Probabilistic Mechanics: the hidden variable.

Richard Lawrence Norman,
Editor in chief, *Mind* magazine *Journal of Unconscious Psychology*
Scientific Advisor Thunder Energies Corporation
editor@thejournalofunconsciouspsychology.com

Jeremy Dunning-Davies,
Departments of Mathematics and Physics (retd),
University of Hull, England;
Institute for Basic Research, Palm Harbor, Florida, USA.
j.dunning-davies@hull.ac.uk

Abstract:

Information has been suppressed which appears to lead to new solutions for many problems in physics that could benefit the race of man and the Earth upon which we live. Probabilistic theories are an ingenious approach necessitated to circumvent human phenomenological constraints while reaching a correct assessment of physical system state outcomes, although offering no physical causal basis. This missing physical causality is due in large part to the absence of particular pieces of suppressed information. The suppressed information in question, is a new solution to the equations of Maxwell, that will apparently solve questions of: neutrino theory; gravitational expression and propagation speed; energy production without pollution; the hydrogen bond as acting within aqueous bio-systems; 'virtual' particulate expressions as force carriers within electromagnetic and gravitational dynamics and finally provide a clear physical explanation for quantum effects through mathematical articulation of the actual hidden variable underlying quantum theory itself: *Consciousness*.

Keywords.
Wave-particle duality; hidden variables; Bell's inequalities; scalar waves; Tesla

Introduction:
Probabilistic theory within physical science is a curious and stunning success. It is curious, as it achieves the correct answers without offering a proper causal explanation outside of probability, and we must admit with equal certainty that those same theories in question as best exemplified by Quantum Electro Dynamics, are of the highest accuracy. Quantum mechanics is plagued by paradox, as is the work of Einstein. We contend that paradox is not a proper descriptor of physical systems and is instead, indicative of incomplete or confused theory. It is the purpose of this essay to attempt to offer up the missing information and rid physical science of paradox by way of returning causality to its proper place within physical theory. The hidden variable we will suggest accounts for nonlocal aspects demonstrated within experiments, identifies rightly the true object incorrectly believed to be the neutrino particle with immediate practical implications for energy production and places an actual piece of physics beneath quantum theory. That piece of physics is a longitudinal wave which is itself: consciousness.

We will present new theory to fit the missing and suppressed science into place as is necessary, considering that no theory presently exists to account for the bulk of this new information.

It should be noted that much accepted physical theory is based on false paradox, and often the theory and those attendant reputations of the scientists involved are propped up with false experiments such as the plethora of false experiments designed to support the idea of the speed of gravitational propagation being equal to the speed of light.

See: Big data analysis of Livingston and Hanford logfiles for LIGO project 2010-2016. Demetris T. Christopoulos
https://www.researchgate.net/publication/301593709

The false science and its attendant paradox may be corrected as follows.

Duality, Paradox and Physics:
Duality and paradox have no place within physics. Many errors stem from a single mistake: that of an erroneous confusion between abstract and concrete objects.

Wave or particle? [see reference list one for this section]

Much of the more modern work carried out in addressing the meaning of wave/particle duality has been by Lazar Mayants and this is worth considering in some detail. It probably goes back at least to the appearance of his first book, *The Enigma of Probability and Physics*[1], continues through a number of publications, with one of 1989[2] being of particular relevance here, and culminates in the lucid overall discussion in his second book *Beyond the Quantum Paradox*[3]. To start, it seems worth considering in some detail some of the material contained in Mayants 1989 article cited under reference 2. Here he examines, for example, the phenomenon of particle diffraction but first examines straightforward diffraction which is known to occur when a series of waves of the same frequency encounters obstacles. The resulting diffraction pattern is determined by the geometry associated with the total system involved, together with the wave-length of the wave involved. For a real physical wave process, the detail will be determined eventually by the wave equation and the relevant boundary conditions. The relevant wave equation has the form:

$$\nabla^2\varphi = \left(1/v_p^2\right)\partial^2\varphi/\partial t^2, \qquad \text{(a)}$$

where v_p is the phase velocity of the waves and φ is a quantity whose magnitude squared determines the diffraction pattern.

However, what is the actual position concerning particle diffraction? If the conventional belief that individual particles possess inherent wave properties is true then any such particle should have some property, akin to φ, obeying the above wave equation. If such a property does exist then the diffraction pattern should remain unaltered, regardless of the intensity of the beam, but gradually weakening as the beam does. However, experimentation does not support this. If only a few particles are used, no continuous diffraction pattern appears; a few points on the display are all that do appear. In the case where a large number of particles is used, the picture seems to be a normal diffraction pattern but, in reality, it isn't; it simply consists of a very large number of points which appear to merge together to produce a familiar diffraction pattern seemingly. One might say that the perceived result is essentially a statistical one in the sense that a very large number of particles is involved and such numbers may only be treated effectively by statistical considerations. These remarks have been

phrased to refer to particles – any particles – and, therefore, would refer to photons if photons are considered as particles.

In an actual particle diffraction experiment, a beam of *concrete* particles (to use Mayants terminology) is concerned and the experimenter considers the experimental statistical distribution of the coordinates of these diffracted *concrete* particles. However, in the theoretical situation, attention turns to the relevant probability distribution of the coordinates of what are, in effect, corresponding *abstract* diffracted particles. It is this rather subtle distinction between the *concrete* particles of the experimenter and the corresponding *abstract* particles of the theoretician which lies at the very heart of Mayants argument. This seemingly obvious distinction between abstract and concrete objects is an error hiding in plain sight. To see the distinction with clarity, allows the removal of many apparent paradoxical contradictions. As Mayants says[3], "It is these two principle features of abstract objects—the nonexistence in reality and the lack of definite values of many properties—which differentiate them from the corresponding concrete objects." "Which comes first, the chicken or the egg" refers to an abstract chicken and an abstract egg. The question being based on an abstract object can not be answered, but that is not important, as the abstract object "the chicken" does not have particular properties or exist, rendering the question improper and trivial. Each real particular such bird exists in no temporal paradox but comes after the egg in which it was gestated, and before any egg it may itself produce. In like fashion, the subject of "a cat" in Schrodinger's paradoxical experiment, which it must be remembered was outlined in the original case to point up quantum theoretic inconsistencies at macro scale is again, an abstract cat, in this case symbolizing an indeterminate probability distribution, which is itself again, an abstraction with undefined qualities. The resultant paradox, simply does not exist. Probability theory works, and an abstract set adequate to a concrete set gives good results in calculations, but in no case are abstract and concrete objects alike. Paradox itself is not paradox, but misunderstanding. *The world is made of concrete objects.* It is this which the theory in its end *result* must describe, and does.

As has been described in detail elsewhere[2], it follows that the probability distributions of physical quantities for an abstract physical system, which conform to real motion of the corresponding concrete physical system, are determined by the solutions to the Schrödinger equation

$$E\psi = H\psi.$$

For a free real particle, the Hamiltonian is given by

$$H = c(p^2 + m_0^2c^2)^{1/2},$$

where, as usual, m_0 is rest mass and p is momentum. c is the speed of light in a vacuum. However, the operators for particle momenta are $p_\alpha = -i\hbar\,\partial/\partial\alpha$ and $E = i\hbar\,\partial/\partial t$ Then the Schrödinger equation takes the form

$$c(-\hbar^2\nabla^2 + m_0^2c^2)^{1/2}\psi = i\hbar\partial\psi/\partial t$$

which leads to

$$\hbar^2c^2\nabla^2\psi = m_0^2c^4\psi + \hbar^2. \qquad \text{(b)}$$

However, diffraction refers to a stationary state of the particle, determined by a specific value E of the energy which corresponds to a definite value of the momentum p and these are linked via

$$p^2 = (E^2 - m_0^2c^4)/c^2.$$

It follows that

$$\hbar^2\,\partial^2\psi/\partial t^2 = -E^2\psi \text{ and } \psi = -E^{-2}\hbar^2\,\partial^2\psi/\partial t^2.$$

Substituting in the first term of the right-hand side of (b) above gives

$$\nabla^2\psi = c^{-2}(1 - m_0^2c^4/E^2)\,\partial^2\psi/\partial t^2.$$

By putting $(E^2 - m_0^2c^4)/c^2E^2 \equiv 1/v_p^2$ in this equation leads to

$$\nabla^2\psi = \left(1/v_p^2\right)\partial^2\psi/\partial t^2,$$

that is, the well-known wave equation (a) with $v_p = E/p$.

At the very least, this would seem to indicate that particle diffraction is not a wave process but is, rather, linked with to the probability distribution of particles in a stationary state with corresponding with well-defined values of both energy and momentum for the particles. Again, it does suggest that the whole notion of wave particle duality should be re-examined with truly open minds. The above outlined theory is due, as stated previously, to Mayants – particularly in his cited article of 1989 - but is work which seems to have been forgotten by much of the scientific community and is certainly deserving of more public acknowledgement.

The Speed of Light.

What is really meant when people speak of the speed of light? What is meant when reference is made to the constancy of the speed of light? Popular talking about issues linked to the speed of light have probably increased since the popularisation of Einstein's theories of relativity. It is a popular misconception that Einstein's theory claims the speed of light to be a constant and that the theory leads to an ultimate speed for everything

which is this constant speed of light. This, however, is only an incorrect public misconception.

It is important to remember that Einstein assumed the speed of light *in a vacuum* to be constant. Also, in several subsequent mathematical manipulations, the factor

$$(1 - v^2/c^2)^{-1/2}$$

appears, with *v* being the speed of the object under consideration and *c* the speed of light but, as emphasised above, the speed of light in a vacuum. It must always be remembered, though, that Einstein's theory was,,and is, just that – a theory. Like any theory it will only hold when the assumptions made in constructing it hold; if any one of those assumptions ceases to be valid, it cannot be assumed the theory continues to be valid. This is, of course, true of any theory.

These points are important to remember since it is known, and has been known for a long time, that the speed of light is *not* constant; it certainly varies for light passing through different media. The speed of light passing through a medium of refractive index *n*, is *c/n*, where *c* is the speed of light in a vacuum. Hence, for light passing through a medium, such as water, which possesses a refractive index greater than unity, the speed of light will be substantially less than the value in a vacuum. Therefore, the ration v^2/c^2 in the factor mentioned above will be less than unity and so, no mathematical problems are encountered with this factor. However, there are media which appear to possess refractive indices less than unity and, in such cases, light will propagate at speeds in excess of the speed in a vacuum. This, in turn, raises questions about the above relativistic factor since if *v* is greater than *c* in this expression, mathematical problems do arise due to the appearance of a negative quantity whose square root is required.

What must be remembered here is that, as Santilli has explained[4], special relativity was constructed to describe the propagation of light in a vacuum but not within physical media. Many of the results of special relativity have been validated on numerous occasions for point particles or electromagnetic waves moving in a vacuum but the theory is inapplicable for the movement of such in physical media because the speed of light is really a local variable dependent on the properties of the medium through which it is passing.

As with all physical theories, it is important to realise that they are just theories and, as such, are based on certain very definite assumptions. If any theory is applied in a situation where one or more of those basic assumptions is invalid, that theory cannot reasonably be expected to produce a satisfactory explanation of that situation. Note that this does not mean the theory is incorrect, it merely points out that there are definite limits to its range of validity.

Axiomatic implications: Uncertainty, EPR, Popper, Bell and gravitation.

Uncertainty, as an inherent systemic property and the quantum uncertainty principle we attribute to Heisenberg, as well as the closely related wave/particle duality have been the target of much enquiry and by no means stand on certain and irrefutable ground, nor should they. The Einstein-Podolsky-Rosen (EPR) paradox, is in no way paradoxical. In fact, it reveals the uncertainty relation itself to be "paradoxical." Indeed, this simple thought experiment involving two particles moving along the same linear path in the same direction at the same speed, maintaining, therefore, fixed relative distance, does allow the precise simultaneous determination of both position and momentum of either particle. The thought experiment refers to concrete particles and has a non-paradoxical outcome, where the uncertainty principle refers to quantum probabilistic calculations upon abstract objects, yielding a "paradox" when mistakenly applied directly to the particular 'concrete' world.

Mayants is not the first to advance some of these ideas, which can be seen in the work of Popper in slightly different language[5]. The factual order of historical development points to an initial particle view of electromagnetism, with the field then added later as a secondary mathematical abstraction, which subsequently had the particle, the photon, emerge secondary to the field as an excitation[3]. Indeed, it appears we see the same confusion yet again, and perhaps it may be fruitful to restore the proper genesis of theory and realities, place the photon at the base of its collective wave propagation, and understand it is the source of any emergent field effects.

In reference 5 it is stated that:

"Max Born himself says about his statistical interpretation of wave

> mechanics: "The solution . . . was suggested by a remark of Einstein's about the connection between the wave theory of light and the photon hypothesis. The intensity [of course, what is meant is the square of the amplitude] of the light waves was to be a measure of the density of the photons or, more precisely, of the probability of photons being present."
>
> "Thus, through Born's statistical interpretation of matter waves even the one problem of quantum theory which appeared not to be statistical - the problem of atomic stability - was reduced to, or replaced by, a statistical problem: Bohr's quantized "preferred orbits" turned out to be those for which the *probability* of an electron's being found on them differed from zero."
>
> "All this is to support my thesis that the *problems of the new quantum theory were essentially of a statistical or probabilistic character*."

However, Popper also draws this unusual, apparently contrary conclusion which will fit into place later:

> "Thus the relativity to specification of which we have spoken is characteristic neither of quantum experiments nor even of statistical experiments: it is a permanent feature of all experimentation. (And a propensity relation might be regarded, and intuitively understood, as a generalization of a "causal" relation, however we may interpret "causality".) For this reason it seems to me mistaken to regard statistical laws, statistical distributions, and other statistical entities, as non-physical or unreal. Probability fields are physical, even though they depend on, or are relative to, specified experimental conditions."

In order to make sense of the above statement, it may be beneficial to take an elliptical pathway and consider the consequences of these insights as applied to one of the basic tenets supporting the current predominant quantum viewpoint: the Bell inequalities. Mayants' commonsense analysis will have come as an unwelcome surprise to some. However, any facts unearthed in a cogent analysis such as his must be accepted and it must be seen where they lead. It may be noted that Bell's inequalities suffer from the

same logical error as the other 'paradoxical' constructs considered above: an erroneous substitution of abstract for concrete elements. Bell's inequalities are based on Bell's theorem, which is itself a derivative of Bohm's paradox, and Bohm's paradox confuses abstract quantum elements and concrete objects. It is argued[3], that the basic experiments upon which Bell's inequalities are based can apply only to large numbers of particle pairs and must represent a statistical expression, and so, it is therefore entirely *expected* that Bell's inequalities do not conform to experiments involving the real concrete system in question, as Bell's inequalities confuse abstract and concrete elements to assume simultaneous rotation amongst various axes in the case of *one individual particle*, which is physically impossible. Quantum physics in this light may be rightly seen as representing real non-paradoxical outcomes and Bell's inequalities are thereby revealed as flawed at their axiomatic basis, hence the apparent but nonexistent paradox.

From this new vantage point Mayants[3] informs us of the *ordinary view* of the consequences implied which place Bell's ideas and nonlocal faster than light effects on one side of the scales, and on the opposing side of the balance we find realism and the common, if incorrect, assumption that *nothing moves faster than c*. Recall that Einstein's limit of *c* refers to propagation through a vacuum. Does Einstein's *c* hold good as a matter of consequence to defeat nonlocal theory, if Bell's ideas are not correct? What of nonlocality? What of light? Do physical processes move faster than light in a nonlocal way and, if so, which ones?

In Tom Van Flandern's essay[6], *The Speed of Gravity what the Experiments Say*, a solid and specific empirical answer is provided:

> "The most amazing thing I was taught as a graduate student of celestial mechanics at Yale in the 1960s was that all gravitational interactions between bodies in all dynamical systems had to be taken as instantaneous.
>
> . . . Yet, anyone with a computer and orbit computation or numerical integration software can verify the consequences of introducing a delay into gravitational interactions. The effect on computed orbits is usually disastrous because conservation of angular momentum is destroyed.

> . . . While relativists have always been partial to the curved space-time explanation of gravity, it is not an essential feature of GR. Eddington (1920, p. 109) was already aware of the mostly equivalent "refracting medium" explanation for GR features, which retains Euclidean space and time in the same mathematical formalism. In essence, the bending of light, gravitational redshift, Mercury perihelion advance, and radar time delay can all be consequences of electromagnetic wave motion through an underlying refracting medium that is made denser in proportion to the nearness of a source of gravity. (Van Flandern, 1993, pp. 62-67 and Van Flandern, 1994) . . . The principal objection to this conceptually simpler refraction interpretation of GR is that a faster-than-light propagation speed for gravity itself is required. In the context of this paper, that cannot be considered as a fatal objection.
>
> . . . We conclude that the speed of gravity may provide the new insight physics has been awaiting to lead the way to unification of the fundamental forces. . . . Moreover, the modest switch from SR to LR [Lorentzian Relativity] may correct the "wrong turn" physics must have made to get into the dilemma presented by quantum mechanics, that there appears to be no "deep reality" to the world around us. Quantum phenomena that violate the locality criterion may now be welcomed into conventional physics."

Gravity appears to propagate at extreme super-luminal velocities[6]. It may safely be concluded that the logical inconsistencies of Bell's theorem and inequalities do not in fact preclude non-locality in its super-luminal aspects. Mayants also comes to the conclusion that photons can vary from *c*, and names fundamental sub *c* non-zero rest mass expressions of EM: emons.

Next recall the famous wave function collapse of the double-slit experiment. A photonic interference pattern 'collapses' if measured to become something more closely akin to a single particle. This is traditionally ascribed to the effect of "measurement/observation." What can be made of this paradoxical anomaly where the observer affects the observed to induce wave function collapse and perhaps even 'create reality'?

Measurement or observation are not the bottom of the process; they are but second order descriptions. Wheeler was highly insightful to posit

information at the very deepest level of physical reality. Observation and measurement in terms of a primary informational dynamism then represent: *Informational Exchange*. Information affects physical form. Indeed this is true also in biology, not surprisingly, as biology and its relation to chemistry are founded on a primary physical basis with information at the deepest level[7]. The paradox appears as such, only because the primary role of information and its exchange, which clearly affect form/outcome, has not been understood. Now, it may be seen that there is no wave function collapse in the usual sense; the interference pattern is a complete outcome formed of photons, and the 'collapsed' expression is again a different complete outcome formed of photons, both being not in any way uncertain or indeterminate, the differentiation between them being a product of informational exchange which is the dynamic at the bottom of both observation and measurement.

To place this in a human perspective, and suggest a few alterations to the Copenhagen interpretation and some of the more radical theoretical anomalies which have gained predominant sway, such as the deeply troubling many worlds hypothesis, or the equally vexing solipsistic implications of observation, ideas so strange as to have one wonder if an electron is there or perhaps the moon if we are not looking, and place all this into proper relation to probability, attention might turn to some of the more puzzling experiments which are now mounting up and deserve to be addressed.

In these experiments, double-slit interference patterns are seen to change due to thought, and random number and event generators which are properly shielded become more organized in their output. These effects are created at close range, and at *very great distances*[8-13]. Is this inexplicable paranormal activity, or perhaps the cognitive result of resolved uncertainty affecting photonic wave expression? Theory allows an answer: No! This is simply the physics of informational exchange.

In the case of gravitation and also of thought as it affects reality it appears that some nonlocal aspect is needed to explain the effects we observe. Recall the unlikely assertion by Popper that appears quite clearly to confuse abstract and concrete elements, which states that probability fields must be attributed reality. He had observed experimental effects which required explanation, a real physical explanation was demanded to account for

observed phenomenon, hence his supposition. It might reasonably be posited that probability is not at the root of physical form but that information is. Hence it might be hypothesized that the field in question is not a probability field, but a non-probabilistic informational field: *the 'bit field.'*

Imagine a simple example of probability: one reaches one's hand into a concealed container to extract a ball or game chip with some particular marking common to a sub-set of the total objects in the container. Probability is used to make a prediction, but in fact the hand does not extract the chip or ball by way of probability, each concrete case is that of selecting one particular concrete object, probability is invoked only to allow prediction under uncertain conditions of human observational constraint, and hence reflects a limit in our available knowledge, not the basic dynamic of the system which is not probabilistic but, rather, specific. It has been clearly understood and articulated in previous articles[14] that the nature of human perception is by phenomenological necessity and anatomical analysis understood to be entirely probabilistic. Probability is a valuable and necessary consequence of our human limits. It is a second order method and not a descriptor of underlying processes, but instead an admission of our human limits in defining those processes. A wave function is a necessary abstraction.

With this in mind, the many seemingly paradoxical aspects of quantum theory under the current interpretation may now be reassessed:

There are no many worlds, as the wave function is a probability distribution, an abstract thing which does not require its unrealized aspects be accounted for in some imaginary other world, for all outcomes are complete in and of themselves. There is no uncertainty or wave/particle duality endemic to physical dynamism, those are aspects not of the system at its lowest level of operation, but reflect our human limits which are revealed in attempting to ascertain the same. Uncertainty is the product and province of human cognition and phenomenology, not external reality. Human mental effects upon physical reality including observation/informational-exchange entirely within the sphere of mentation are revealed in experiments referenced above to yield a very slight but demonstrable impact on physical systems. It appears that there is an experimentally demonstrable and specific place for human consciousness in

quantum theory, but not the solipsistic one supposed. It may rightly be concluded that human observation in no case creates an electron to observe it, any more than human observation itself might create the moon. The appearance of probability alteration in experiments with human mentation indicates specific informational exchange over some actual medium, perhaps one such as the proposed 'bit field.' It may be concluded that

The wave function itself represents an abstract probability distribution, signifying the ***possible effects*** *of a potential REAL alteration in systemic informational allocation.*

The fact that subatomic particles demonstrate some fuzziness and do not behave as virtual little golf balls but in a way more akin to a wave packet, is then not due to the fact that the particle is somehow wave-like or uncertain, but because it is a process, a *specific* process which is informationally interactive, as are the larger emergent structures which they compose en masse.

Future questions:

1. Is the implied connection between gravitation, informational exchange and refraction testable in quantum experiments? Clearly alteration in refractive index can account for faster than *c* propagation speeds for light. If informational exchange over a 'bit field' accounts for the super-luminal aspects of gravity, and gravitation can be accounted for in its effects upon light by way of alterations in the refractive index as suggested above[6], then an experiment could be derived where the hypothesis is tested. Hypothetically: *Micro-gravitational effects created through interactive informational exchange alter refractive conditions yielding specific patterned allocations within the experiment thereby determining the outcome*. Can these theoretical postulations be tested?

2. Is probability at the basis of physical reality or is non-probabilistic information? Does the uncertainty relation signify an endemic systemic aspect, or a human phenomenological limit in epistemology?

3. Is there a realistic interpretation of quantum theory which allows for the unification of gravitation in an informational model based around the empirical necessity of other than "*c"* electromagnetic propagation speeds

and experimentally observed nonlocal aspects? Can a quantum model be derived without uncertainty or duality by way of accepting a central tenant of 'informational gravitation'?

4. Is paradox endemic to reality, or is it simply a misunderstanding based on improper assumptions which confuse abstract and real elements?

5. Is it possible to create sound physics based on a constant vacuum propagation value for *c* ? Does Lorentzian relativity (which admits the existence of an aether) offer an alternative?

6. Is the 'bit field' real? If so...*what is it*?

7. Can clear and evident effects of informationally encoded photons on morpho-functional outcomes in biological systems[7] be taken as a correct model for a system-wide common informational basis in physics? If so, how does water hold information? How do H bonds fit in?

8. Does information theory offer us the elusive prize and connect together gravitational effects with quantum theory by placing informational gravitation as a quantum basis?

9. It appears that the 'bit field' (previously aka the temporal field) *mediates specific entangled and relational properties and strength* such as that between a mind and an object or *between gravitationally interactive bodies*, and recent experiments and theories have concluded entangled evolution to be the source of time. Then, could the 'bit field' provide a specific mechanism for temporal/gravitational effects such as gravitational time dilation and others?

[See reference list one for previous section]

Now that we have attended notions of gravitation and light as related to paradox and duality, we may turn to neutrino theory and that of the hadronic structure of the neutron, and see what insight may be gained to examine plainly experiments and science which have been wrongly suppressed.

[See reference list two for this section below]

Within the freely available early works of Tesla [Martin (1995 p. 148, 275 and others)] it is clearly mentioned that the surrounding energy density, or aether as it was known, is in a bound state around mass and in an unbound state away from mass and in both cases it is to be treated as an incompressible fluid. This implies aether as a bound, therefore moving, medium around massive objects, meaning the medium moves with the object and could not possibly demonstrate the stationary characteristics of reference needed to ascertain absolute motion, behaving just as the Michelson-Morley experiment found. Those Michelson-Morley experimental results then, do not contradict the presence of aether. It seems the basic theory was not rightly considered in interpretation of the experimental results.

Thornhill (1984) may be followed and the error corrected by reintroducing the medium (aether) to the physics and specifying the correct Total Time Derivative to then be used in calculations specifying the medium's system dynamics as *bound to mass*, and so implying a return to a partial time derivative in the medium's unbound stationary state.

From Thornhill (1984), it is seen that

For general unsteady motion of a gas in three space- variables x_i, (i = 1, 2, 3) when the fluid velocity components are denoted by u_i, the governing equations may be written, again using the summation convention,

(Mass) $$\frac{Dv}{Dt} - \frac{v\partial u_i}{\partial x_i} = -Av^2$$

(Momentum) $$\frac{Du_i}{Dt} + \frac{v\partial p}{\partial x_i} = B_i v$$

(Energy) $$\frac{DS}{Dt} = v(H - Apv)/T$$

Here p denotes, pressure, v specific volume, S specific entropy, T absolute temperature and the total time-derivative, moving with the fluid, is given by

$$\frac{D}{Dt} = \frac{\partial}{\partial t} + u_i \partial/\partial x_i \qquad \text{(c)}$$

In the assembly of Maxwell's equations, the time-derivatives which occur in Ampère's rule and in the laws of induction have invariably been interpreted as the partial derivative $\partial/\partial t$. This is not acceptable in the concept of a gas-like ethereal medium, where the ethereal velocity may vary from point to point and with time, and the Newtonian frame of reference may be chosen so that its origin moves at any constant speed, independent of the ethereal motion. To satisfy the requirements of a gas-like ether unambiguously, the time-derivative in Ampère's rule and the laws of induction can only be interpreted as the total time-derivative moving with the ethereal flow, namely D/Dt, as defined in Eq. (c) above.

Note that the above referenced work (Thornhill, 1984) brings forward not only the information concerning the total time derivative but also the important fact that oscillations within the medium form longitudinal condensations along a transverse wave front. These ideas are brought out best by studying the original paper in detail but, basically, Thornhill points out that, in a gas-like aether, the duality between the oscillating electric and magnetic fields, which are transverse to the direction of propagation of electromagnetic waves, becomes a triality with the longitudinal oscillations of motion of the aether, if electric field, magnetic field and motion are coexistent and mutually perpendicular. He points out that, therefore, it must be shown that, if electromagnetic waves comprise also longitudinal condensational oscillations of a gas-like aether, analogous to sound waves in a material gas, then all three aspects of such waves must propagate together along identical wave fronts. To this end, the full characteristic hyperconoids must be derived for the equations governing the motion and the electric and magnetic field-strengths in a gas-like aether in three space variables and time. All that is required is achieved in the cited article.

Also, the reader should note that in adjusting the total time derivative to account for a *bound* condition, where the medium moves with associated mass, a physical basis for charge itself follows, as the aether/energy density is itself bound to the matter with which it is associated. Charge may now be given a sensible physical basis as mobile aethereal expressions bound to molecular motion as a moving medium.

This correction and specification then allows for the correction of a piece of vital physics, *presented within CIA released documents as closely associated with Tesla*, that has finally been revealed, although with flaws,

from behind the cloak of state secrecy: a new solution to the equations of Maxwell allowing the representation and derivation of scalar wave phenomenon. Referring to the relevant equations in the released CIA document "CIA-RDP96-00792R000500240001-6", https://www.cia.gov/library/readingroom/docs/CIA-RDP96-00792R000500240001-6.pdf,
it follows that with

$$\bar{E} = -\nabla\phi - \frac{1}{c}\frac{D\bar{A}}{Dt} \text{ and } \bar{B} = \nabla \times \bar{A},$$

where ϕ is the scalar (electric) potential and $\bar{A}$ is the vector (magnetic) potential.
The modified Maxwell equations, which have been derived from first principles (Dunning-Davies, 2002) in an article which also clarifies the position of the dynamo mechanism for providing an explanation for the origin of planetary magnetic fields, then predict

$$\nabla^2\phi - \frac{1}{c^2}\frac{D^2\phi}{Dt^2} = 0$$

and

$$\nabla^2\bar{A} - \frac{1}{c^2}\frac{D^2\bar{A}}{Dt^2} = 0$$

As pointed out in the quoted article, a solution appears to exist for the case when $\bar{E} = 0$, $\bar{B} = 0$ and $\nabla \times \bar{A} = 0$ for a new wave satisfying

$$\bar{A} = \nabla S \text{ and } \phi = -\frac{1}{c}\frac{DS}{Dt},$$

with *S* then satisfying

$$\nabla^2 S - \frac{1}{c^2}\frac{D^2 S}{Dt^2} = 0.$$

These modified equations still assert that *S* is a potential with a wave equation – albeit a progressive wave equation – mathematically, which suggests the propagation of this wave even though $\bar{E} = \bar{B} = 0$ and the Poynting theorem implies no electromagnetic power flow. Note that, for convenience, the same notation for vectors has been adopted here as is used in the original quoted article.

To understand the Poynting Vortex hypothesis it is entirely *necessary to grasp the paper*, Norman, Dunning-Davies (2017) Hadronic paradigm reassessed: neutroid and neutron synthesis from an arc of current in Hydrogen gas, *Hadronic Journal*. 40; 119 - 148.

https://www.researchgate.net/publication/317267278_Hadronic_paradigm_reassessed_neutroid_and_neutron_synthesis_from_an_arc_of_current_in_Hydrogen_gas

Within those few, important pages, we see rigorous empirical demonstration and analysis revealing the neutroid, an intermediate spin zero state, becoming a neutron with the addition of 0.78 MeV of energy, derived as a longitudinal impulse from the energy density itself: from the aether. There was insufficient energy to produce neutrons in experiments from Sternglass, Borghi, Santilli, and Trounson which demonstrated (delayed) neutron detections, indicative of preliminary neutroid synthesis, an intermediate spin zero state.

To condense from the reference above, with additional analysis, it follows that,
To synthesize neutrons in nuclear transmutation within neutron detector materials 0.78 MeV is induced as pieces of longitudinal impulse seen to scatter in experiments, not neutrinos. This is why no neutrino has ever been directly observed; only *associated effects* from gamma ray production involving electron positron annihilation and also gamma ray production stemming from cadmium neutron interactivity, allowing signature-specific timing differentiation between two *supposedly neutrino induced* gamma sources has been observed.

Logical inconsistencies in existing neutrino theory.

As is well known Fermi suggested that neutron synthesis proceeds by way of emission of a neutrino, or absorption of an antineutrino:

$$p^+ + e^- \rightarrow n + v,$$

or

$$p^+ + e^- + \bar{v} \rightarrow n.$$

However, logically this cannot be the case.
Note here that

$$E_p = 938.272 \text{ MeV}, \quad E_e = 0.511 \text{ MeV}, \quad E_n = 939.565 \text{ MeV},$$

$$E_n - (E_p + E_e) = 0.782 \text{ MeV} > 0,$$

clearly indicating the rest energy of the neutron is 0.782 MeV larger than the combined rest energies of the proton and electron, requiring a "positive binding energy" and "mass excess" both of which are strictly *counter indicated* by quantum mechanics.

1. Recall the necessity for a positive binding energy to account for the 0.782 rest energy difference between the neutron and its experimentally demonstrated constituents, the electron and proton. Note that positive binding energies are NOT accounted for within the Schrödinger equation's proper quantum application, which does not admit positive binding energies for a bound state such as the electron being bound within the hyper-dense medium of the proton.

2. Although a positive binding energy is indicated by experiments, the antineutrino is ascribed negative energy in classical antimatter theory, and so, cannot account for the empirical facts.

3. The antineutrino cross section for proton and electron interactions is null, again insuring demonstrated effects are not accounted for.

4. Paradoxical results seem to indicate neutrino scattering effects implying some "particle" mass, yet no particle is detected. Such "particle scattering" sans particle implies another solution: a longitudinal impulse moving through a substantial surrounding energy density interacting with targets: *the Aetherino* (symbolized as: "*a"*) (Santilli, 2007).

The Aetherino carries mass and charge zero, spin 1/2 and 0.78 energy according to the synthesis $p^{+} + a + e^{-} \rightarrow n.$

Next the neutroid must be briefly understood. See (Norman, Dunning-Davies 2017).

Don Borghi and his scientific associates coined the name "neutroid" (symbolized here as $\tilde{n}$), where the neutroid was proposed as an intermediate particle mutation preceding synthesis of actual neutrons. Neutroids have also been experimentally created by Santilli, where he defines the proposed neutroid as a (spin zero) particle having the values (in standard nuclear

units: A = total number of nucleons; Z = number of protons; (N = number of neutrons); J the total angular momentum; with *amu.* = mass),

$$A = 1, Z = 0, J = 0, \text{m} = 1.008amu.$$

Santilli then writes:

$$p^{+}\uparrow + e^{-}\downarrow \rightarrow \tilde{n}(1, 0, 0, 1.008)$$

where $J = 0$ avoids a spin anomaly in the synthesis (Burande, 2016).

Observed scattering effects are rightly ascribed to longitudinal impulses denoted as aetherinos within the theory of Santilli (2007), not to inferred unobservable neutrino particles that are in fact, as we will see, pieces of *directed* scalar wave. *Directed*, meaning a (scalar) wave should be *without* directionality of energetic transfer [direction and intensity (flux density)] in the usual sense, as it lacks a Poynting vector. Such directionality then has been dynamically induced. We may simply apply the same mechanism demonstrated within Nature as she derives energy from the surrounding energy density to satisfy physical conditions, and empirically derive the same dynamic, and extract power thus.

The *Li*-activated detectors in Santilli's experiment function as mediators of aetherino and neutroid interactivity yielding neutrons by:

$$Li(3,7,3/2) + \tilde{n}(0, 1, 0) + a(0, 0, ½)$$

$$\rightarrow Li(3, 8, 2)$$

$$\rightarrow 2\ \text{He}(2, 4, 0) + 2\ \gamma(0, 0, 1)$$

It appears clear that the neutroid within the lithium atom above constitutes a vortex through which an energetic quantum of 0.78 MeV and spin 1/2 (aetherino) (Santilli, 2007) is induced to achieve nuclear transmutation.

Now it is possible to offer a hypothesis based on copious experimental evidence concerning neutron synthesis and working theory (Norman, Dunning Davies, 2017).

The genius of Tesla has been suppressed and concealed. That vision however, was articulated countless times, even if its specifics have been withheld to the profound detriment of mankind. Here it is seen within the experiments of Santilli and others, *energy extracted from the energy density itself,* and mass created: energy inducement and mass creation (Santilli, 2007, 2016/2017, 2017*a*; Norman et al. 2017; Norman, Dunning-Davies, 2017). The power of the energy density might be harvested as Nature herself does so clearly demonstrate.

In early lectures Tesla states (Martin, 1995):

p. 196. "But there is a possibility of obtaining energy not only in the form of light, but motive power, and energy of any other form, in some more direct way from the medium. The time will be when this will be accomplished, and the time has come when one may utter such words before an enlightened audience without being considered a visionary."

p. 235. [in the future] "We shall have no need to *transmit* power at all. . . . our machinery will be driven by a power obtainable at any point in the universe."

p. 197. Then, with the light obtained from the medium, with the power derived from it, with every form of energy obtained without effort, from the store forever inexhaustible, humanity will advance with giant strides."

A brief schematic of direct energy extraction and matter creation via induced scalar process: the Poynting vortex.

1. Insufficient arc energy to create neutrons in Santilli's and other experiments demonstrate **neutroid to neutron transformation and necessary addition of 0.78 MeV energy, likely in the form of longitudinal impulse (aetherino) (Santilli, 2007), a piece of directionalized, induced scalar wave**.

2. Scalar waves lack a Poynting vector, so the mechanism of induction may be deduced: "The vibrational qualities of a neutroid within substance specific nuclear transmutation create condensational oscillations that function as a "Poynting Vortex" [as a Poynting vector but delineated by a

receptive vortical surface] so as to receive/induce longitudinal impulses at 0.78 MeV, a directionally induced scalar of that quantum."

3. The schematic basis mechanism of matter and energy extraction may now be deduced as follows:

If VVP is *Vortical Voltage Potential*: The amount of work required to induce a given directed scalar quantum of MeV over infinite distance to a given Poynting vortex,

If *Swp* is the *Scalar wave potential* of a given system state of aether. *Swp* defines system conditions to perform the work [VVP] necessary to induce a directed scalar wave of a given quantum from the surrounding aether,

If *Ae* is Aether, *Pv* is Poynting vortex, S is Scalar wave,
then

$$Pv = [Swp(Ae)—S—> E —> M]$$

It is important to note that it is, of course, entirely possible that *energy* may best be derived using the *matter* specification below, while draining off the arriving energy from the vortical surface.

Energy extraction via the Poynting vortex is derived from aethereal vibrational oscillatory condensations of the neutroid and may be represented schematically by

$$[Swp(Ae)—>S—>E]$$

Implication:

Energy may be derived at a quantum of 0.78 MeV to create artificially the resonant oscillatory condensations of a neutroid, then functioning as a Poynting vortex to induce a directionalized scalar wave of that quantum toward that vortical receptive surface.

Matter creation Poynting vortex derived from associative aethereal refractive patterning, vibrational oscillatory condensations of the neutroid within *Li* atom (matter must reflect neutroid *within* mass/vibratory relations of the *Li* atom (*Li* is most simple to model), meaning its gravitational/EM refractive matrix. Ergo, add gravitational refractive matrix (bound aethereal condensations) defining an object to energy for matter creation of said object.)

[*Swp*(*Ae*)—>S—>*E*—>*M*]

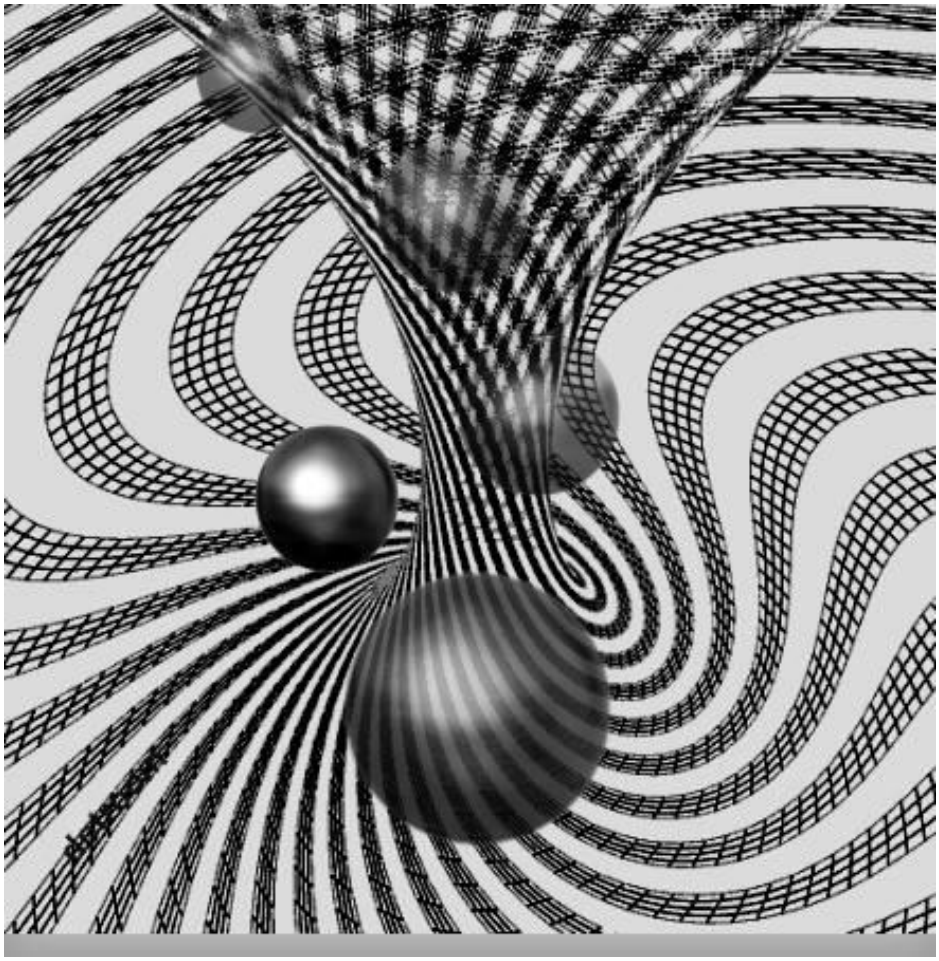
The implication is that the refractive qualities (gravitational and EM relations within the medium) defining an object, such as the necessity of the neutroid nested in a *Li* atom, along with induced added scalar energy sufficient to account for transmutation, create matter (neutron).
Gravitational/EM refractive signature defining object + energy = object.

A few comments may be made concerning the above theorizing,

It is believed that the longitudinal condensations within electromagnetic transverse oscillations provide directionality to induce scalar processes.

Hence the speculation that the vortex created appears to be an informational allocation indicative of systemic dis-equilibrium, indicating the requirement for energetic transfer of 0.78MeV as a directed/induced scalar to create the neutron, and restore overall systemic equilibrium and stability within the atomic structure. The vortex then, projects "dis-equilibrium information" and so, could possibly have an "informational value" (meaning the condensational wave form associated with positron) of 0.78MeV, deriving 0.78MeV as inductive (charge reversed) compensation.

The idea of Vortical Voltage Potential is related to electrical potential but pertaining to the work ascribed to *induce* a scalar wave, and as an inverse concerning charge.



Artist's conceptualization of particulate and energy creation by vortical processes. *Arthur Pletcher*

The Santilli and other experiments appear to allow inference toward the suppressed promise of Tesla:

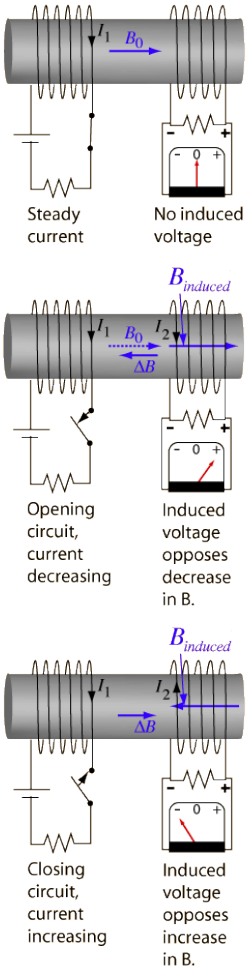
Matter and energy creation by mathematical modelling and implementation of the dynamic atomic condensational surfaces of nuclear processes and transmutation as matter and energy Poynting vortices.

[See reference list two for previous section]

Now we have solved the cause of quantum paradox, made some implications concerning information, fields and gravitation and found a

'new' (suppressed) solution to Maxwell's equations that appears to lead toward the creation of clean energy from the energy density itself while solving the particular errors in neutrino theory. We have introduced the scalar wave, a longitudinal wave based in inductive dynamics. Let us review the basics of those dynamics before attempting theoretical application of that information to define the mechanics of entangled anti-correlation and nonlocal phenomena, gravitation, force carriers and the elusive hidden quantum variable of consciousness itself.

Inductive processes create opposing charges in coupled system parts as compensation for interruptive current dynamics. If there is no current change there is no induction created and if there is change, a compensatory inductive response is created in the coupled system component.



We propose that physical system scalar dynamics explain nonlocal and other quantum correlations as examples of inductive processes. (Mutual inductance appears to be akin to concurrent strength of entanglement).

Van Flandern proposes near instantaneous gravitational propagation speed in order to maintain contact with physical reality within the province of known celestial mechanics and as the reader is now aware, we propose that a scalar wave is also responsible for nonlocal entangled phenomenon which also propagate their dynamism all but instantaneously. (It is satisfying to note how closely this approximates Newton's insight that gravitation is *near* instantaneous in its speed of propagation). The reader is undoubtedly aware

of the fact that quantum entangled correlations are generally of the form of anti-correlations—spin up and spin down in the case of entangled photons generated in experiments, for example. The Bell states propose positive correlations, but we simply do not see them often represented in physical experiments demonstrating entanglement. Clearly, the reason is *not* uncertainty! If we accept that assertion, we must ask: Why?

Should any wave which is mediator of inductive processes project over long distances, self-inductance must be brought to zero. Any change within the current that induces counter-motive force would dissipate the wave over great distance. Clearly, any such wave would be best suited not to possess any fluctuation at all, meaning the complete absence of phase expression. Hence, we imply as a condition for its functional existence that such a scalar wave is a combinative result of exact anti-correlation. Charge, spin, phase sums (cancels), as relative phase across the system components is inverted 180 degrees. Here we see the basis of entangled expression over distance, the correlation of spin-up and spin-down is indeed a functional necessity as the physical basis of entangled effects over distance. Those effects then, are not merely examples of the conservation of spin; the statistically validated results imply, as they must, that informational exchange and active systemic organizational effects are taking place. We propose those observed connectivities above the components of the system taken by themselves which are engendered in the *abstract* idea of entangled effects, meaning observed correlations and probability instead of causal mechanics, are in fact founded upon a real physical basis: scalar connectivity. Voltage over time alone sans phase or fluctuation, created as a function of exact anti-correlation. Scalar connectivity. Non local over *c* propagation speed is directly supported through the notion of wave expression within the medium of an incompressible fluid. Earlier, when introducing the notion of a scalar wave, which seems to be possible even though $\bar{E} = \bar{B} = 0$, it was noted that the Poynting vector would be zero, indicating no EM power flow. Hence the question arises as to from where the energy is drawn to sustain such an occurrence. However, as is discussed in Ferraro (*Electromagnetic Theory*, Univ. of London, 1956), it is clear that *any* vector whose divergence is zero may be added to the usual expression for the Poynting vector without affecting anything. Ferraro points out that, at the point of writing, there was no physical reason to introduce this complication but now this assertion seems open to question. Precisely what the said vector is and what it represents physically is still an open question but its possible existence is

certainly raised in the quoted released CIA document and here its possible relevance in a modern physical problem is highlighted. This is the basis for our proposed causal explanation of experimentally demonstrated entangled effects and propagation speeds in separated systems.

Within human to human experiments we do indeed see the expected anti-correlation of minds (Persinger et al., 2009). [1] We may then theorize concerning the demonstrated simultaneous necessity of a "classical channel" in manifesting quantum effects created at a distance between minds and equipment. In the case of an object such as a laser set up being influenced by affective expression, that is, the will to 'be one with' the device, this representing a *somatic wish* from the human sending such an expression, the wave must find its target without a receiving mind which is presumably in anti-correlation and so, directionality must be induced, although somewhat inefficiently, by the electromagnetic expressions of the receiving device itself and a necessary connective chain of internet EM transverse wave components and so their oscillatory condensational longitudinal expressions: *an inefficient Poynting vortex*. In this we see the experimentally demonstrated reason for a simultaneous quantum and classical channel revealed as simple necessity if a human is interactive from a distance with a piece of equipment: the directionality of expression must be induced via such an accompanying classical connection as no anti-correlated receiver, such as another mind, is represented within the receptive system, and so, vortical directive dynamics of aetherial condensations must be produced through classical means. This appears to be why a classical channel must accompany a quantum channel to create effects upon equipment issuing from minds, and, why said effects are so slight due to inefficiency in those cases, although demonstrable to a high degree of statistical validity in experiments [9, 10, 11, 12 reference list one].[2]

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[1] (NeuroQuantology | December 2009 | Vol 7 | Issue 4| Page 548-551 Persinger et al., Evidence of macroscopic quantum entanglement).

[2] Dean Radin stated: Consider what the President of the American Statistical Association -- the profession most directly involved in the rigorous analysis of experimental data -- said in 2016 to an audience of 6,000 professional statisticians at the ASA's annual meeting:
For many years I have worked with researchers doing very careful work in [parapsychology], including a year that I spent full-time working on a classified project for the United States government, to see if we could use these abilities for intelligence gathering during the Cold War. . . . At the end of that project I wrote a report for Congress, stating what I still think is true.
The data in support of precognition and possibly other related phenomena are quite strong statistically, **and would be widely accepted if it pertained to something more mundane.** Yet, most scientists reject the possible reality of these abilities without ever looking at data!

Within perturbation theory of quantum field theory we find *virtual particles*. They are a *transient fluctuation* of *some unknown sort*, limited by 'uncertainty.' They are 'fluctuations of the underlying field' and are *associated with particles*, to represent the reversed doctrine of modern causality (see previous text concerning fields and particles). In Wikipedia we read: "Any process involving virtual particles admits a schematic representation known as a Feynman diagram, in which virtual particles are represented by internal lines. . . . The accuracy and use of virtual particles in calculations is firmly established, but as they cannot be detected in experiments, deciding how to describe them precisely is a topic of debate." https://en.wikipedia.org/wiki/Virtual_particle

We state without the possibility of contradiction: ***Virtual particles are not real objects. Virtual particles are abstract mathematical objects***. Some real object must be performing these functions. We propose that the impulse associated with a particle which interacts as a force carrier is the longitudinal condensational wave associated with transverse wave expressions, and, within gravitational dynamics that a longitudinal wave also acts, but in this case to polarize the shielded nuclear gravitational attraction of massive bodies, which are in turn, different expressions of scalar waves. There is a real object performing these physical operations but it has been missed as the equations and medium through which the wave travels have been incorrectly understood, and in the case of the needed solution to the equations of Maxwell—*the science has simply been suppressed*. "Virtual particles" within functional theory are longitudinal scalar waves bound to matter. Anti-correlated nonlocal scalar waves and their resultant attractive nuclear polarizations are themselves the gravitational force.

We propose that scalar waves act as compensatory longitudinal expressions forming up the physical basis for the mistaken notion of the neutrino, also form the basis of quantum entangled anti-correlations and act as the actual physical basis of force carriers, which must be real objects rather than abstract objects such as 'virtual photons'. We propose, force carriers are aetherial longitudinal condensational expressions directly associated with electromagnetic transverse expressions in the case of photons (bound to mass), and as hyper-rapid interruptive/inductive aetherial nonlocal mediators within gravitation.

We will follow Wal Thornhill in recognizing the radially oriented dipoles of nuclear and electron structure as a source of gravitational polarization, noting inverse square force dissipation is implied via the reasoning: "the dipole-dipole force, which varies inversely as the fourth power between co-linear dipoles, becomes the familiar inverse square force of gravity for extended bodies." We agree with W. Thornhill again as he states: "the crucial difference between the near-infinite speed of the electric force and the relative dawdle of light on any cosmic scale is that the electric force is longitudinal."
Source:[3]

These atomic polarizations, we theorize, induce a force specific mass/capacitance dependent scalar wave in the surrounding medium, which is paired at the opposite end in attractive gravitation to an object that is induced to opposing phase/spin/charge, as is requisite to create and sustain such a wave. (Please note the idea of mass could be a variable as in the theories of W. Thornhill, so we place capacitance with mass (mass/capacitance), as it is the basis of observed effects). The weak scalar wave induced polarization is likely, primarily of the dipole nuclear magnetic moments, and also secondarily those of the electrons (which are *not* point particles, and do have spatial dimension), and is dependent upon the opposition of phase (spin) and charge, hence meeting the requisite conditions for the limitation of self-inductance. These inductive anti-correlated scalar waves and the resultant attractive polarizations are themselves the gravitational force, moving at near instantaneous speeds of propagation, as they must. [As an aside, it is implied that anti-gravitation (anti-matter's inverse gravitational signature) must be created as two stage inverse path induction, meaning as non-opposing, hence repellant, single polarization relations induced across system dynamics.] Such a system in constant fluctuation will necessarily collapse the scalar very rapidly, resetting the system again and again to account for the variable dynamics of changing conditions. In this case, self-inductance and the resultant rapid system reset, a sort of basic instability, are the functional basis of gravitational scalar mediated nonlocal speed adaptations to changing system conditions. Here we may observe that once the hidden variable is placed back into the physics rather than suppressed, that we have then discovered

[3] Source: https://www.holoscience.com/wp/electric-gravity-in-an-electric-universe/ "Electric Gravity in an ELECTRIC UNIVERSE"

the pleasing fact that gravitation is simply an expression of electromagnetism.

We can begin to see that the scalar wave within gravitational and entangled dynamics has no fluctuation, charge or phase, hence its frequency is that of its inductive rate of interruption or harmonic oscillation/alternation. In the case of gravitation that rate is inversely proportional to the mass meaning, shorter duration, higher frequency corresponding to greater collective systemic mass. In the case of entangled systems said rate/frequency is proportional to the entangled (or coherent) object's oscillatory energetic resonance as perturbing aether. Gravitational systems are in constant dynamic fluctuation and must demonstrate scalar wave system instability in proportion to the mass in systemic relational flux. Hence the gravitational scalar wave is necessarily limited in duration as a function of dynamic mass through self-inductance *within the capacitance offered by the mass*. That *capacitance* functioning to stabilize to some degree systemic self-inductance then, and so permitting scalar formation, must be associated with scalar wave *voltage*, accounting for variance in gravitational strength as a function of distance between objects, due to increased polarization strength per interruptive pulsed voltage unit.

To condense these basic principles:

Mass/capacitance relation to frequency:
Increase in mass = faster inductive interruption rate (frequency) = greater number of repolarizations per time.

Mass/capacitance relation to gravitational strength as a function of voltage and inverse of distance yielding inverse square relation:
Mass/material/capacitance x inverse of the distance between objects = voltage of scalar wave hence gravitational power *per* pulsed time unit (frequency); inverse square relation emerging of collective dipole dynamics.

Gravitation then, does not really "propagate" in the usual sense—it is a near instantaneous distribution of nonlocal inductive polarizations. Scalar waves do not propagate between objects over time. They exist between objects or they do not. Again, the frequency of a nonlocal scalar wave is that of its inductive interruptive rate. Gravitation is the inductive polarization of atomic structure via scalar anti-correlation.

As to the possibility of supporting extreme frequencies as defined above, operating within electrical physical systems as a function of pressure alone, voltage alone working over time with no power flow, we read in the early published works of Tesla: “Let the pressure increase to an enormous value, and let the flow correspondingly diminish, then such impulses—variations merely of pressure, as it were—can no doubt be transmitted through a wire even if their frequency be many hundreds of millions per second.” (Martin, 1995 p. 291)

What could the reason be for gravitational lensing then, and is it related to our proposed *bit field* with its hypothetical effects upon a dynamic refractive medium?

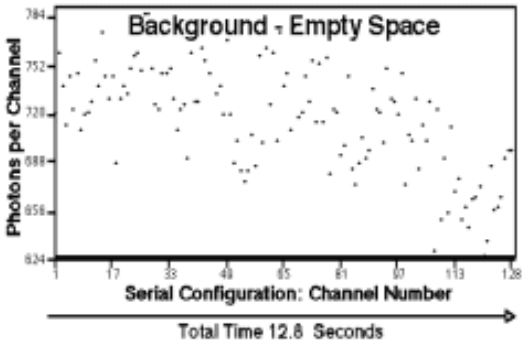
Gariaev and associates conducted interesting experiments. [4]

When DNA was exposed to laser light within a scattering chamber, the resultant pattern observed in experimental Laser Correlation Spectroscopy equipment remained for some time after the DNA was removed if the laser was again shone upon the chamber, demonstrating a phantom effect. We propose that this effect is the refractive medium itself, the aether in evidence, functioning as a mnemic (informational) refractive medium once induced to new refractive state by the laser/DNA interaction. Aether is an informational refractive medium capable of retaining excitations, a basic part of the missing hidden variable along with the scalar wave, which we believe induces those excitations and changes. This explains the famous quantum double slit observation/measurement experiment, and variations using human subjects by way of *informational exchange and refractive variance via scalar mediation*, as referred to previously within the sections above. We may infer that quantum effects are merely informational exchange and resultant refractive effects through a functional medium—quantum effects are simply refractive electromagnetic effects mediated

[4] [https://www.bibliotecapleyades.net/ciencia/ciencia_genetica04.htm ; P.P. Gariaev, K.V. Grigor'ev, A.A. Vasil'ev, V.P. Poponin and V.A. Shcheglov. Investigation of the Fluctuation Dynamics of DNA Solutions by Laser Correlation Spectroscopy. Bulletin of the Lebedev Physics Institute, n. 11-12, p. 23-30 (1992). **;** P.P. Gariaev and V.P. Poponin. Vacuum DNA phantom effect in vitro and its possible rational explanation. Nanobiology 1995]

through an informational bit field: *the scalar field*. Probability fields are scalar fields.

Now, we may interpret gravitational lensing in the same way, much as referred to above in the early work of Eddington we see a refractive explanation: solar plasma and gravitational influence have altered the aetherial refractive index, induced the surrounding aether to contain a scalar wave excitation (*information*) altering the pathway of star light. Light travels a different pathway as a function of refractive variance induced by scalar process associated with plasma and gravitation in the refractive medium, the aether. Gravitation is electromagnetic.



(a) MALVERN <<< K7032 >>> Version 2.1 Date 18-09-1991 Time 18:49:58
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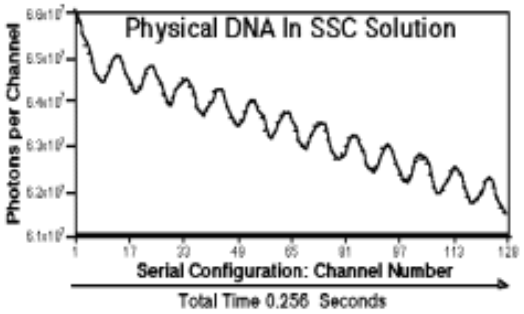
Auto-correlation



(b) MALVERN <<< K7032 >>> Version 2.1 Date 14-12-1990 Time 12:25:07
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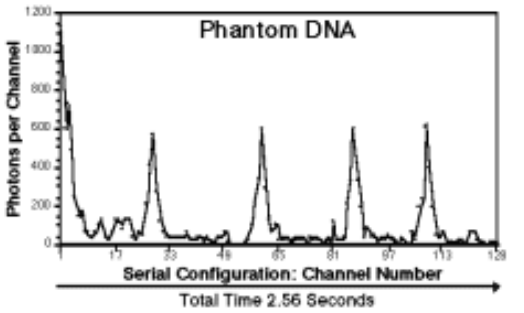
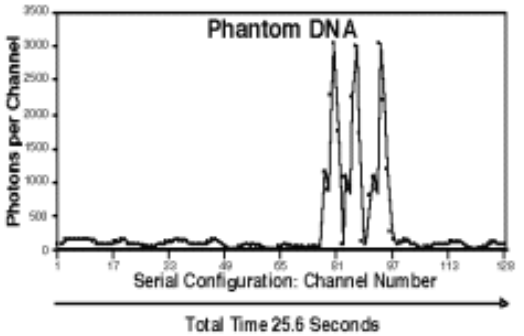
Auto-correlation



(c) MALVERN <<< K7032 >>> Version 2.1 Date 23-11-1992 Time 13:37:28
Correlator 1 Sample Time per Channel (mS) = 20
Auto-correlation



(d) MALVERN <<< K7032 >>> Version 2.1 Date 23-11-1992 Time 14:25:53
Correlator 1 Sample Time per Channel (mS) = 200
Auto-correlation

Figure 2. The top (a) plot illustrates a typical background or control when there is not any physical DNA or the presence of DNA phantom in the scattering chamber. The next plot (b) is typical when physical DNA is placed in the chamber and the bottom plots (c & d) show examples of the DNA phantom effect. Note that in these plots the cuvette containing the physical DNA has been removed from the scattering chamber.

Source: https://www.bibliotecapleyades.net/ciencia/ciencia_genetica04.htm

We may define the active element creating correlation within physical systems to create many effects including quantum ones, such as entanglement. In the case of force carriers also, we see the actual physical basis of functional abstract objects, supposed 'virtual particles' acting as force carriers in the actual physical exchange of scalars between particles, and those scalars/force-carriers affect systemic evolution, and so, those scalar expressions are clearly possessed of, if not actually being themselves, an *informational component apart from and above the system components they connect* in exchange, just as within entangled systems. That informational function, is the one mathematically ascribed to *consciousness* in the work of Tononi (Tononi, 2008).

We must introduce the reader to a promising new tool in the intellectual arsenal of the scientific thinker: Integrated Information Theory.[3] Consciousness in IIT is akin to integrated information. Integrated information is defined as: "the amount of information generated by a complex of elements, above and beyond the information generated by its parts" (p. 216). Also, we read (p. 221): "Thus, a system can generate integrated information only to the extent that it cannot be decomposed into informationally independent parts." Integrated Information Theory uses an informational integrative metric applied to systems: Φ, so as to ascribe a theoretic conscious value to that system. Likewise, the integrated information itself is also ascribed an entropic informational metric akin to entanglement: *γ.* Informational connections within a system are relations between probability distributions (pp. 226-227) represented by arrows in a geometric qualitative space: Q-space. These q-arrows can become entangled. As one would expect, we read: "A q-arrow is entangled if the underlying connections considered together generate **information above and beyond the information they generate separately**… Thus, entanglement characterizes informational relationships (q-arrows) that are **more than the sum of their component relationships** (component q-arrows, . . .), just like Φ characterizes systems that are **more than the sum of their parts**... an entangled q-arrow can be said to specify a *concept*, in that it groups together certain states of affairs in a way that cannot be decomposed into the mere sum of simpler groupings" (p. 227). Relative entropy between the contributions of summed individual systemic components vs. their collective interactive intra-systemic relational

contributions provides the formal conceptual framework (p. 220). This permits a phenomenological systemic measure of biological and physical consciousness (pp. 229-233). [emphasis in bold added]

See:

3. Tononi G. Consciousness as Integrated Information: a Provisional Manifesto.
Biol. Bull 2008; 215: 216–242.

Next, we may observe consciousness working in a quantum interpretation of pre-evolutionary processes. For source material and all numeric references below see:

Quantum Entangled Prebiotic Evolutionary Process Analysis as Integrated Information: from the origins of life to the phenomenon of consciousness. Norman and Tamulis, *Journal of Computational and Theoretical Nanoscience* Vol. 14, 2255–2267, 2017 doi:10.1166/jctn.2017.6818

Integrated Information analysis of pre-biotic quantum process entanglement:

Before we continue the analysis it will be necessary to gather a few key pieces of text. **References and figures within below quoted text are generally omitted**: *see the original article*. Note emphasized portions with care. References one and two below, respectively, are:
1. A. Tamulis and M. Grigalavicius, Syst. Synth. Biol. 8, 117 (2014).
2. A. Tamulis, L. Berteska, M. Grigalavicius, and J. Baltrusaitis, Quantum Matter 5, 5 (2016).

> 1. We expect that our quantum chemical calculations results should also be applicable in room temperatures situations based on the work of Cai, Popescu and Briegel where the authors proved that quantum entanglement can be continuously generated and destroyed by non-equilibrium effects in an environment where no static entanglement exists. . . . Rieper et al. modelled the electron clouds of nucleic acids in DNA as a chain of coupled quantum harmonic oscillators with dipole–dipole interactions between nearest neighbours resulting in a van der Waals type bonding. These authors showed that, for realistic

parameters, nearest neighbour entanglement is present even at room temperature. These authors found that the strength of the single base von Neumann entropy depends on the neighboring sites. *Thus, we can question the notion of treating single bases as logically independent units.* [emphasis added].[2] Namely: change the base and the message gets changed.

2. An important point[1,2]: "We have observed during the geometry optimization process of this photosynthetic prebiotic minimal cells that the quantum entangled states remains not depending on the mutual distances of photosensitizer and pFA molecules, i.e. exist invariance of quantum entangled states relative the mutual distance. According to Zeilinger's quantum information theory this invariance of quantum entangled states relative the mutual distance might be used for *quantum information transfer in this certain photosynthetic prebiotic minimal cells system during two quantum entangled excited states" [emphasis added].*[2,19] "Our discovered phenomenon of the quantum entanglement in the prebiotic systems enhance the photosynthesis in the proposed systems because simultaneously excite two prebiotic kernels in the system by appearance of two additional quantum entangled excited states . . ."[1]

3. Specific results [1]: Analysis of results . . . concerning the individual transitions of excited states 5 and 6 shows that these states are quantum entangled and gives the additional light harvesting in the UV region due to the incorporation of the provitamin D molecule in the prebiotic kernel. One can see that individual transitions of 5th and 6th excited states . . . are composed of the same HOMO, LUMO + 2 and LUMO + 5 with different coefficients. The HOMO is located on 1,4-bis(N,N-dimethylamino)naphthalene-8-oxoguanine supermolecule. The LUMO + 2 and LUMO + 5 are located on 1,4-bis(N,N-dimethylamino)naphthalene-8-oxo-guanine supermolecule and on the provitamin D and pFA molecules . . . The electron charge density transfers in 5th and 6th excited states also are from 1,4-bis(N,N -N-dimethylamino)naphthalene-8-oxo-guanine supermolecule to 1,4-bis(N,N-dimethylamino)naphthalene-8-oxo-guanine supermolecule and to the provitamin D and pFA molecules . . . . It means that there exists quantum superposition of 5th and 6th excited states. Quantum entanglement occurs when particles such as

photons, electrons, molecules as large as buckyballs, and even small bioorganic systems interact physically and then become separated; *the type of interaction is such that each resulting member of a pair is properly described by the same quantum mechanical description (state) [emphasis added]*, which is indefinite in terms of important factors such as topological position, momentum, spin, polarization, etc., (p. 123). And…"We note that the *simultaneous nature of the involvement of two different sensitizers in the energy transfer would also mean that information is being transferred." [emphasis added]* (p. 126) [1]

4. The example of the phenomenon of quantum entanglement in a photoactive prebiotic kernel pertains to the coupled two sensitizer (bis(4-diphenylamine-2-phenyl)-squarine and 1,4-bis(N,N-dimethylamino)naphthalene) (see Figure 2).

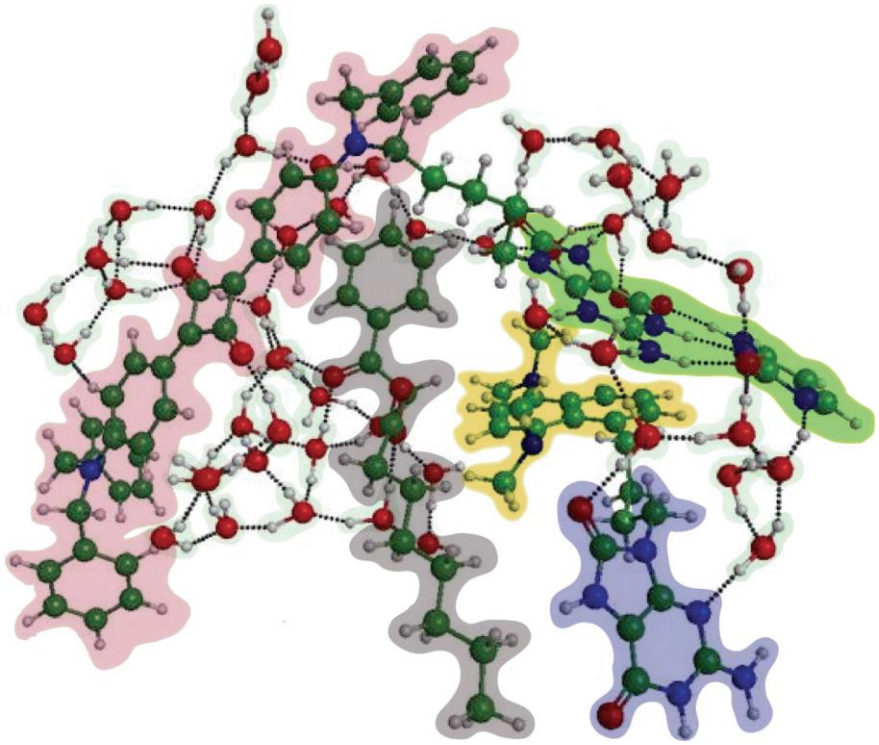


Figure 2. Visualization of a photosynthetic prebiotic kernel **(1)** containing sensitizer molecule squarine (situated in left) attached covalently to 8-oxo-guanine::cytosine supramolecule (top-right) and separate sensitizer molecule 1,4-bis(N,N-dimethylamino)naphthalene (centre-right) attached covalently to 8-oxo-

guanine (bottom-right), and pFA (centre - bottom), and 50 water molecules after the 836 steps of the geometry optimization. Carbon atoms and their associated covalent bonds are shown as grey circles and sticks, hydrogens – light grey, nitrogens – black, oxygens – dark grey. Dashed lines means the hydrogen bonds.

Quantum entangled states are also involved in some of the photosynthetic reactions. Examples of this include the 27th and 29th states, as well as the 45th and 47th states.[1] *The phenomenon of quantum entangled states which induce photosynthesis appears only in cases where two photosensitizers are involved and is absent in the case of involvement of only a single sensitizer [emphasis added].* For example, analysis of the frontier orbitals HOMO-m and LUMO + n of photosynthetic prebiotic kernel (1) in the 27th (535.4 nm) and 29th (534.2 nm) excited states shows that quantum entanglement exists between the photosynthetic supramolecule SQ-8-oxo-guanine::cytosine and the photosynthetic supermolecule 1,4-bis(N,N-dimethylamino)naphthalene-8-oxo-guanine. Thus, electron transition energy might be simultaneously transferred from the photosynthetic supramolecule and supermolecule to the pFA molecule for both the 27th and 29th excited states of this photosynthetic prebiotic kernel. *We note that the simultaneous nature of the involvement of two different sensitizers in the energy transfer would also mean that information is being transferred [emphasis added]*. We have observed during the geometry optimization process of this photosynthetic prebiotic kernel (1) that the quantum entangled states remain not depending on the mutual distances of photosensitizer molecules, i.e., there exists invariance of quantum entangled states relative to the mutual distance (p. 130). According to A. Zeilinger's (Brukner and Zeilinger, 2009) quantum information theory this invariance of quantum entangled states relative to the mutual distance might be used for quantum information transfer in this certain photosynthetic prebiotic kernel (1) system during two quantum entangled excited states"[1] (pp. 130-131).

5. Analysis of the frontier orbitals HOMO-m and LUMO + n of photoactive kernel (1) associated with the 45th (482.5 nm) and 47th (479.5 nm) excited states shows that quantum entanglement also exists there between the photosynthetic supramolecule SQ-8-oxo-guanine::cytosine and the photosynthetic supermolecule 1,4-

bis(N,N-dimethylamino)naphthalene-8-oxo-guanine Thus, electron transition energy might be simultaneously transferred from the photosynthetic supramolecule and supermolecule to the pFA molecule for both the 45th and 47th excited states of this photosynthetic prebiotic kernel. We again note that the simultaneous nature of the *involvement of two different sensitizers in the energy transfer would also mean that information is being transferred [emphasis added]"* [1] (p. 131). "Only in the case if there are quantum entangled excited (45th and 47th and also 27th and 29th) states then the state of all the system is equal to high value equal to 1. This . . . represents the two variable AND gate in this certain system" [1] (p. 132).

6. For a two kernel system: "we have discovered quantum entangled energy and information transfer from one photosynthetic prebiotic kernel to another separate photosynthetic prebiotic kernel. . . . This photosynthetic system (4) composed of two subsystems [(2) and (3)] possesses 534 atoms" [1] (p. 133). Analysis by our methods in the different excited states allows us to separate quantum-entangled photosynthetic transitions between neighboring prebiotic kernel models. This means that a *quantum-entangled phenomenon of energy and information transfer exists in these model units." [emphasis added]* [1] (p. 134)

7. The results allow separation of the quantum entangled photosynthetic spin density transitions within the same photosynthetic prebiotic kernel [(5) or (6)] and with the neighbouring photosynthetic prebiotic kernels in the system (7) (Tamulis & Grigalavicius, 2014, p. 137). Analysis of frontier orbitals HOMO-m and LUMO + n of the system (7) in the excited states 13th shows that there also exists quantum entanglement between two photosynthetic minimal protocells (5) and (6). *This means that electron spin density transition energy (and information) might be transferred at the same time (during excited state 13th) from the two different photosynthetic prebiotic kernels [emphasis added]* (5) and (6) in the system (7). [1] (p. 137)

8. It is possible to make the following statements concerning our investigated self-assembled photosynthetic prebiotic kernel with two

different photosynthetic centres and model systems composed of two photosynthetic prebiotic kernels [1]:

(i) The pairs of quantum entanglement excited states of photosynthetic prebiotic kernels (1), (2) and (3), or (5) and (6) are composed of the HOMO-m states located on the sensitizer supramolecule and the sensitizer supermolecule and the LUMO + n on a fatty acid precursor molecule. This coupling promotes electron hopping (tunnelling) from these photoactive derivatives to the pFA molecules in the excited states. (p.138)[1]

(ii) The results allow separation of the quantum entangled photosynthetic electron density or electron spin density transitions within the same photoactive prebiotic kernel [(1), (2), (3) or (5), (6)] and with the neighbouring photosynthetic prebiotic kernels in (4) or (7) possessing photoactive close shell molecules or photoactive open electronic shell neutral radical molecules. *This means that electron density or electron spin density transition energy (and information) might be transferred at the same time from the two different photosynthetic prebiotic kernels in the system. [Emphasis added]*. (p. 138) [1]

(iii) Analysis by our methods in the different excited states allows us to separate quantum entangled photosynthetic transitions between neighbouring prebiotic kernel models. This means that *a quantum-entangled phenomenon of energy and information transfer exists in these model units [emphasis added]*. Quantum entanglement in the prebiotic kernel systems enhances photosynthesis in the system because two prebiotic kernels in the system are excited simultaneously by appearance of two additional quantum entangled excited states." (p. 138) [1]

(iv) Different two variable, quantum entangled AND logic gates were discovered in these photosynthetic prebiotic kernel systems (1), (4) and (7) described, which consist of two input photoactive sensitizer derivatives containing two different variable inputs and one output. It is proposed that a similar process might be applied for the destruction of tumour cancer cells or to yield building blocks in artificial cells and in magnetically active artificial cells. (p. 138) [1]

Integrated Information Analysis:

In order to interpret this information most simply, let us read of the role of

information in these systems, which appear to create "it" from integrated "bit":

> "An absorbance of discrete quantum portions light spectrum and the consequential reorganization of these supramolecules due to the absorbance of light energy is another omnipresent quantum effect in living systems. The quantum portions light energy goes In Formation of living supramolecular derivatives. The origin of the word Information is from the Latin verb informare, which means to give form. Later the additional quantum portions of light energy go to Re-Formation of these supramolecules. The quantum physics initiated changes of biological supramolecules lead to Positional Information that causes further to the biological functions of photosynthesis, metabolic reactions, growing, self-replication and self-reproduction of biological systems possessing cell structure." (pp. 120-121) [1]

So as the reader reviews points 1, 2, 3, 4, 5, 6, 7, and 8, a clear pattern emerges. As to the entangled portion of dynamic alteration in systemic evolution: We see a system which must be defined as a logical whole, that by way of entanglement, which is defined under IIT as "integrated information" (integrated bit) meaning dynamic consciousness itself creates more structure (it) which demonstrates ever increasing Φ. One might say that entanglement γ is the informational and energetic *process* whereby structure demonstrative of increased Φ is organized. It appears logically consistent in this context, to see entanglement γ, which if you will recall, is itself a *concept,* is exactly that: a conscious *act.* And the result of this informational/energetic instantiation—this particular applied conceptual information—is structural form itself possessed of greater informational integrative conscious demonstration.

Now, we may understand those probabilistic interpretations were interpretations of probabilistically derived *results*, not *causes*! Such causes must be attributable to actual objects and interactions, not effects alone implying the logical necessity of considering two elements to be of one system, or necessarily in a state of correlation. We propose: These 'conscious' interactions producing entangled effects, are the product of systemic intra-connective scalar mediation. Quantum informational science and physical quantum 'conscious' attributions are in fact causally based, just

as are Popper's experimentally implied probability fields, all of which are not based in probability but in scalar wave mediations. Scalar waves exchange information above that of system components. Informational exchange is the actual basis of "observation." This is the hidden variable beneath physics: consciousness, an actual object—the scalar wave. This wave corresponds to the long neglected Bohmian nonlocal pilot wave.

Next we will consider the connection between our model of a fluid dynamic aether supporting a longitudinal wave, and Bohmian mechanics. A fluid dynamic model of pilot wave theory is coming into its own. From the popular article "*Have we been interpreting quantum mechanics wrong this whole time?" N. Welchover 2014* in *Wired* magazine:

https://www.wired.com/2014/06/the-new-quantum-reality/

> De Broglie could not predict the exact place where an individual particle would end up — just like Bohr's version of events, pilot-wave theory predicts only the statistical distribution of outcomes, or the bright and dark stripes — but the two men interpreted this shortcoming differently. Bohr claimed that particles don't have definite trajectories; de Broglie argued that they do, but that we can't measure each particle's initial position well enough to deduce its exact path.
>
> In principle, however, the pilot-wave theory is deterministic: The future evolves dynamically from the past, so that, if the exact state of all the particles in the universe were known at a given instant, their states at all future times could be calculated.
>
> By 1932, when the Hungarian-American mathematician John von Neumann claimed to have proven that the probabilistic wave equation in quantum mechanics could have no "hidden variables" (that is, missing components, such as de Broglie's particle with its well-defined trajectory), pilot-wave theory was so poorly regarded that most physicists believed von Neumann's proof without even reading a translation.
>
> More than 30 years would pass before von Neumann's proof was shown to be false, but by then the damage was done. The physicist

> David Bohm resurrected pilot-wave theory in a modified form in 1952, with Einstein's encouragement, and made clear that it did work, but it never caught on. (The theory is also known as de Broglie-Bohm theory, or Bohmian mechanics.)
>
> Later, the Northern Irish physicist John Stewart Bell went on to prove a seminal theorem that many physicists today misinterpret as rendering hidden variables impossible. But Bell supported pilot-wave theory. He was the one who pointed out the flaws in von Neumann's original proof. And in 1986 he wrote that pilot-wave theory "seems to me so natural and simple, to resolve the wave-particle dilemma in such a clear and ordinary way, that it is a great mystery to me that it was so generally ignored."
>
> Now at last, pilot-wave theory may be experiencing a minor comeback — at least, among fluid dynamicists.

Here in the fluid dynamic model of pilot wave theory we see a better idea without paradox. There is no wave particle duality…the double slit problem vanishes! There is no more wondering if a probability wave is real, and we may dispense with trying to find its "home" and location. The pilot wave, although described quantum mechanically is a wave, not a probability. It creates the observed cancelation pattern. Superposition is now but a highly useful piece of mathematical formalism guiding systemic evolution, the conflicted, paradoxical reality of which is *not* implied by the theory...the paradoxical cat is *either* dead *or* alive! [5]

Lastly, let us consider information as expressed within the mnemic capacities of aqueous systems, and those systems' primary informational H bond. [6]

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[5] See: *What is Bohmian Mechanics,* Valia Allori, Nino Zanghi, 2001, *Arxiv*: http://arxiv.org/pdf/quant-ph/0112008.pdf (p. 7-8)

[6] See: Richard Lawrence Norman, Jeremy Dunning-Davies. The Informational Magnecule: The Role of Aqueous Coherence and Information in Biological Dynamics and Morphology. American Journal of Modern Physics. Special Issue: Issue III: Foundations of Hadronic Chemistry. Vol. 6, No. 4-1, 2017, pp. 17-28. doi: 10.11648/j.ajmp.s.2017060401.12

[See reference list three for section below]
Quantum *entangled processes* and *informational exchange* are now known to be dynamic contributors in biological systems at room temperatures (Cai et al. 2010; Cifra et al. 2010; Rosi et al. 2011; Prasad et al. 2014) and by way of empirically rigorous Time Dependent Density Theory models, have been demonstrated as primary contributors to the evolution of life itself from photosynthetic prebiotic kernel systems in the Isua Greenstone Belt in Greenland some 3.7 - 3.85 billion years past (Tamulis et al. 2016; Norman and Tamulis 2017). There is further longstanding evidence of the delicate connectivity between photonic expression and biological processes. What is now known as the coherent biophoton field (please think of the life's work of Fritz Popp), was first discovered by Alexander Gurwitsch while working with onion roots in 1922 as "mitogenetic radiation" in the UV range, exemplifying his concept of "morphogenetic fields." In Popp (1999) we read: "…a single photon may suffice to trigger about 10^9 reactions per second since the average reaction time is of the order of 10^{-9} seconds and provided—in addition—that it is directed in a way that it delivers the right activation energy as well as the right momentum at the right time to the right place. This means that a surprisingly low photon intensity may suffice to trigger all the chemical reactions in a cell." Electromagnetic fields can be mathematically defined as informationally interactive with biological systems (Brizhik et al. 2003; Brizhik and Foletti 2014). Based upon this evidence, we conclude that given the correct conditions (at room temperatures) *photons can be informationally encoded and via quantum processes can and do affect biological systems*.

For a wealth of experimental evidence demonstrating informational effects within aqueous systems sans molecular constituents acting to affect pathologies and bio-systems just as the drug molecules the information was derived from please see:
Richard Lawrence Norman, Jeremy Dunning-Davies. The Informational Magnecule: The Role of Aqueous Coherence and Information in Biological Dynamics and Morphology. American Journal of Modern Physics. Special Issue: Issue III: Foundations of Hadronic Chemistry. Vol. 6, No. 4-1, 2017, pp. 17-28. doi: 10.11648/j.ajmp.s.2017060401.12
A few examples will be provided below.

Examples of informational pharmacology:

In (Foletti et al. 2014) *Electromagnetic information delivery as a new tool in translational medicine*, we see a 7Hz carrier frequency modulated at 3 kHz was encoded with molecular information electromagnetically derived from retinoic acid, a known cell differentiation agent.

> The results: "LAN-5 neuroblastoma cell line was grown up for 4 days in standard medium (CTR) or in the presence of shielded retinoic acid signal (Shielded RA-ECM); Retinoic Acid molecule was used as positive control (RA). Cell proliferation was then analyzed by direct cell count. The results showed that LAN-5 cultured with the shielded electronically conditioned medium didn't present any changes in the proliferation rate compared to control.
> *Electromagnetic signals from Retinoic Acid do not affect cell viability*
>
> . . . reduction in cell proliferation rate is correlated with the electromagnetic information system, while it did not correlate with an increase in cell death. LAN-5 neuroblastoma cell line was grown up for 4 days in standard medium (CTR) or in the presence of Retinoic Acid signals (RA-ECM) while Retinoic Acid molecule was used as a positive control (RA). Cellular mortality was analyzed by Trypan blue exclusion test . . . The results showed a sustained increase of cellular mortality in Retinoic Acid treated cells as compared to control ones. Moreover the cells cultured in the electronically conditioned medium, receiving physical electro-magnetic information from RA, displayed no differences in cellular mortality compared to control" and "Interestingly, cells grown in the presence of the electro-magnetic signal from RA (RA-ECM), showed a statistically significant decrease of cell growth, similarly to RA treatment, but no changes in cellular mortality . . . These findings suggest that the electromagnetic information system is able to induce the decrease of cell growth without affecting cell viability."

[Do note the *presence* of active informational field effects demonstrably akin to the known biological activity of the source molecule, and the *absence* of associated chemical toxicity—the latter quite unlike the chemical molecule from which the information was derived.]

In (Foletti et al. 2011) "*Differentiation of human LAN-5 neuroblastoma cells*

induced by extremely low frequency electronically transmitted retinoic acid," we see the same highly replicable results, this time using the field directly:

> "METHODS: Retinoic acid was placed at room temperature on one coil attached to an oscillator (VEGA select 719), while LAN-5 neuroblastoma cells were placed on another coil and incubated under controlled condition. The oscillator was then turned on for 12 hours a day for 5 days, after which cells were counted and morphology studied by contrast microscopy.
> RESULTS: The effect of the differentiating agent added to the cell culture by physical means generates a decrease in cell growth, metabolic activity, and the protrusion of a neuritelike structure typical of the differentiated cells.
> CONCLUSIONS: These preliminary results suggest that retinoic acid molecules emit signals that can be transferred to LAN-5 neuroblastoma cells by artificial physical means in a manner that seems related to the chemical structure of the source molecules."

Just as important as these studies clearly demonstrating vital effects upon malignant cells, are others of equal reliability and replicability which demonstrate effective informational influence upon various types of infectious pathogens by way of extracted antibiotic molecular *information alone*. How potent is the effect? It works on many common, problematic infectious bacteriological pathogens, and also on the modern scourge of stubborn treatment resistant MRSA!

In (Heredia-Rojas et al. 2015) Antimicrobial Effect Of Vancomycin Electro-Transferred Water Against *Methicillin-Resistant Staphylococcus Aureus* Variant, we may watch as MRSA is curtailed:

> "Material and Methods: MRSA cultures were treated with vancomycin electro-transferred water samples, vancomycin (4.0 and 8.0 μg/mL), sham electro-transferred (water to water) and non-transferred water samples (medium alone). Growth inhibition was evaluated in liquid and solid culture medium, spectrophotometrically and by CFU determination respectively.
> Results: The obtained data showed that by transferring vancomycin (4.0 and 8.0 μg/mL) information to water samples, the growth of cultured MRSA was significantly ($p < 0.05$) inhibited (up to 35%),

> compared with those cultures treated with electro-transferred water to water or cultured in medium alone (0% growth inhibition).
> Conclusion: This in vitro study suggests that water samples that are electronically transferred with vibration sustained information of vancomycin are capable of inhibiting growth of axenically cultured *methicillin resistant S. aureus*."

In (Heredia-Rojas et al, 2011) *Entamoeba histolytica* and *Trichomonas vaginalis*: Trophozoite growth inhibition by metronidazole electro-transferred water, we see the same yet again, now working to ameliorate the proliferation of *Entamoeba histolytica* and *Trichomonas vaginalis*.

> "This paper demonstrates that by transferring metronidazole information to water samples by an electronic amplifier (BRT device), the growth of axenically cultured trophozoites of *Entamoeba histolytica* and *Trichomonas vaginalis* is significantly inhibited, compared with those cultures treated with non and sham electro-transferred water samples. A positive control of metronidazole, a well known cytotoxic drug against parasites, was used as a reference."

> "In conclusion, our in vitro study suggests that water samples that are electronically-transferred with vibrational information of metronidazole are capable of inhibiting trophozoite growth of axenically cultured *E. histolytica* and *T. vaginalis.*"

We invite the reader to examine closely each study referenced above in detail. Recall that we have selected here but a small representative sample of a larger body of work. See: (Norman et al., 2016 and the references therein; Endler et al. 1995; Thomas et al., 2000). Please examine the many various methods of evaluation used in the condensed studies above, including accurate measures such as reverse transcription PCR, contrast microscopy and others. Over and over the same effect is demonstrated. Benveniste was correct. The ugly accusations which ruined his career and good reputation may be left aside as false.

Within the suppressed and quite correct science of Santilli, we find the actual model describing the H bond. The H bond is magnecular (Santilli,

2001, 2005). A magnecule is an expression of inductive processes. Magnecular molecules have unusual properties.

Magnecular analysis and the H bridge: polarized toroidal orbits.

It may be possible to apply a magnecular analysis and gain even deeper insight into the phenomena and effects demonstrated. Toward that end we will first articulate some of the particular specifications of magnecules.

". . . magnegas has a variable energy content, a variable specific weight, and a variable Avogadro number." (Santilli 2005 p. 101)

"Alternatively, the magnecular structure can be also interpreted as an unusual form of "semi-liquid" in the sense that the magnecular bond is much closer to the so called "H-bridges" of the liquid state of water. The increase of pressure evidently brings magnegas progressively closer to the liquid state, which continuous process can only occur for a variable Avogadro number." (Santilli 2005 p. 101)

"Magnecules have anomalous average atomic weights in the sense that they are bigger than that of any molecular constituent . . . ." (Santilli 2005 p. 23)

"Santilli magnecules in gases, liquids, and solids consist of stable clusters composed of conventional molecules, and/or dimers, and/or individual atoms bonded together by opposing magnetic polarities of toroidal polarizations of the orbits of at least the peripheral atomic electrons when exposed to sufficiently strong external magnetic fields, as well as the polarization of the intrinsic magnetic moments of nuclei and electrons." (Santilli 2005 p. 21)

"Magnecules can break down into fragments under sufficiently energetic collisions, with subsequent recombination with other fragments and/or conventional molecules, resulting in variations in time of spectrographic peaks (called time mutations of magnecular weights)" (Santilli 2005 p. 22)

"Substances with magnecular structure have anomalous physical characteristics, such as anomalous specific density, viscosity, surface tension, etc., as compared to the characteristics of the conventional molecular constituents" (Santilli 2005 p. 23).

“Magnecules can accrue or lose during collision individual atoms, dimers or molecules” (Santilli 2005 p. 22)

“Magnecules release in thermochemical reactions more energy than that released by the same reactions among unpolarized molecular constituents” (Santilli 2005 p. 23)

“. . . the test at PCFL provided the first experimental evidence of mutation in time of the atomic weight of magnecules. In fact, the peak . . . is macroscopically different . . . This difference provides evidence that, when colliding, magnecules can break down into ordinary molecules, atoms, and fragments of magneclusters, which then recombine with other molecules, atoms, and/or magnecules to form new clusters.” (Santilli 2005 p. 82)

We propose that the coherent Exclusion Zone (EZ) water along hydrophilic surfaces that is so essential for biological processes is demonstrative of a particular type of magnecular structure. Unlike in the case of Hydrogen accretion in gasses which requires large magnetic fields along the lines of 10 to the 12 Gauss (Santilli, 2012, p. 3), the dynamism within the existent aqueous system of aqueous magnecular creation may be observed with low em field strength, and, the EZ coherent zone itself may be created, extended and fed, by relatively low levels of IR radiation (Pollack 2013, 2013*a*). The instantiation of molecular information into the aqueous medium may be accomplished through the encoding of a low energy 7 Hz carrier frequency to supply the small perturbations to be summed in coherent CD processes which yield a fairly long lived and stable vortical structure, and then, the distributed information functions to affect manifest morphology, functional development and manifest proliferation. All this activity, including chemically derived em encoded informational distribution acting as a sort of "epigenetic" informational allocation (an idea borrowed from the work of Borghini if memory serves), happens by way of physical dynamics which can be expressed within the framework of Hadronic theory and QED. Del Giudice (2012) states: “According to Quantum Electro Dynamics (QED) these fields are able to attract co-resonating molecules giving rise to selective chemical attractions governed by specific chemical codes.” In close analogy to the way magnecules seem to alter the expressed combustive properties of specific fuels, so does this informational epigenetic effect create alteration in the expressed result of biological

energies and forms. In this case, the new particular magnecular species represented in coherent exclusion zone water is of the form H_3O_2, according to the experimental evidence gathered by Dr. Gerald Pollack (2013; 2013*a* and others). Here we see a new, larger, composite non-valence structuralization created by way of H bonds. This appears to be an informational magnecule with dynamic distributional functionality. Its collective *viscosity is divergent* from the 'parent' water molecule by a factor of as much as ten (Karbowski and Persinger, 2015, p. 6), and its properties and size change under conditions of IR exposure, under particular em and magnetic fields as referenced above and/or, in some instances 'spontaneously' over time (Persinger, 2015). However, the informational content and expression which stems from the near frictionless coherent CD process, are remarkably stable (Del Guidice et al., 2013; Montagnier et al., 2011). Another anomalous aspect: the refractive index, and hence one might infer the density of EZ water, is ten percent higher than bulk water (Pollack, 2013). As to the effects of pressure Dr. Pollack states: "EZ water has a higher density than bulk water. If you take H_2O and you put it under pressure, it should give you H_3O_2 because the EZ structure is denser than the H_2O. We did the experiments and we found, indeed, that's the case. If you put H_2O under pressure, you get more EZ water." (Mercola 2013) (Note the similarity to above referenced magnecular processes).

Clearly, time reversal does not play a role in biological systems. No human or biological cell gets younger with time, any more than one might expect the droplets sprayed from a perfume bottle might somehow re-coalesce back into the container from which they originated. However, there MUST be a full spectrum of temporal exchange beyond the limits of relativity evidenced in biological systems (Santilli, 2008 p. 517). Think of the Wheeler delayed choice experiment, which has turned out so as to demonstrate temporal influence extending into the past (Manning et al., 2015), and also Predictive Anticipatory Activity (Mossbridge et al. 2014), which demonstrates human, biological, physiological evidence of the clear influence and presence of future events represented *before their temporal actualization*, as visible effectors in the present. We may therefore define the magnecule in question as a hypermagnecule (Santilli, 2005 p. 23; 2008 p. 511). We invite the reader to consider the work of Montagnier to see the clearest example of biological structure created through encoded low strength EM within the context of aqueous informational mnemic capability (Montagnier, et al. 2011; 2014). DNA itself may be formed up from raw PCR ingredients with

no trace of a physical DNA template! Only encoded EM is needed to affect the aqueous mnemic system, and so, we understand the processes which sustain disease themselves and those of health as well are deeply connected to informational dynamics and distribution stemming from magnecular aqueous processes. (Please keep in mind also that the DNA double helical structure itself is largely due to H bonding between base pairs).

After years of detailed research and experimental examination the coherent fraction of exclusion zone water to which Del Giudice refers has been derived and articulated by Dr. Pollack as being of the structure H_3O_2. The H bonded water structuralization of H_3O_2 had a molar mass of 35.02262 ± 0.00081 g/mol. Do keep in mind the familiar fact that H_2O has a molar mass of 18.01528 ± 0.00044 g/mol. These facts permits the following analysis:

1. In Del Giudice (2013) we read: "Consequently at each T there is a coherent fraction Fc(T) of molecules and a non-coherent fraction Fnc(T) whose sum is 1. Molecules cross over continuously between the two fractions leaving constant the total number of coherent and non-coherent molecules."

2. Dr. Pollack has clearly demonstrated the increase and shrinking of the exclusion zone layer in response to conditions including infrared exposure.

3. Furthermore, Del Giudice (2013) states (see original article for embedded references):

> "Water close to surfaces should therefore exhibit a much larger coherent fraction than bulk water. Its coherent inner structure should remain stable in time, allowing, contrary to bulk water where a continuous cross-over between the two fractions occurs, a direct observation of the consequences of the presence of coherence. The depth of the coherent layer close to a surface is governed, according to [7], by the strength of the electric field emitted by the surface, which correlates coherently the CD electric dipoles. The depth of the layer could therefore reach values as high as hundreds of microns, much larger than the depths of a few molecular layers predicted by conventional theories based on H-bonding [9]."

4. Between the spontaneous bulk water's coherent non-coherent cross-over

and the many various dynamic influences and effects upon exclusion zone size, we may conclude that *the entire aqueous system is variable over time as to its mass per mole*.

5. Temporal variability in molar mass (Avogadro number) is a hallmark of magnecular structure.

6. It appears that the hydrophilic/bulk aqueous bio-system corresponds to the pure gaseous species of magnecule by way of variability in the Avogadro number.

Condensation of findings (see informational magnecule):

a. Biological aqueous systems demonstrate variance in their Avogadro number.

b. Water structure may vary its H bonds 'spontaneously' or as a function of specific known field effects to yield anomalous changes in viscosity.

c. Coherent encoded water affects biological energetic expression and morpho-functionality.

d. Unique/anomalous spectral peaks, some of which indicate the presence of the aqueous informational magnecules' hypothesized coherence domains, are demonstrated by water affected/structured by fields (Persinger 2015; Murugan et al., 2015; Karbowski and Persinger, 2015; and references cited above).

e. Water loses its internal magnetic properties at 100 degrees C. indicating the presence of a Curie temperature.

f. Water (H_2O) becomes structured into H_3O_2 via intermolecular variation in H bonds forming a different, heavier mass per mole. Liquid H_2O itself is given its special characteristics such as high vaporization temperature by way of intermolecular H bridges, which may well be nothing but pieces of polarized electromagnetic structure (see below).

g. The electromagnetically encoded information distributed via H bond dependent water structure and resultant coherent dynamics onto biological

systems affects systemic energetic expression, proliferation and form as an 'epigenetic effect.'

h. The refractive index, and hence the implied density of EZ water, is ten percent higher than bulk water (Pollack, 2013). In another anomalous instance, the viscosity of coherent EZ water may be up to 10 times that of H_2O (Karbowski and Persinger, 2015, p. 6).

Ergo, Liquid Water, and Biological Aqueous Systems in particular may therefore be defined as: *magnecules*.

With a few more facts, the future implications will become clear.

From Dr. Pollack's (2013) book *The Fourth Phase of Water*: "EZ charge separation closely resembles the initial step of photosynthesis, which entails the splitting of water next to some hydrophilic surface. This resemblance may be auspicious: if that first step works as effectively as it does in photosynthesis, then some kind of water-based harvesting of light energy may have a promising future. Designs built around water might one day replace current photovoltaic designs." (p. 336).

Santilli (2005) writes:

> "Recall that quantum chemistry was unable to achieve an exact and invariant representation of the main characteristics of the water molecule from unadulterated first principles despite efforts over the past century. In fact, a historical 2% has been missing in the representation of the water binding energy, while the representation of its electric and magnetic moments was embarrassingly wrong even in the signs." (Santilli 2005, p. 142).

A new approach is required. Hadronic mechanics is that approach. Dr. Santilli has also derived a novel underlying quantitative explanation for H bonds which is explicable entirely within the known confines of QED (Santilli, 2005, 2008, 2012 and others). As is known, liquid water may be ascribed its unique characteristics such as high vaporization temperature to the part played by H bridges. In place of the familiar description of H bond formation involving uneven molecular charge distribution and proton exchange, Dr. Santilli offers up a quantitatively specific model based in the

forming up of H bonds and intermolecular adherence via the primary attraction of actual *polarized* toroidal electron orbits (as distinct from the orbitals, which are abstract mathematical objects rather than physical objects). (Santilli 2005, p. 31; 2012).

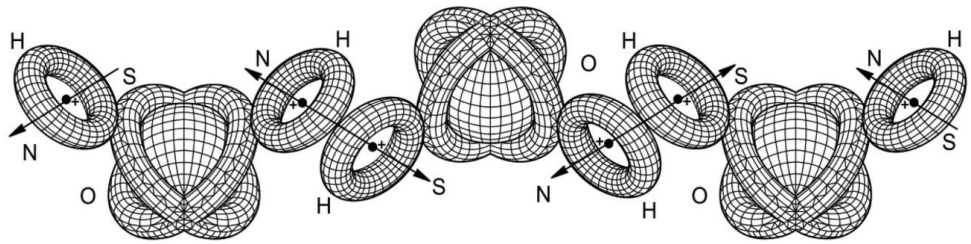


Figure 1. One of the possible magnecular bonds of H-atoms in the liquid state of water. Pictorial representation of liquid water as hypothesized in Santilli's polarized toroidal orbit model of the H bridge. Figure used with permission of Dr. Santilli.

Due to the fact that within aqueous informational systems we are dealing with a ferro-electric structure with mnemic properties, we may not be surprised to discover the internal magnetic organization of the system is disrupted by increased temperature just as with a magnet, and so, the *Curie temperature* is that of the boiling point.

Now that we have established the magnecular structure of the H bond, let us look to the H bond itself to observe how it forms clusters which continuously flicker—indicating inductive dynamics and compensatory opposite charges across the H bond. Here, we see the polarized electron orbits, constantly created by way of induction and anti-correlation—implying the expected source of coherence and informational exchange: *a scalar wave*. This appears to be the source of like likes like attraction we observe in aqueous systems, from human bodily tissues which are of predominantly negative charge, right to cloud formation and coherence of negatively charged droplets: polarized electron orbits bound in magnecular inductive bonds. We assert: the scalar wave is a coherent informational mediator and structural agent within the H bond.

The effects upon cell morphology and health of aqueous information extend to the basis of biology: coherence itself (Norman and Dunning-Davies, 2017). Please note, coherent photons in the UV range called bio-photons regulate genetic expression and appear to originate from DNA (Popp et al.

1984) and structures called microtubules (Hammeroff, Penrose, 2014). Experiments have created just these sort of coherent excitations from microtubules using ***AC*** (Hammeroff, Penrose, 2014, p. 69, Bandyopadhyay ref. 88, 89) implying from our vantage, that inductive processes fostered those coherent biophotonic excitations from H bonds interacting with geometricized proteins within the microtubule's water channel.

We wish to put forward the theory, that coherent domains within aqueous systems are in fact coherent collections of flickering H bonds that are known to rapidly form in their dynamism many near-simultaneous clusters within aqueous systems as they presumably, by our theories, express and exchange scalar waves across system components such as the aqueously immersed H-bond mediated double helix of DNA (see below). The coherent organization and mnemic capacity within aqueous systems is a function of their changeable, rapidly interruptive, informationally rich H bond magnecular scalar wave exchanges.

[see reference list 4 for section below]
How does the H bond actually work to create the high vaporization temperature and large mnemic capacity of water? How do scalar processes play in, and how does the distributed encoding across bio-systems work?

We may theorize and propose a specific piece of physics which creates these effects. What is the hidden informational variable, and how would it operate to maintain system coherence?

Along with Dr. Ruggeri Santilli, coauthor of the information below excerpted from our work: "Jeremy Dunning-Davies, Richard Norman, Ruggero Maria Santilli. A Possible Angular Quantization as a Complement to the Conventional Radial Quantization in the Hydrogen Atom and Aqueous Systems. American Journal of Modern Physics. Special Issue: Issue III: Foundations of Hadronic Chemistry. Vol. 6, No. 4-1, 2017, pp. 105-109. doi: 10.11648/j.ajmp.s.2017060401.19,"—we have derived the following magnecular model of the H atom molecule and bond, here further expanded to generally define the oscillators in question and their relation to scalar process connectivity.

Our study is based on the principles of quantum mechanics according to which the energy absorption by the hydrogen atom cannot be continuous and, therefore, must be discrete.

To begin, we consider the ground state of the hydrogen atom at absolute zero degree temperature. We assume in first approximation that such a ground state is entirely contained in a plane, thus ignoring fluctuations due to the uncertainty principle and other contributions because of expected second order effects.
The conventional quantization of the hydrogen atom shall be called hereon *radial quantization,* (and be denoted with the superfix "*r*") to indicate its emphasis on a toroidal
distribution of quantized orbits as per the magnecular model.
We will study the absorption by the hydrogen atom of thermal energy (e.g., due to infrared waves) in cases where energetic quanta are assumed to be *smaller* than the energy needed for the transition from the ground state to the first excited state.
Our main assumption is that, in order to verify quantum mechanics, the indicated absorption cannot be continuous. Consequently, the said absorption is here assumed, apparently for the first time, to be quantized. Alternative views would imply either deviations from quantum mechanics or the inability by the hydrogen atom to absorb heat.
Since, by assumption, the absorbed energy does not allow the transition to the first excited state, the most plausible transition of the hydrogen atom is that from the planar distribution to a distribution in three dimensions, thus implying the appearance of an *angular component* in the shape of the electron orbits.

The quantization of the absorbed thermal energy by the hydrogen atom when insufficient for the transition to an excited state is hereon called *angular quantization* (and denoted with the superfix "*a*") to indicate its emphasis on angular distributions over the plane of the ground state at 0^o *K*.

The next issue is the identification of the *shape* of the orbit of the electron for the indicated energy absorption. As the considered excitation cannot lead to the first excited state, since the electron orbit is expected to remain near that of the ground state, and since the excited orbit under consideration cannot be radial to avoid violation of quantum mechanics, the most plausible shape is that of a *toroid distribution* much along the lines of that

introduced in (Santilli, 2001) at the emergence of the new chemical species of magnecules.

The next issue is the shape of the electron orbit inside the indicated toroid. Since the said trajectory cannot be radial for the reason indicated above, the most plausible trajectory
in angular quantization is that of a helix entirely contained in the indicated toroids, as illustrated in Figure 1.

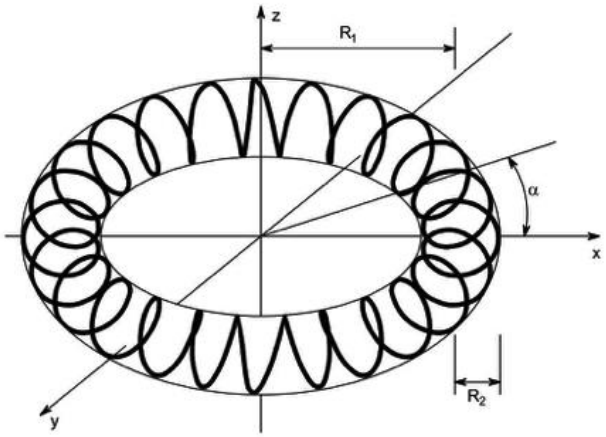


Figure 1 above.

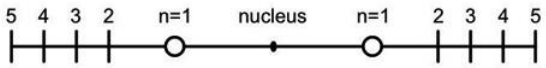


FIG. 2A

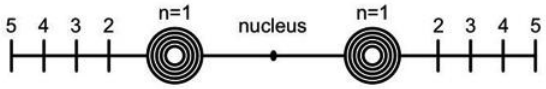


FIG. 2B

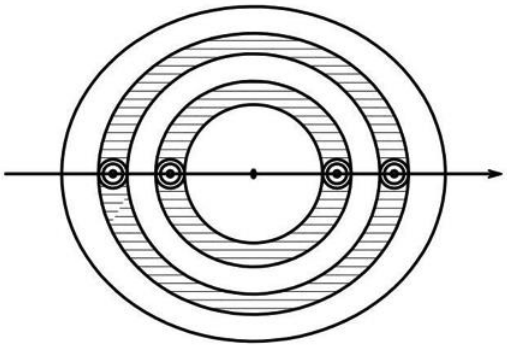


FIG. 2C

Figure 2 above.

In order to appraise the plausibility of orbital quantization, we believe that the first quantitative treatment should be done in the simplest possible, semi-classical Bohr approximation, and then pass to full treatments in first and second quantization.
Therefore, we consider the wavelength of the electron of the hydrogen atom for the ground state and the first excited state in the Bohr approximation

$$\lambda_1^r = 2\pi r_1 = 6.28\ b, \quad \lambda_2^r = \pi r_2 = 12.57\ b. \tag{1}$$

with related difference

$$\Delta\lambda^r = \lambda_2^r - \lambda_1^r = 6.29\ b \tag{2}$$

where $b = 0.053 \times 10^{-8}\, cm$ is the well-known Bohr radius.

The thermal energy absorption here considered should verify the condition

$$\Delta\lambda^a \leq 6.29\, b. \tag{3}$$

We consider now the corresponding (negative) values of the energy

$$E_1^r = 1.36\, eV, \;\; E_2^r = \frac{1.36}{2^2}\, eV = 0.34\, eV. \tag{4}$$

Consequently, the thermal energy absorbed by the hydrogen atom E^a here under consideration is restricted by the condition

$$E^a \leq 1.02\, eV. \tag{5}$$

We consider now the quantization of the helical trajectory of the electron inside the toroid as illustrated in Figure 1. As one can see, the said trajectory is characterized by two lengths: r_1, which is the original radius of the ground state; and r_2, which is the radius of the toroid; plus the number of turns p of the helix in the said toroid.

The quantization connected to r_1 is conventional and, therefore, it is indicated with the traditional quantum number n = 1,2,3,...; the quantization connected to r_2 will be indicated with the new quantum number m = 1,2,3,...; finally, the number of turns cannot be fractional for stability, thus constituting a third quantum number p = 1,2,3,....

Therefore, the wavelength created by thermal energy λ^a has the following functional dependence

$$\lambda^a = \lambda^a(r_1, r_2, n, m, p). \tag{6}$$

under conditions (3) and (5).

By keeping in mind the limitations of our model that are unavoidable for first studies, the following ideas are important. In order to initiate a quantitative treatment, we approximate the toroidal helix of Figure 1 with a cylindrical helix with length $2\pi r_1$, cross-sectional area with radius r_2 and the same number of turns p, in which case the length of the helix and, therefore, the wavelength electron in orbital quantization, is given by the known expression

$$\lambda^{a}_{n=m=p=1} = \sqrt{(\frac{2\pi r_1}{np})^2 + (\frac{2\pi r_2 p}{m})^2} \qquad (7)$$

where one recognizes the conventional quantization for radius r_1, and two new quantizations - that for the radius r_2 and that for the turns.

The first important implication of our model is the introduction, apparently for the first time since the initiation of studies on the hydrogen atom, of a basically new quantization that is geometrically based on the angle α of Figure 1, although mathematically treated through the radius r_2.

It should be stressed that representation (7) is only an *approximation* of the expected full angular quantization of the electron trajectory inside the toroid which is currently under study. In fact, expression (7) is a mere "linearization" of the toroid. However, to be valid, the said linearization should occur for the helix in the toroid without solution of continuity, that is, without beginning and end. The verification of the latter condition is done via the condition that the number of turns, p, be positive integers.

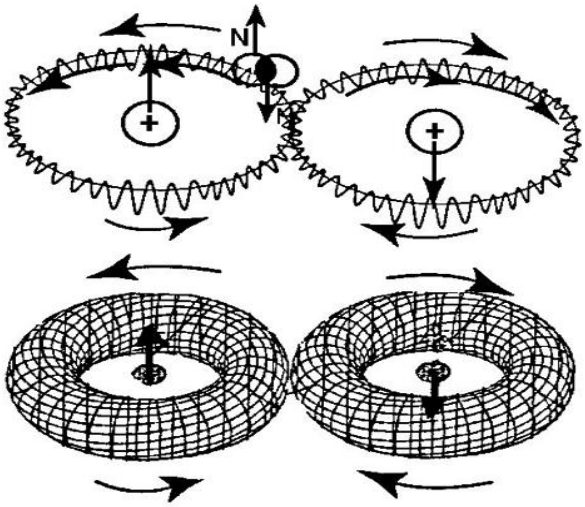


Figure 3 above.

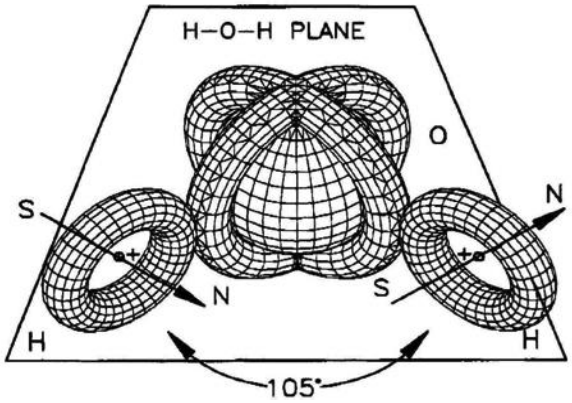


Figure 4 above.

The following comments are in order:

1. When the radius of the toroid is null, $r_2 = 0$ (in which case $p = 1$), the absorption of thermal energy is null, and Eq. (7) recovers Bohr's quantization uniquely and identically,

$$\lambda^a \equiv \lambda^r = \frac{2\pi r_2}{n} \tag{8}$$

as a result of which our model can be considered as being a "completion" of the Bohr model with quantized angular contributions.

2. The smallest possible quantized absorption of thermal energy by the ground state occurs for $n = m = p = 1$, with wavelength

$$\lambda^a_{n=m=p=1} = \sqrt{(2\pi r_1)^2 + (2\pi r_2)^2} \tag{9}$$

namely, the wavelength is given by Bohr's wavelength for the ground state plus a correction term.

3. When the absorbed thermal energy is that with the equality in value (5), there is the transition to Bohr's first excited state with no toroids. The same occurs for subsequent excited states.

4. It is evident that, for large values of the quantum numbers n, m at constant p, the absorption of thermal energy tends to zero, and so does the associated wavelength

$$Lim\lambda^{a}_{n,m\to\infty}= 0 \qquad (10)$$

By keeping in mind the limitations of our model that are unavoidable for first studies, the following comments are in order also:

i. In addition to the right and left degrees of freedom of the helix for a given *n*, there exists a large number of values of *m* and *p* verifying conditions (3) and (5), as necessitated for reasons indicated below. This occurrence is conceptually illustrated in the sectional view of Part B of Figure 2 with several concentric toroids associated with the ground state without encompassing the first excited state.

ii. Until now we have considered the absorption of thermal energy (e.g., due to infrared waves) by the *structure* of the hydrogen atom. In addition, we have the thermal energy due to collisions, which causes known rotations of the hydrogen atom conceptually illustrated in part C of Figure 2. The latter absorption occurs for *the hydrogen atom as a whole* and, as such, cannot be quantized.

iii. The application of a sufficiently strong external magnetic field to the hydrogen atom (such as that caused by a high current DC discharge in a hydrogen gas) eliminates the rotation, therefore exposing the quantized toroids of the new species of magnecules (Santilli, 2001) as experimentally confirmed by Day and Yang et al (Day, 2004; Yang et al. 2013, 2013*a*). A second important implication of our model presented in this note for the first time, is that the toroidal distributions at the foundation of the new chemical species of magnecules have a quantized structure in full agreement with quantum mechanics.

Needless to say, in order to allow, in due time, experimental verifications, the proposed angular quantization must be extended to the hydrogen molecule. For this purpose, we adopt the *Santilli-Shillady isochemical model of the hydrogen molecule* (Santilli, 2001) which is based on an actual *attractive force* between the identical valence electrons in singlet couplings; that attractive force being of sufficient strength to bond the electron pair into a quasiparticle called *isoelectronium.*

With reference to Figure 3, the application of our angular quantization to the hydrogen molecule is then given by the extension of the initial helical trajectory of one single electron (Figure 1) to the helical expression of two bonded electrons represented in the isoelectronium in the oo-shaped toroid of Figure 3. Therefore, the extension of our model to the isoelectronium of

the hydrogen molecule appears indeed to allow the extension of the angular quantization from the hydrogen atom to the hydrogen molecule.

Our angular quantization implies that the isoelectronia of the two $H - O$ dimers of the water molecule describe a helical trajectory within the oo-shaped toroids of Figure 4. Consequently, *the water molecule can indeed acquire a substantial amount of data* expressed precisely by the

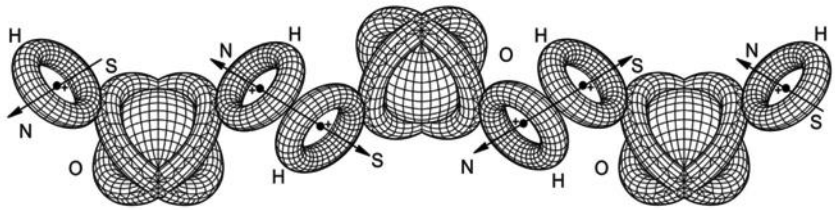


Figure 5 above.

angular quantization described above, as a function of the descriptively encoded multiplicity of quantum numbers associated with the evolving toroids, the angular interactivities demonstrated by individual water molecules and their collective orientation in the H-bond network. Next we will spell out the toroid as a proposed new sort of harmonic oscillator, within the context of the magnecular H bond model.
In order to initiate a quantitative study pertaining to informational propagation in aqueous systems, it is necessary, in our view, to use a model of the liquid state with an explicitly articulated *attractive force* between the water molecules, such as the magnecular model of Santilli (Santilli, 2017). In fact, only as a function of this attractive force can the information acquired by one hydrogen atom of the water molecule be propagated to the corresponding hydrogen atom of the next water molecule, evidently with progressively decreasing intensity.

The H bond is responsible for the informational capacity and high vaporization temperature of water. How does the propagation of information and attractive force across the H bond work? We propose the following:

Think of the two toroidal orbits which form an H bond as oscillators, but not linear oscillators, instead, think of them as coherent toroidal oscillators.

This explains coherent aqueous oppositional toroidal polarizations as a continuous scalar mediated inductive process.

Water demonstrates coherence...why? Please recall the necessity of anti-correlation in fostering stable scalar informational connectivity. If a scalar wave is to connect two elements, it is dependent upon anti-correlation in those two elements so as to cancel charge, hence cancelation of phase and fluctuation in order to eliminate self-inductance and sustain the wave as voltage-over-time. In fact, self-inductance is itself a limiting factor in electrical systems (according to the known writings of Tesla). So it is with the H bond.

Think of the two toroids of an H bond (fig. 5) as anti-correlated inductively coupled electron path oscillators. One electron passes through its helical pathway at relative 180 degree phase to the other electron, bound in anti-correlation, thereby creating conditions for a scalar wave between them. However, there is a stability exchange limit, what we refer to as "system exchange capacity" within such a coupled physical system, past which sufficient anti-correlation breaks down, creating fluctuation and self inductance. This implies the collapse of the scalar wave, creating the H bond flicker, and hence by way of this interruption, the oscillator pairs' compensatory inductive realignment to renew phase opposition and anti-correlation in repolarization.[7] In this way, attractive force and coherence between H bond components is maintained by way of continuous interruptive inductive polarization of the toroids expressed within an intrinsic system exchange capacity.

Hence we may infer, the flash rate of a particular H bond is merely its rate of inductive interruption. Differing flash rates of differing H bonds then, indicate variance in aqueous system coherence and stability. It seems natural to propose that flash effects could be due to interference between longitudinal scalar waves in dynamic cluster formations, leading to variance in system stability hence variance in "system exchange capacity." Scalar waves provide systemic *constraint*, organization, which appears to be the active dynamic, rather than physical uncertainty.

---

[7] **We wonder if H bond intra-polarizations reverse with each interruption to reduce vibratory expression which would weaken the H bond, see note below**.

We may theoretically define coherence and entanglement within magnecular aqueous forms, likely all magnecular clusters, and *perhaps in nearly all manifest cases* as demonstrating scalar wave mediated inductive coupling. Entanglement is *stable* scalar wave mediated inductive coupling.

We may define concurrence or, strength of entanglement then, as being akin to mutual inductance.

Heat and entropy[8] play into these processes at a fundamental level, as is clear considering their relation to informational capacity (Norman et al. 2016; Norman, Dunning-Davies, 2017). Please note how hydrophilic H bond structured coherent water H_3O_2, is formed by way of heat (or pressure). Note the role of entropy[9] within the mathematics of consciousness (Tononi, 2008), and (aqueous) information theory alike (Norman, Dunning-Davies, 2017). Perhaps you can guess at this juncture our proposed system-emergent informational and so conscious connection: *the scalar wave*.

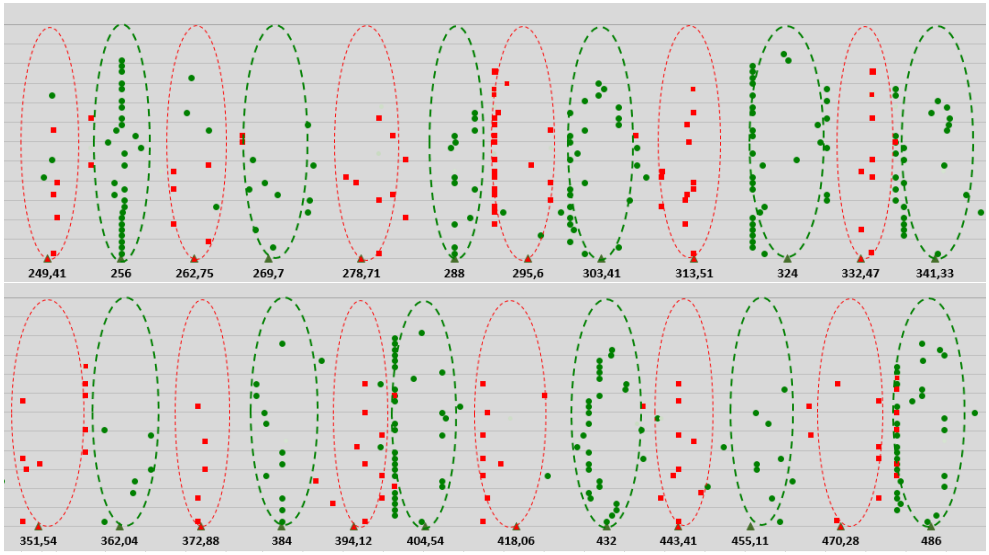
As longitudinal waves, scalar waves are closely predicted to generate interference with each other, offering up a physical explanation for observed patterns within coherent phenomenon. Manifest efficacious frequency spectra associated with coherent phenomenon then, are theorized to be a function of longitudinal scalar wave constructive interference between scalar waves associated with object dynamics within the coherent intra-system. If our theory is correct, and the H bond within aqueous systems and most pertinently within aqueous bio-systems is indeed a coherent dual toroidal harmonic oscillator we should observe said frequency specific coherence in close association with the encoding of toroidal geometry.

This is precisely what is inferred through meta-analysis of examples of bio-coherence within the scientific literature. In the important paper *Mathematical Structure for Electromagnetic Frequencies, that Reflects Bohm's Implicate Order*, J.H. Geesink and D.K.F. Meijer, Biological

[8] We will however point out that this particular argument concerning heat is theoretically limited, as it must be clear to which entropy function – classical thermodynamic or informational – reference is being made since the two are not necessarily the same.

[9] Strictly speaking this refers to *informational entropy* to recognize the fact that the entropy functions of classical thermodynamics and information are not proved to be the same.

Physics, January 2018, from which the caption, graphics and quotations below are derived, we see that 382 bio-studies have been analyzed, frequency specific coherent bio-effects derived, and the possibility of toroidal geometric connectivity is indeed, deeply implied. The hidden variable in evident operation, we propose is indeed akin to the one Bohm envisioned: *the longitudinal scalar wave.*



Frequencies (normalized) (Hz)

Measured frequency data of living cells systems that are life-sustaining (green points) and detrimental for life (in red squares) versus calculated normalized frequencies. Biological effects measured following exposures or endogenous effects of living cells in vitro and in vivo at frequencies in the bands of Hz, kHz, MHz, GHz, THz, PHz. Green triangles plotted on a logarithmic x-axis represent calculated life-sustaining frequencies; red triangles represent calculated life-destabilizing frequencies. Each point indicated in the graph is taken from published biological data and are a typical frequency for a biological experiment(s). For clarity, points are distributed along the Y-axis.

"The Tonnetz (German: tone-network) is a coherent topological structure and can represent a toroidal lattice diagram, that pictures a tonal space, as first described by Leonhard Euler in 1739.

A first approach has been made into analysing the involvement of toroidal geometric structures . . . In such a geometric model the decoherent parameters are conceived as waves that are able to distort the toroidal positions of the proposed coherent parameters."

The above caption, diagram, and quotes above and below from: *Mathematical Structure for Electromagnetic Frequencies, that Reflects Bohm's Implicate Order*, J.H. Geesink and D.K.F. Meijer, Biological Physics, January 2018, with permission.

> "Bio-solitons are conceived in the proposed model as self-reinforcing solitary waves, that are constituting local fields, being involved in intracellular geometric ordering and patterning, as well as in intra- and intercellular signalling."

Coherent light in the UV range emanating from microtubules and chromatin, *biophotons*, regulate genetic and bodily processes. Such coherent excitations may be readily produced with the application of AC current as Bandyopadhyay's group has shown (Hammeroff, Penrose, 2014, p. 69, *Bandyopadhyay* ref. 88, 89). Recall the role of AC or interruptive DC in inductive processes. We may infer from our theory that it is the H bonds within the geometricized protein water channel that are then electrically encouraged to induction. In Tesla's works we read a description we believe implies how this coherent light emission probably occurs: by way of rapidly alternating electrostatic potential (Martin, 1995 p. 187) exciting bound aetherial vibratory expression (ibid. p. 148; 279) and hence luminescence.

In the case of an H bond, the resultant biophoton is then encoded within the coherent toroidal structuralization of the flickering H bond, to which we attribute the inductive role of hyper-rapid electrostatic alternation, having an estimated "genuine" lifetime (hence an average estimated inductive flicker rate) of over three picoseconds for "genuine" H bond breaking (Voloshin et al. 2009).[10]

We propose: It is between system component associated longitudinal scalar wave expressions that constructive interference arises leading to bio-functional, manifest, frequency-specific coherence. Longitudinal scalar wave interference structures the above proposed bio-soliton and hence, is the hidden variable creating observed effects.

[10] [V. P. Voloshin and Yu. I. Naberukhin Translated from *Zhurnal Strukturnoi Khimii*, Vol. 50, No. 1, pp. 84–95, January–February, 2009; Journal of Structural Chemistry February 2009, Volume 50, Issue 1, pp 78–89.]

In *Evidence for Bohm's Deterministic Quantum Equilibrium for inanimate and animate systems* J.H. Geesink Quantum Physics, January 2018, we learn that the substantial and copious experimental data associated with Einstein, Podolsky and Rosen correlation paradoxical entangled effects, fits the proposed coherent spectra! Bohm was right. There is no paradox, only physics. Here is the hidden variable in question: the longitudinal scalar wave.

It appears quite possible that the famed collapse of the wave function is merely the collapse of the system associated scalar wave expression upon conditions of inductive interruption, such as those of informational exchange.

We may use our model based in a functional bound aether to deduce that the soliton like effects attributed to scalar waves in CIA documents[11] such as unperturbed passage through matter sans dissipation must be due to the propagation of the wave through the bound aetherial medium with which matter is associated/bound, not the matter itself.

To review a few well known facts: Hydrogen bonding establishes the regular pattering and geometry of DNA itself. 142 hydrogen bonds exist between DNA and the histone core in each nucleosome. [12] Chromatin is an acknowledged source of biophoton emissions.[13]
Just as the toroidal H bond electron pathways offers up an obvious micro-parallel to the winds in a Tesla Transformer or Induction Coil, permitting a simple analogy to both the demonstrated physical aspects of particle charge and angular momentum (see previous discussion of intermediate neutroid to neutron mutation, spin, charge and the aetherino), so may we again find a familiar electrical basis within chromosomal structure.

[11] (https://www.cia.gov/library/readingroom/docs/CIA-RDP96-00792R000500240001-6.pdf)
[12] (see: molecular biology of the cell, 4th edition)
[13] [https://www.ncbi.nlm.nih.gov/pubmed/6204761 Cell Biophys. 1984 Mar;6(1):33-52. Biophoton emission. New evidence for coherence and DNA as source. Popp FA, Nagl W, Li KH, Scholz W, Weingärtner O, Wolf R.].

In the important article (Kanev et al. 2013)[14] we read the following:

> "Our studies reveal previously unidentified electrical properties of chromosomes: (1) chromosomes are amazingly similar in construction and function to electrical transformers; (2) chromosomes possess in their construction and function, components similar to those of electric generators, conductors, condensers, switches, and other components of electrical circuits; (3) chromosomes demonstrate in nano-scale level electromagnetic interactions, resonance, fusion and other phenomena similar to those described by equations in classical physics.
>
> Our search for electrical properties, phenomena and mechanisms in the construction and function of chromosomes are based on the satellite associations of the acrocentric chromosomes in plants, animals and humans. It is known that associations develop only among charged satellites, but the origin and nature of the interactive forces responsible for satellite charge and association formations remain unknown.
>
> Resonance, vibrational and oscillatory forces and their mechanisms are well-known in physics, yet they are unrecognized at the chromosome level in genetics.
>
> In physics, electrical, and mechanical engineering, it is well known that resonance forces occur with all types of vibrations or waves: mechanical, acoustic, electromagnetic, nuclear magnetic, and electron spin resonance. It is also known that vibration is a mechanical phenomenon whereby oscillations occur about the equilibrium positions of the system where the total energy is the lowest.

[14] Ivan Kanev, Wai-Ning Mei, Akira Mizuno, Kristi DeHaai, Jennifer Sanmann, Michelle Hess, Lois Starr, Jennifer Grove, Bhavana Dave, and Warren Sangera Searching for Electrical Properties, Phenomena and Mechanisms in the Construction and Function of Chromosomes Comput Struct Biotechnol J. 2013; 6: e201303007. Published online 2013 Jun 27. doi: 10.5936/csbj.201303007

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3962117/

“Resonance oscillation takes place when the system is interacting with a time dependent external disturbance with a similar frequency that renders a self-reinforced vibration and causes the amplitude to grow and reach the size of the system. Eventually, in conditions with strong resonance, oscillation and vibration forces could get out of control and become violent, leading to “self-destruction”. “

Our collaborative studies across disciplines reveal that the mechanisms responsible for the formation of satellite associations and joint formations are similar to these described in physics by Maxwell's equations. Even the terminology used in physics and genetics is similar. For example “charge” is widely used in physics for the description of attractive and repulsive forces of electromagnetic origin. “Charge” with unspecified definition is used in clinical genetics for the description of satellite associations like these shown in Figures 4–6 [49]. Charged satellites demonstrate at the nano-scale level, attractive and repulsive forces which are similar to these described by Maxwell equations

Based on data from quantum mechanical studies on the molecular structures of DNA and chromosomes, we can confidently regard DNA and chromosomes as mechanical structures on a microscopic scale, which are anticipated to obey the same laws of physics as other mechanical structures. It seems very promising to evaluate the corresponding resonance, vibrational, and oscillatory forces, operational in DNA and chromosome structures, as well as their ability to cause cracks and breaks.

In studies on DNA and chromosomes, the emitted light is known as ”biophotons”, “mitogenetic radiation” and “Gurvich ray” as reported by Gurvich [43–44]. Sound and image generation were related to holograms and biocomputers, as reported by Peter Gariaev *et al* [45]. Information and transmission properties of viral RNA were discussed by Nobel Prize winner Luc Montagnier at al. [46].

Bodily tissue, including chromosomes, is known to act as a capacitor (condenser) since the time of Tesla [38] who suggested that: *“Bodily tissues are condensers or capacitors, perhaps with innate*

compatibility toward the presence of high electric fields which already is present in cellular tissue, which is the basic component (dielectric) for an equivalent circuit only recently developed for the human body."

Ergo: Bodily tissues could provide a source of current for inductive effects, and partly stabilize conditions of self-inductance much as a condenser, fostering scalar wave creation and resultant coherence within the highly variable environment of bio-systems.

DNA is highly coherent.[15] The entire double helix of DNA is in interactive external aqueous contact via H bonds.[16]

We have put forward the proposition that biophotons created in Bandyopadhyay's group's stimulated AC microtubule experiments (Hameroff, Penrose, 2014) which are indeed manifest as coherent excitations, emanate across the H bonds in the geometricized microtubule protein water channel once those constrained H-bonds are stimulated to rapid induction by available alternating energies. The so called *Quantum nano-electro mechanical oscillator interference patterns* in the work of Bandyopadhyay, the resultant "soliton" created and those rapid, self-limiting protein self-assembly processes described in this deeply detailed work arise in our view, by way of transverse associated, condensational, longitudinal scalar wave interference emergent of interactive em expressions fostered amongst geometricized proteins, creating coherence and so, functional informational constraint within physical system-state evolution.

See:

[15] http://www.pnas.org/content/110/39/15555 Mapping of chromatin dynamics
Alexandra Zidovska, David A. Weitz, Timothy J. Mitchison
Proceedings of the National Academy of Sciences Sep 2013, 110 (39) 15555-15560; DOI:10.1073/pnas.1220313110

[16] 26-APR-2011 Water molecules characterize the structure of DNA genetic material HELMHOLTZ ASSOCIATION Public Release. https://www.eurekalert.org/pub_releases/2011-04/haog-wmc042611.php

Annual Report for AOARD Grant FA2386-10-1-4059 “Research Title” Biological information processing in single microtubules. Anirban Bandyopadhyay http://www.dtic.mil/dtic/tr/fulltext/u2/a563853.pdf [17]

According to Anirban Bandyopadhyay, we paraphrase: Heat in combination with electrical processes creates two proposed soliton types which interact, one might say 'self interfere', within protein structural mediation to gain the needed effects.

> "Thus, continuous creation/destruction of point-contacts plays a major role in the cooperative management of purely mechanical phonon transport, and purely electromagnetic soliton transport. The protein structure spontaneously produces the electronic form of soliton, while, structural symmetry of 2D tubulin array is essential for the phonon-solitons. A harmony in opening/closing the gates for two kinds of solitons is achieved through the synchrony of dipoles, a remarkable dipolar rearrangement mechanism that enables it to shift the charge centers of all tubulin-dimers simultaneously. Eventually, we observe an unprecedented transport of electrical energy that could naturally negate its associated mechanical vibrations." (ibid.) [18]

We believe those interferences and any proposed soliton heat augmentations take place across the province of geometricized-protein-adherent H bonds acting as toroidal oscillators constituent of informationally laden dynamic toroidal geometries which encode and constrain the resultant emissions. These effects, we theorize must then also involve the coordinated mechanical interventions of aqueous angular molecular variance collectively

[17] It is pleasing to note the helical electron pathway implied by the tubulin cylinder grid shape in considering our oscillator model which proposes just such a pathway, although functioning within the H bond oscillator pair, offering a pathway toward a toroidal geometric dynamic H bond mechanic associated with angular quantization and frequency.

[18] A speculative note to the reader: **We wonder if, and suspect that possibly, the relative polarization of the H bond toroids shift with each interruptive flicker in order to sustain the process sans vibratory excess over H bond structural limits?** We also wonder if the same alternation of system component polarizations is possibly present for the same reasons in other scalar mediated inductive systems?

shared and distributed via H bonds across geometrically constrained protein water system interactions. [19]

Now, we propose that scalar wave encoding transferred collectively across the flickering oscillatory aqueous/chromosomal H-bond intra-system, once affected by DNA protein geometry and electrics, is sufficient to offer deep near-simultaneous connective informational constraint (a hallmark of consciousness) and informational capacity and hence, mediate encoded coherent biophoton expressions emanating from chromatin (DNA). Biology and the coherence which sustains it are functions of electromagnetic processes.

Types of scalar functionality noted (permitting substantial functional overlap):

1. as induced charge and spin via Poynting vortex—a function of dis-equilibrium information (neutrino theory correction).
2. as inductive scalars mediating coherence limited by system exchange capacity—the H bond etc. A source of polarized toroidal aqueous like force polarizations such as those noted in (Santilli, 2017)[20] and high vaporization temperature due to H bonds.[21]
3. as nonlocal mediator of anti-correlation within entangled systems.
4. as nonlocal gravitational distributor of nuclear polarizations.
5. as a longitudinal pilot wave associated with particle and systemic state evolution (Schrodinger equation/Bohmian mechanics).
6. as particle and mass associated, informational, inter-system state mediators—force carriers.

Closing remarks:

Due to scientific suppression and misinterpretation of experimental results, physics has been left in a quandary. Each different force and aspect seemed to require individual explanation and so, unneeded complexity was the result. Tesla states (Martin, 1995 p. 149):

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[19] We wish to thank Dr. Ruggero Santilli for his many insightful communications concerning the connection between variations within aqueous molecular angular expressions and systemic informational exchange.

[20] A Tentative Magnecular Model of Liquid Water with an Explicit Attractive Force Between Water Molecules. *American Journal of Modern Physics*, Special Issue: Issue III: Foundations of Hadronic Chemistry.

[21] We wish to thank Dr. Ruggero Santilli for his many insightful communications concerning the H bond within collective aqueous molecular systems.

"***But of all the views on Nature, the one which assumes one matter and one force, and a perfect uniformity throughout, is the most scientific and the most likely to be true***."

We agree. Do note, we have shown that the hadronic structure of matter is electromagnetic,[22] quantum effects are electromagnetic and also note that the gravitational force is itself, again—electromagnetic. Dualism and paradox are manifestations not of physics, but of confusion. Simplicity is ours. There is a hidden variable, real physics beneath our world; the omnipresent medium through which it travels and the scalar wave.

Conclusion:
Scalar waves propagating through an aetherial medium within physical operations spanning aqueous bio-systems and the H bond, gravitation, quantum effects and electromagnetic expressions are themselves the additional informational component past the systemic components that are in evidence: *Consciousness*.

The physics of the inductive longitudinal scalar wave propagating within an aether medium is the hidden quantum, electromagnetic, aqueous, biological and gravitational variable.

We assert that *scalar wave connectivity adds system-state information past the sum of those components it connects within entangled dynamics and also within the dynamic mediation of electromagnetic phenomenon, gravitation and all physical operations involving force carriers expressed as virtual particles*. By definition we may then conclude:

Physical and biological operations involving scalar mediations as force carriers, and within correlation effects and coherence as expressed in biological, aqueous and other physical systems, are a function of consciousness, and consciousness then, as it is itself expressed in coherent, entangled and electromagnetic processes is objectively definable at the

[22] Norman, Dunning-Davies (2017) Hadronic paradigm reassessed: neutroid and neutron synthesis from an arc of current in
Hydrogen gas, Hadronic Journal. 40; 119 - 148.
https://www.researchgate.net/publication/317267278_Hadronic_paradigm_reassessed_neutroid_and_neutron_synthesis_from_an_arc_of_current_in_Hydrogen_gas

lowest physical level as **the scalar wave**.

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Two minute minute movie on the operation of the neutron source
http://thunder-energies.com/docs/MagnaPower.mp4 ;
neutron counts per Seconds detected by the Ludlum detector model 375
http://thunder-energies.com/docs/Ludlum-Alarms.mp4
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