the experiment as a whole. (Speed of light measurements have historically shown variations over time. See, for example, page 436 of Maxwell's "Electricity and Magnetism".) Though quite markedly obvious, these "anomalous" measurements were apparently completely ignored by the experimenters, and those who came after, as irrelevant to the purpose of the experiment, which was to prove, or disprove, that an "aether drift" existed. In actual fact, were faster than light events involved, or were infinitely small particles involved, the experimenters had no way to measure them, nor their activities. Surprisingly, it is now clear that their measurements strongly support the idea that there exists some kind of aether. It's just not the kind of aether that the experimenters were looking for.

Several aether drift experiments were performed, subsequent to the Michaelson-Morely experiment. Experiments by Miller, [8] Kehr, [9] and Silvertooth, [10] have provided physical evidence that an aether drift exists, that the planet moves relative to a background gas, and that portions of that gas are entrained by the motion and mass of the planet. It seems clear that the results of all the aether experiments performed to date, can support the model for the aether proposed by Mendeleev and LaPlace during the 1800s. Perhaps their model is the correct one, and the differing experimental results may be due to the behaviors of the same material substance, under different circumstances.

Contrary to common understandings, the various fields are not well represented as smooth unbroken lines. Real electrostatic fields, for example, do not behave in a simple and regular manner. Empirical observations have shown us that actual field structures exhibit complex and irregular fluctuations in measured local field strengths and directions. It is possible that all such variations arise as the result of the activities of the Zero Group gases (or subquantum particles).

The force of gravitation is not a constant, but exhibits high speed transient variations and periodic variations to such an extent that the gravitational "constant" should be more accurately considered as an "average". [7] We suggest such observations may be caused by stellar and interstellar releases of large numbers of subquantum particles, due to plasma processes.

What is not commonly examined when we are observing the detailed structures of fields, are any periodicities which may arise in these field structures. In addition to the commonly observed irregular fluctuations, we can also directly observe, complex overlaying periodic behaviors. What is the agency responsible for such periodicities? With the advent of new measuring equipment, we suspect that it will be found that such periodicities arise as the result of periodic stellar and interstellar high dv/dt plasma events, [1] acting to release large periodic fluxes of subquantum particles, which act to create the observed periodicities, traveling across space to influence the region under observation. The behaviors of the stellar plasma exhibit both "random" occurrences, and periodicities. Thus, such fluxes of infinitesimals, originating from the sun, and other stellar bodies, may be responsible for both the observed irregularities, and the periodicities, encountered in detailed observations of the various fields, including the gravitational field.

Given that there are instantaneous variations in the force of gravity, [1] and granted that gravitation interacts to some degree with light, which is observed to vary in speed on occasion, it is easy to see that there may be a direct correlation between these two variations, so that when the force of gravitation varies during a certain time-frame, we might also measure variations in the speed of light, at about the same time, with sensitive enough instruments.

As mentioned previously, we consider the force due to gravitation is not a constant, but an "average".

Given that we accept the aether flux model for gravitation proposed by the Marquis de Laplace about 1853, and granted that gravitational variations might exhibit strong correspondences with the stellar and interstellar events which liberate vast outpourings of the “infinitesimal particles” which are the cause of gravitation in the Laplacian model, we are led to the startling realization that the original experimental series of Michaelson and Morely actually contributes towards proving the existence of an aether, of the kind proposed by Laplace in the 1850s, due to the large measured variations in the speed of light recorded during the experiments.

Were a similar experiment performed today, where variations in the speed of light and variations in the force of gravitation were being constantly measured, at the same time, and were correlations observed in these measurements, we would have compelling evidence in support of the Laplacian model for gravitation, and evidence which would support the existence of an “aether” of the kind proposed by Medeleev and Laplace, composed of vast streaming quantities of infinitesimal particles originating from stellar and interstellar events.

When one examines the existing quantum theory regarding the electrodynamics of the “elemental” particles, such as the electron, the present theory predicts infinite values for the various physical properties of the electron. These infinite values occur because the theory treats the electron as infinitely small, while in actual fact, from scattering experiments, the electron has finite and measurable extent (10^{-16} cm.). We have not yet found any way to consistently incorporate into quantum theory, an electron with a finite but very small size.

It may be that this difficulty can be resolved by treating the electron as an entity of finite size, which has a substructure. Recent high energy results have strongly indicated that even the tiny quark has a substructure, [11] prompting one of the researchers to exclaim, “Is there no end to smallness?”. It is quite feasible to model the electron as having a substructure composed of a whirlpool-like circulation of subquantum particles (Zero Group gases). Indeed, the validity of the Maxwell equations relies on the existence of a physical aether, where the background is composed of aether whirls.[12] We can view electrons as the result of coherent activities of the subquantum particles in a fluidic media, which media is composed of subquantum particles. The electron is then viewed as a complex structure participating in a media composed of subquantum particles. For example, T. Smith and Sidharth have modeled the electron as having a complex substructure called the Kerr-Newman vortex.[6] Such a complex structure can easily behave in the fluidic media in a wave-like manner, while at the same time, presenting particle-like concentrations of energy.

Rochus Boerner has pointed out a number of new theoretical developments that indicate that longitudinal waves exist in the vacuum, conducted by some gas-like media. He states:

“During the past decade, several theorists have pointed out empirical and theoretical reasons to doubt the completeness of Maxwell's theory, and proposed an extended theory of electromagnetism that allows for novel EM phenomena, such as "pressure waves" in the vacuum. The literature on this subject is substantial.

T. W. Barret argues in [1] that "a number of physical effects strongly suggest that the Maxwell field theory of electromagnetism is incomplete." He subsequently proposes a modified EM theory based on the non-abelian symmetry group SU(2) instead of the abelian U(1) of Maxwell's theory [2]. In the same theoretical spirit, M.W. Evans has proposed O(3) Electrodynamics [3].

B. Lehnert writes in [4]: "An extended Lorentz invariant form of Maxwell's equations has been

developed on the hypothesis that the densities of electric charge and current can be interpreted as intrinsic properties of the electromagnetic field in vacuo. As consequences of this proposal, longitudinal electric space charge waves and steady electromagnetic equilibria are predicted to exist in vacuo."

These proposed extensions of the Maxwell equations have in common that they treat the potentials of the EM field as physically real, while the Maxwell theory treats them as mere mathematical conveniences without physical meaning. The implications of longitudinal EM are vast. Since the frequency and wavelength of such waves can be modulated independently, they could provide a virtually infinite bandwidth for communication. They would provide for instantaneous (superluminal) communication and thus utterly destroy Einstein's relativity theory.

References:

- [1] Terence W. Barret: Maxwell's Theory Extended (Part 1) - Empirical Reasons for Questioning the Completeness of Maxwell's Theory- Effects Demonstrating the Physical Significance of the A Potentials. *Annales de la Fondation Louis de Broglie*, Vol. 15, 2, 1990, p.143-183.
- [2] Terence W. Barret: Maxwell's Theory Extended (Part 2) - Theoretical and Pragmatic Reasons for Questioning the Completeness of Maxwell's Theory. *Annales de la Fondation Louis de Broglie*, Vol. 15, 3, 1990 p.253-283.
- [3] M.W. Evans: O(3) Electrodynamics. *Modern Nonlinear Optics, Part 2, Second Edition, Advances in Chemical Physics Volume 119, ISBN 0-471-38931-5, p. 79-267*
- [4] B. Lehnert: Basic Concepts of an Extended Electromagnetic Field Theory. *Speculations in Science and Technology, Vol 17, 4, 1994 p. 259-266."*

It is sometimes forgotten that the researches of James Clerk Maxwell were devoted to discovering and proving the properties and composition of the medium which exists in space. Maxwell stated, "...we are unable to conceive of propagation in time, except either as the flight of a material substance through space, or as the propagation of a condition of motion or stress in a medium already existing in space." Torricelli remarked, "...energy is a quintessence of so subtle a nature that it cannot be contained in any vessel except the inmost substance of material things." [13] Indeed, the Maxwell equations do not function unless there does exist a media in space. The Maxwell equations are only valid in an inertial frame, which implies the existence of a physical media which has the property of inertia.

In fact, we know that electromagnetic waves possess a linear momentum, [14]

$$P_{\text{field}} = \text{Integral } S/c^2 \, dv$$

(where S is the Poynting vector)

and momentum density,

$$P_{\text{field}} = S/c^2$$

The question then arises, what is it that is conveying such momentum, if not a particle with the attribute of mass? Many such particles might then comprise an "aether", allowing for the propagation of longitudinal waves through the media.

We suggest then, that interpreting the Klein-Gordon equation in the form of a particle-based model, as previously suggested by Nambu, [Y. Nambu, *Prog. Theor. Phys.*, 5, 82-94 (1950)] may be a valid perspective. Then the suggested wave equation will be based on a parameter r , which represents the

order of development of a system, so that,
 $\nabla^2 \theta = d'Alembertian \theta$

(where ∇ is the partial differential).

Looking for a solution of the form

$$\theta = \exp[-iKx] \exp(i\lambda t),$$

we obtain,

$$K^2 \theta = d'Alembertian \theta.$$

By choosing $K = m^2_0$, the above reduces to the Klein-Gordon equation, with the added feature that we can now obtain solutions for arbitrary values of K , leading to an expression which has room for an infinite range of particle masses, which could be useful for explorations in the subquantum particle realms, if it is found experimentally that there are particles of various masses in the subquantum realms. Such a view is consistent with existing quantum theory and relativity theory, in that both require that a range of particle masses must exist, ranging down to infinitesimals. This approach also seems consistent with the expressions of Stapp [15] and Boyd [16] regarding "Quantum matter".

In line with these expressions, the quantum theory that quanta are "indivisible", has been refuted physically by the Nobel Prize winning results of the "Fractional Quantum Hall Effect", [17] which proved experimentally that quanta can be subdivided, perhaps infinitely. These results imply the existence of a subquantum realm, composed of particles much smaller than the electron. By these experiments, the divisibility of energy is proved, and the concept of the continuity of motion is recovered from classical mechanics.

The combination of the notions of subquantum particles, and the infinite divisibility of quanta allow us to produce detailed descriptions of the process of the transference of a quanta of energy, or a fraction of a quanta, from one quantum system to the next, by modeling the process in terms of transports of subquantum particles, from one system to the next, thus alleviating another "irrational trait" [18] from quantum physics. This process can occur at faster than light speeds, because the infinitely small particles involved in the transfer of quanta, are not subject to Relativity theory, having negligible mass.

We know that the translational velocity of impact (shock) waves through a medium can easily be vastly higher in velocity in a given medium, than the speed of sound through the media. As we know, the velocity of light through a medium is related to the speed of sound through the medium, in terms of mass density per unit volume. Cherenkov radiation is an example where the electron velocity exceeds the velocity of light in the local medium. In this situation, the electron radiates a photon of specific frequency so as to release excess translational energy and so return to light speed propagation velocity, in accordance with Relativity theory.

However, when subquantum particles are involved, relativistic considerations no longer apply. All of Planck's constants have perfectly vanished where subquantum events and masses are involved. Additionally, when we perform the calculation of the allowable translational velocity of an infinitely small mass, assuming that such entities actually exist, we can easily see that the translational velocity limitations described by relativity theory do not apply because there is no mass (an infinitely small mass) involved with the acceleration of the particle beyond light speed. Therefore, the relativistic

prediction of an increase in inertial mass toward infinity as the mass approaches the speed of light, fails, because our mass is infinitely small in this situation.

These understandings bring us to the core principle of non-local behaviors and interactions, the idea that all non-local events are due to the transports of information-carrying subquantum particles. These information-bearing properties of the subquantum particles are strongly indicated by the experimental results of Gariaev, et.al., [19][20][21][22] (Also see: B. DePalma [23].) In addition, it is already well known that the “quantum field” is an information-bearing “field” which acts to carry information in a non-local way. What has not been made clear, up to this time, is how such information can be conveyed from point A to point B, at faster than light speeds.

In our view, the “quantum field” is identically the faster than light propagation of information-bearing subquantum particles (Zero Group gases). The infinitesimals can attain any velocity from zero velocity to an infinite velocity, without violating Relativity. In other words, the so-called “quantum field” is physically represented as infinite velocity transports of information by the vehicles of the subquantum particles.

In the book, "The Undivided Universe", by Bohm and Hiley, at page 203, Bohm says, "...The essential point is that in an independent disturbance of one of the particles, the fields acting on the other particle (by osmotic velocities and quantum potential) respond instantaneously even when the particles are far apart. It is as if the two particles were in instantaneous two-way communication exchanging active information that enables each particle to 'know' what has happened to the other, and respond accordingly." At page 352, Bohm says, "...the quantum potential represents active information." The vehicle which carries that information, in a non-local, superluminal manner, is exactly the superluminal subquantum particles which comprise the plenum and which are the cause of gravitation.

It is well known that the various vector potentials, such as the magnetic vector potential, can carry enormous quantities of information. [24] What has been unknown up to this time, is how the vector potentials can convey such information, from one point in space, to the next. It is becoming clear that the vector potentials may, in actual fact, represent fluid-like streaming flows of information-bearing subquantum particles. If it is found experimentally that the vector potentials can carry information at faster than light speeds, such results would represent strong support for the concept that the vector potentials are actually flows of information-carrying subquantum particles.

Because there is a direct relation between the various vector potentials and the various fields, [25] it may eventually be demonstrated that the vector potentials actually originate the commonly known fields, representing streams of subquantum particles. (More likely, it will be found that this is a bi-directional process, a mutual interaction between the various vector potentials and the various fields.)

The purpose of Bell's inequality was to show that any local hidden variable theory which allows for any kind of independent disturbance of the quantum system, from outside the system, must imply a failure of quantum mechanics. Freedman, Aspect, and others, have proved experimental non-local violations of Bell's inequality. These kinds of results show that if there are hidden variables involved with quantum activities, that they must be nonlocal or subquantum. P. H. Eberhard, in *Nuovo Cimento* 46B, 392 (1978), showed that if there were a nonlocal EPR connection between particles, that any signals which relied on correlations of these particles could not occur, because EPR correlations alone, do not make possible the transmission of signals of any kind. Such correlations will not allow a signal to be transmitted faster than light, by means of the statistical measurements which are common to quantum theory in its conventional interpretation. If we accept these results, then any observed

superluminal information transfers must be due to some other cause.

Other violations of Bell's inequality have come from the experimental results of Jahn, Radin, Dean, et. al., at Princeton Engineering Anomalies Research, which show independent disturbances arise in nonlinear, random, and chaotic systems, from outside the systems, by the vehicles of the attention, intention, and the emotional states of the human being. [26] These results imply that local hidden variables exist. Localized information transfers do not appear to require that EPR-type correlations must exist, prior to the information transfer. Thus, it is possible that both local, and nonlocal, hidden variables are constantly influencing the behaviors of quantum systems.

In a paper that was posted on the Los Alamos Archive in 1999, then removed about 2000, an experiment was described where the radiation patterns of symplectic electromagnetic transmission facilities were instrumented, while at the same time, the operators of the transmission facilities acted to change their attention, intention, and emotional states. It was found that as these qualities of the operators changed, the radiated pattern of the antenna changed correspondingly. It was also discovered that these qualities of consciousness also caused a divergence in the quantum potential. Subsequent experiments in France have found the same results obtain for operator interactions with normal electromagnetic transmission facilities.

Considering that we now know empirically, that the factors of attention, intention, and emotional states act to alter the radiation patterns of electromagnetic transmission antennas, while at the same time, causing a divergence in the quantum potential, we want to know, how is this possible? Since the subquantum particles carry information, comprising the information "field", we think it is highly probable that all macroscopic entities are constantly emitting and absorbing subquantum particles, each of which carries all the information available regarding the environment it just left. Then we consider the possibility that these particles of infinitely small mass might readily be influenced to motion by the qualities of Living Beings, such as attention, intention, and emotional conditions, since these qualities act directly on the quantum field, per instrumented evidence.

It is conceivable that these qualities act on the minuscule masses of the of the subquantum particles in such a way as to cause them to be stimulated into motion, carrying new information along the line of their propagation, thus causing a divergence in the quantum potential, especially in the case where large numbers of subquantum particles are stimulated to motion by these qualities of Living Beings, influencing the quantum potential. It is easily seen that these qualities of Living Beings can act to alter the probabilities which inhere in the quantum potential, having reproducibly observable macroscopic consequences on both living and "inert" systems, especially those systems which are inherently nonlinear or chaotic, or which involve "random" or "stochastic" events. [26] Indeed, these information-carrying vehicles, composed of propagations of subquantum particles can explain many obtuse empirical phenomenon, such as telepathy, clairvoyance, psychokinesis, and psychometry, events which have been easily observable empirically, yet heretofore inexplicable by the previous sciences. Unfortunately, previous studies of these topics have attempted to dismiss such easily observable events as "impossible", or "unscientific", since the existing sciences could not readily explain such empirical observations and direct experiences.

When regarding the various results which have showed what may be quantum correlations resulting in alterations of genetic systems, we are interested to discover how these alterations might actually have occurred. Let us consider the possibility that in order for the observed correlations to occur in genetic systems, that there might be some requirement for informational quantities, as well as the various information qualities, which will then be directly involved with the observed EPR-like correlations. This requirement for information density might then represent a fundamental mechanism which

describes genetic information transfers as analogous to a series of quantum state changes, which rely on information density by type, per unit time, per unit volume. This concept is related to the idea of “quantum matter”, first proposed by H. Stapp, [15] and to the corresponding “quantum phase states” of Stapp’s “quantum matter”, as proposed by us. [16]

Perhaps in the observed genetic quantum correlations, information density can be viewed as an additive function and might be cumulative over time, resulting in the kind of memory function that is already known to be inherent in the media. The notion that the media itself acts as an active memory for information of various sorts, is supported by numerous experimental results, such as those reported by Gariaev, Kanjen, Poponin, etc.

In some situations, there may be a transport of the media, whereby the memories inherent in the media are relocated. In other circumstances, there may be an active transference of the information contained in the media, by the vehicles of photons, electromagnetic propagations, or other energetic informational conveyances. In these cases, the information contained in a given local volume may be transferred to some location remote from the origination, while the memory of the local media, which has not itself been relocated, is retained, unaltered.

All of this has been alluded to by Bohm [27] [28] [29] in his expressions regarding an “implicate order” and a “quantum potential”. The implicate order, and the quantum potential are simply information, inherent in the media. The fact that certain varieties of information can propagate superluminally under certain conditions, is not relevant to the fact of the existence of the information itself.

The standard quantum concepts of superposition, correspondence, coherence, quantum states, and so on, are all resulting from the information that is held in the media. For example, the superposition principle regards the state of a physical system as its configuration at a particular moment, residing in some combination of states which have physically different properties, such that the state of the system at a given moment is considered some proportion of the primary physical conditions which the system may occupy at any given moment.

This situation is examined in terms of the probability that the system will occupy one or another physical state, at some point in the future. Without active information already being inherent in the system, there can never be any superposition, nor can there ever be any “quantum state” in the first place, which can be “occupied” by the system. In other words, all of the information about the system is already contained inherently by the system, prior to any examination of the system by any instrumentation or observer. The quantity of different kinds of information can be quite vast, and some of these qualities might be uninstrumentable by any means presently available. The principle of superposition of quantum states is then, in fact, a secondary statistical effect resulting from the active information already inherent in the system.

Let us now consider the possibility that there is no real limitation regarding the amounts or types of information that can be contained in a given quantum system. Clearly then, there can easily exist kinds of information about which we cannot be aware, internal to the system. Thus, the quantum system may be viewed as a kind of “black box”. We can see what comes out of the box, but we don’t really know what is actually inside the box, except by our observations of what comes out of the box, and then only statistically, through numerous repetitions of similar events. There can then arise nonlinearities and unexpected deviations from the normally expected output, which could be viewed as “uncertainty”.

Actually, our uncertainty lies exclusively in our inability to know precisely everything that is contained

in the black box, in the informational sense, and to know what information is present in the various non-local information transfers which may act to influence the quantum system.

In other words, the system itself can be inordinately and unfathomably complicated in the information sense, and what we can observe is actually a secondary result of the active information inherent in the system. Quantum results are inherently incomplete, because it appears that we can never possibly have access to all the information which has been involved internal to the quantum “black box” to produce the results which come out of the quantum black box.

The results which arise from the quantum system are not due to multiple fictional “quantum worlds” comprised of infinities of possibilities, which are due to overlapping of probabilities. This way of thinking leads to a view which we can never actually observe in our everyday experience. Rather, the activities of the quantum system rely exclusively on vast quantities of diverse kinds of information, which act to determine what exactly comes out of the black box, and when. The internals of the black box may be actually directly causal, but this is beyond our ability to perceive directly, at this time.

We inhabit a very real and experientiable universe which interacts with us, and we with it. Certainly, we do not at each instant go through a process of examining infinite numbers of superpositions of infinite numbers of “possible worlds” in order to determine which quantum states have “collapsed from the wave functions”. Instead, we constantly accept whatever information is available wherever we have focused our attention, and act on that information, as required by the circumstances. The observer is perfectly dependent on the information supply available, and thus not at all separated from the universe, nor its activities, contrary to some of the current quantum themes.

Thus it seems clear that the genetic alterations experimentally observed by Gariaev, et.al., were not due to quantum correlations, but due to the information content of the media having been transferred from point A, across space, by several possible means, to point B. The information transferred contained the genetic sequences. Thus the quantum system at point B was re-organized by new information which came from point A. When we consider the genetic system as being comprised, at the deepest level, of subquantum entities which are the vehicles for the observed memory of the media, then it is easy to see how these entities can inform the larger objects comprising the genetic system, in a manner which seems to have some analogy to quantum correlations, but which is in fact due to a subquantum process.

In 1999, we suggested that quantum tunneling could occur due to a process which had the electron vanish from existence when it encountered a barrier, while the information about that electron continued along the same path the electron was already on. In other words, the electron would vanish from observable existence, at the barrier, only to reform on the other side of the barrier. What was missing from this explanation, was the mechanism whereby the electron managed to reform when the information about all the attributes of that electron had passed through the barrier. Now it is clear that the information, in the situation of tunneling events, is carried by subquantum entities of the same variety which form the electron in the first place. Thereby the electron simply reforms out of its constituent sub-particles, which easily penetrate the barrier, on the other side of the barrier, based on the information about the electron’s attributes which is carried by the sub-particles. This possibility may be investigated physically when new measurement apparatus becomes available.

It is fair to ask, how do these subquantum particles manage to capture and carry such vast quantities of information? At this time, we can offer no explanation, except to say that there are indications that the subquantum particles may be inherently multidimensional. From this, it is possible that the information about our world which is held by the subquantum particles, is somehow “enfolded” into the other and

higher dimensions that appear to be involved with the subquantum particles. We have not yet devised an experiment which can directly investigate this notion, but such experiments may become evident in the future.

It has been determined by experiment that Planck's constant, one of the foundations of quantum physics, is not a constant under all circumstances. [30] What could cause such deviations? What do these results mean to quantum theory? The idea that the Planck length should be the limit of smallness, is logically absurd, since any measurement of distance can be infinitely subdivided, into smaller and smaller parts. We expect that it will become physically evident, with the advent of new instruments, such as the subquantum microscope [31], that there may not be any limit to smallness. We also suspect that there may exist other physical constants, related to the Planck length, which will become apparent as our ability to observe the small, improves.

“Indeterminacy does not follow from quantum theory...[it is] an assumption that can in no way be subjected to experimental proof.” - Bohm, 1957

While it may be true that indeterminacy can never be proved experimentally, it can, however, be disproved experimentally. Hans Dehmelt won the Nobel Prize for a series of experiments that kept an electron frozen in place for months at a time, using a Paul trap. When the location of an object is fixed, we know its location will not change. Thus, we know that the momentum of the fixed object must be equal to its rest mass. In this case, we know that the momentum of the electron is equal to its rest mass, since its location is not subject to change. From this, we know both the position and the momentum of the object with absolute certainty, simultaneously. Dehmelt was thus able to know both the location and momentum of the trapped electron, with no uncertainty regarding both the position and momentum of the trapped electron, for spans of time as long as three months. Dehmelt's results then represent a physical refutation of the Heisenberg Uncertainty principle, as applied to an electron.[32] Later, we presented a proof that there can be no uncertainty whatsoever regarding any of the physical properties of a beam of monochromatic photons. [33] Our proof is easily demonstrated experimentally with standard optical measurement apparatus, and does not require any kind of trap to be constructed to demonstrate the validity of the assertion that monochromatic photons have no uncertainty about them, regarding any kind of optical measurement.

Since Heisenberg Uncertainty and indeterminacy have been refuted experimentally, we will examine the related principle from quantum physics called “complementarity”. “Complementarity” takes the view that any physical properties we wish to examine about a quantum system must be restricted to arbitrary “complementary pairs” of inherently imprecise concepts, such as position and momentum, wave and particle, and so on. (Why?) The principle of complementarity relies on the validity of indeterminacy. The uncertainty principle has been shown to fail physically, by Dehmelt's ability to keep an electron fixed in precisely the same location for months at a time, while performing simultaneous measurements of both the position and momentum of the electron, physically falsifying the principle of complementarity.

Dehmelt's experiments also refute two other long-held concepts of quantum theory, as expressed by Bohr. [34] Bohr's conclusion was that any observation at the quantum level, forces one to consider that the measuring apparatus, and the measured object must become “indivisibly united”. Since there was no way during Bohr's time to show the details of the process of the transference of a quanta from one system to another, it was concluded on that basis, that there was no way to precisely describe the properties and qualities of the system under observation, as distinct from any conceivable measuring apparatus. Dehmelt's results physically falsify this view, since the properties of the electron could be

exactly measured, as distinct from the measuring apparatus, for months on end.

Bohr also argued that since the quanta which are used by the measuring apparatus to accomplish measurements will interact with the object, say an electron, under observation, that the electron would be changed by interacting with the quanta used by the measuring apparatus in a way that could not be predicted, controlled, described, or even conceived of, due to the uncertainty principle and von Neumann's theorem. The usual interpretation of quantum theory then arrives at the absurd notion that the electron, or any other observable, has no properties at all until it is observed. In the first place, objects do not cease to exist, the instant we stop looking at them. Dehmelt's results falsify these arguments, physically, since the position of the electron in his experiment could be predicted, controlled, described, and conceived of, at the same time, over large spans of time.

A difficulty arises in relativistic quantum mechanics (also known as quantum electrodynamics, or QED), regarding the exchange of so-called "virtual photons". In order to describe the mutual repulsion of electrons, QED teaches that the observed repulsion is due to the exchange of "virtual photons". That is to say, that each electron, according to QED, must spontaneously and constantly, emit a continuous stream of "virtual photons". Because these "virtual particles" of light are held to contain "electromagnetic mass", they must, by Newton's Third Law, exert a recoil force on the electron which emits each virtual photon, and an impact force, in turn, on the absorbing electron. (These descriptions are supposedly the "locally generated forces" of special relativity.) Since no external agency can be brought forth to cause these energetic photonic emissions, it is well known that these "virtual" photon activities, clearly and obviously violate energy conservation.

This is considered to be permissible as long as the so-called "life" of the "virtual photon" is so short that its energy is subject to the uncertainty principle of QM. Since it has been experimentally proved by Hans Dehmelt's Nobel Prize winning experiment, and our proof regarding monochromatic photons, that uncertainty is not a valid principle under several circumstances, quantum electrodynamics appears to be on rather shaky ground, as does the concept of "virtual particles". These difficulties may be resolved by invoking subquantum particle activities as being responsible for our observations, eliminating any need to invoke "virtual particles" to explain our observations.

Interestingly, in our view a new kind of non-local unity is available in the form of faster than light transports of information by the vehicles of the subquantum particles. This kind of view explains the informational and holographic principles of the universe, as they appear to be, and the true nature of "non-locality", and thus provides a testable form of "holographic unity". Because of this, we expect a new kind of resonance will be found, which we are calling an "informational resonance", which we believe may be discovered to be relevant to many kinds of systems.

Causality is not violated by non-local information transfers. It is altered. Let us contemplate a situation where we start a race between two objects where the each object will pass through the distance of our race course and trigger a light to signal that the object has completed the race course distance. Let us give our first object some finite and arbitrary velocity. Let us give the second object an infinite velocity. Clearly, our second object will always cross the finish line the very instant we start the race, causing the light to come on in its portion of the track. Our first object, with finite velocity, will cross the finish line some arbitrary time later, causing the light to come on in its portion of the track. In both cases, the passing of the object through the distance of the course can clearly be seen to cause the light to turn on, corresponding to the fact that the object has completed the race course. The fact that one light has turned on before the other, is clearly irrelevant to the fact that both objects have crossed the finish line. Similarly, the velocity of the respective objects is irrelevant to the fact that both objects have completed the course.

To then conclude that the velocity of all objects should be limited to the slower of the two objects, would obviously be an erroneous conclusion. To qualify the finish-time of the infinite velocity object, as being due to a failure of the measurement apparatus, since there is no observable propagation delay measurable, would clearly be erroneous. The light has turned on.

Causation, however, is not violated by our infinite velocity object. The infinite velocity object simply turns on the light when it crosses the finish line. The same argument can be made for any arbitrary superluminal propagation velocity, relative to any luminal or subluminal propagation velocity. Causality is direct, in all cases, regardless of propagation velocity. The fact that there may be superluminal causation is quite irrelevant. Relativity is quite wrong in this kind of situation.

For subquantum entities, both relativity and quantum mechanics fail. Classical, relativistic, and quantum events, result from events at the subquantum level. All the forces and all the fields are the secondary results of the primary activities of the subquantum. All matter, in our view, is comprised of organizations and accretions of the subquantum particles. In hierarchical physical matter expressions, it is easy to consider that elemental particles can be formed out of sub-elemental particles, which might, in turn, be composed of yet smaller particles. We are just extending our present hierarchy towards the infinitely small. We are presently of the opinion that Life itself, and Consciousness, are involved with subquantum information systems. These ideas can be experimentally proved, with the proper instrumentation.

In its present state, quantum mechanics denies empirical observations and direct experiences as having anything to do with any distinguishable or verifiable reality. The removal of all empirical processes from quantum physics actually removes it from the ranks of a physically verifiable science, and into the realms of fantasy. As it stands, quantum theory is only capable of calculating the probability distributions of various kinds of phenomena, since it has irrationally denied, as impossible, all manner of precision. We are convinced that all the paradoxical concepts presently residing in quantum mechanics will be resolved by our continued explorations of the subquantum domains, and a return to rationality and empiricism in the sciences.

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