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The Cosmic Ether: Introduction to Subquantum Kinetics

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Abstract: A general overview of the physics and cosmology of subquantum kinetics is presented, together with its more recently developed explanation for quantum entanglement. Subquantum kinetics is shown to be able to account for the superluminal control of the parallel-antiparallel orientation of particle spin mediated through electric potential soliton beam links established between remotely positioned, mutually entangled particles.

The transmuting ether concept

Subquantum kinetics is a unified field theory whose description of microphysical phenomena has a general systems theoretic foundation (LaViolette 1985a,b,c, 1994, 2010). It conceives subatomic particles to be Turing wave patterns that self-organize within a subquantum medium that functions as an open reaction-diffusion system. This medium, termed the *transmuting ether*, like the Akashic field, forms the substrate from which all physical form in our universe emerge. This ether, which requires more than three dimensions for its description, differs from 19th century mechanical ethers in that it is continually active, its multifarious components transmuting, reacting among themselves, and diffusing through space, these interweaving processes binding the ether into an organic unity.

Subquantum kinetics presents a substantially different paradigm from that of standard physics which views particles as *closed* systems. Whether these be subatomic particles bound together by force fields, or quarks bound together by gluons, physics has traditionally conceived nature at its most basic level to be composed of immutable structures. Unlike living systems which require a continuous flux of energy and matter with their environment to sustain their forms, conventional physics has viewed particles as self-sufficient entities, that require no interaction with their environment in order to continue their existence. Thus classical field theory leads to a conception of space which Alfred North Whitehead has criticized as being one of mere *simple location*, where objects simply have position without incorporating any reference to other regions of space and other durations of time.

Whitehead instead advocated a conception of space manifesting *prehensive unification*, where separate objects can be "together in space and together in time even if they be not contemporaneous." The ether (or Akasha) of subquantum kinetics fulfills Whitehead's conception. As shown below, it is precisely because of its nonlinear, reactive, and interactive aspect that the transmuting ether of subquantum kinetics is able to spawn subatomic particles and photons, manifested either as stationary or inherently propagating ether concentration patterns. In the context of subquantum kinetics, the very existence of the physical world we see around us is evidence of the dynamic organic unity that operates in the universal substratum below, imperceptible to us and out of reach of direct detection by the most sophisticated instruments.

The notion of an ether, or of an absolute reference frame in space, necessarily conflicts with the postulate of special relativity that all frames should be relative and that the velocity of light should be a universal constant. However, experiments by Sagnac (1913), Graneau (1983), Silvertooth (1987, 1989), Pappas and Vaughan (1990), Lafforgue (1991), and Cornille (1998), to name just a few, have established that the idea of relative frames is untenable and should be replaced with the notion of an absolute ether frame. Also a moderately simple experiment performed by Alexis Guy Obolensky has clocked speeds as high as 5 *c* for Coulomb shocks traveling across his laboratory (LaViolette, 2008a). Furthermore Podkletnov and Modanese (2011) report having measured a speed of 64 *c* for a collimated gravity impulse wave produced by a high voltage discharge emitted from a superconducting anode. These experiments not only soundly refute the special theory of relativity, but also indicate that information can be communicated at superluminal speeds.

However, subquantum kinetics does not negate the existence of "special relativistic effects" such as velocity dependent clock retardation and rod contraction. Nor, in offering an alternative to the space-time warping concept of general relativity, does it negate the reality of orbital precession, the bending of starlight, gravitational time dilation, and gravitational redshifting. These effects emerge as corollaries of its reaction-diffusion ether model (LaViolette 1985b, 1994, 2004, 2010). It should be added that subquantum kinetics has made a number of testable predictions, twelve of which have been subsequently verified (LaViolette 1986, 1992, 1996, 2005, 2010); see Table 1.

Table 1
Twelve A Priori Predictions of Subquantum Kinetics that were Subsequently Verified

1)	The prediction that the electric field in the core of a nucleon should be configured as a radially periodic Turing wave pattern of progressively declining amplitude, and that a charged nucleon should have a Turing wave pattern whose core electric potential is biased relative to the background electric potential (LaV, 1985b, 2008b).
2)	The prediction that the universe is cosmologically stationary and that photons passing through intergalactic regions of space should progressively decrease their energy, that is, that photons should continually undergo a tired-light redshift effect (LaV, 1985c, 1986).
3)	The prediction that photons traveling within galaxies should progressively increase their energy, that is, blueshift their wavelengths, and consequently that the luminosity of planets and red dwarf stars should be due to energy being spontaneously generated in their interiors (LaV, 1985c, 1992).
4)	The prediction that the luminosity of brown dwarf stars should be due to the photon blueshifting effect described in (3) (LaV, 1985c, 1996, 2010).
5)	The anticipation of the Pioneer effect; the prediction that a spacecraft maser signal transponded through interplanetary space should be observed to blueshift its wavelength at a rate of about one part in 10^{18} per second (LaV, 1985c, 2005).
6)	The prediction that blue supergiant stars rather than red giant stars should be the precursors of supernova explosions (1985c, 1995).
7)	The prediction that galactic core emissions should come from uncollapsed matter-creating stellar masses (Mother stars), rather than from matter-accreting black holes (LaV, 1985c).
8)	The prediction that stars in the vicinity of the Galactic center should be massive blue supergiant stars as opposed to low mass red dwarf stars (LaV, 1985c).
9)	The prediction that galaxies should progressively grow in size with the passage of time proceeding from compact types such as dwarf ellipticals and compact spirals to mature spirals and giant ellipticals (LaV, 1985c, 1994).
10)	The prediction that a monopolar electron discharge should produce a longitudinal electric potential wave accompanied by a matter repelling gravity potential component (LaV, 1985b, 1994).
11)	The prediction that the speed of the superluminal gravity wave component of a monopolar electron discharge should depend on the potential gradient of the discharge (LaV, 2003, 2010).
12)	The prediction that inertial mass should decrease with a rise of G potential or with an increase in negative potential, and should increase with the reverse polarity (LaV, 1985b).

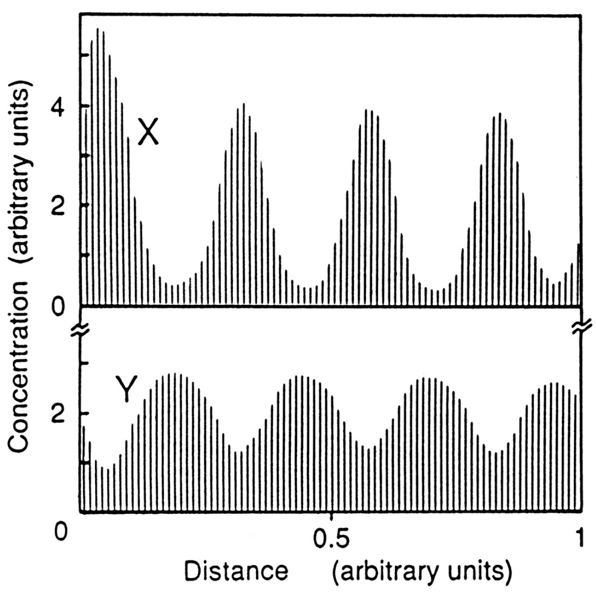
The systems dynamics of subquantum kinetics

Subquantum kinetics was inspired from research done on open chemical reaction systems such as the Belousov-Zhabotinskii (B-Z) reaction (Zaikin and Zhabotinskii 1970, Winfree 1974) and the Brusselator (Lefever 1968, Glansdorff and Prigogine 1971, Prigogine, Nicolis, and Babloyantz 1972, Nicolis and Prigogine 1977). Under the right conditions, the concentrations of the variable reactants of the Brusselator reaction system can spontaneously self-organize into a stationary reaction-diffusion wave pattern such as that shown in figure 1. These have been called *Turing patterns* in recognition of Alan Turing who in 1952 was the first to point out their importance for biological morphogenesis. Alternatively, Prigogine et al. (1972) have referred to them as *dissipative structures* because the initial growth and subsequent maintenance of these patterns is due to the activity of the underlying energy-dissipating reaction processes. In addition, the B-Z reaction is found to exhibit propagating chemical concentration fronts, or *chemical waves* which may be easily reproduced in a school chemistry laboratory; see figure 2.

The Brusselator, the simpler of the two reaction systems, is defined by the following four kinetic equations:

$$
\begin{aligned}
A &\xrightarrow{k_1} X, && \text{a)} \\
B + X &\xrightarrow{k_2} Y + Z, && \text{b)} \\
2X + Y &\xrightarrow{k_3} 3X, && \text{c)} \\
X &\xrightarrow{k_4} \Omega. && \text{d)}
\end{aligned}
\qquad (1)
$$

The capital letters specify the concentrations of the various reaction species, and the k_i denote the kinetic constants for each reaction. Each reaction produces its products on the right at a rate equal to the product of the reactant concentrations on the left times its kinetic constant. Reaction species X and Y are allowed to vary in space and time, while A, B, Z and Ω are held constant.



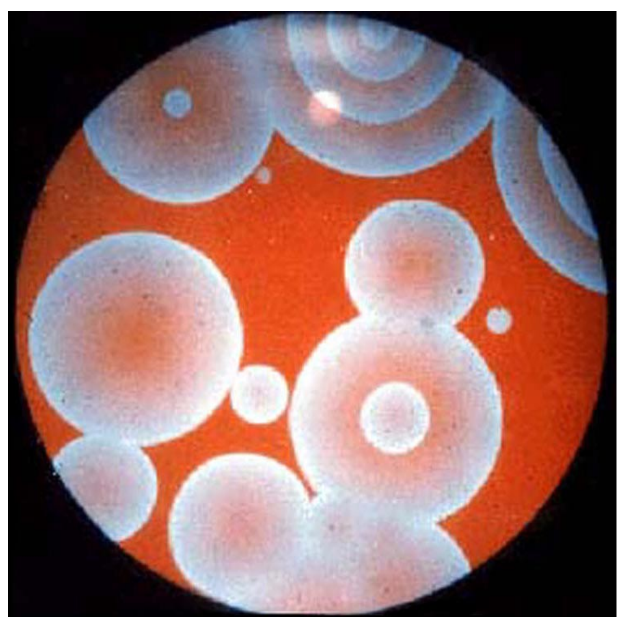


Figure 1. One-dimensional computer simulation of the concentrations of the Brusselator's X and Y variables (diagram after R. Lefever 1968).

Figure 2. Chemical waves formed by the Belousov-Zhabotinskii reaction (photo courtesy of A. Winfree).

This system defines two global reaction pathways which cross-couple to produce an X-Y reaction loop. One of the cross-coupling reactions, (1-c), is autocatalytic and prone to produce a nonlinear increase of X, which is kept in check by its complementary coupling reaction (1-b). Computer simulations of this system have shown that, when the reaction system operates in its supercritical mode, an initially homogeneous distribution of X and Y can self-organize into a wave pattern of well-defined wavelength in which X and Y vary reciprocally with respect to one another as shown in figure 1. In other words, these systems allow order to spontaneously emerge (entropy to decrease) by virtue of the fact that they function as open systems; the Second Law of Thermodynamics only applying to closed systems.

The Model G ether reaction system

Subquantum kinetics postulates a nonlinear reaction system similar to the Brusselator that involves the following five kinetic equations termed *Model G* (LaViolette, 1985b):

$$
\begin{aligned}
&A \underset{k_{-1}}{\overset{k_1}{\rightleftarrows}} G, && \text{a)}\\
&G \underset{k_{-2}}{\overset{k_2}{\rightleftarrows}} X, && \text{b)}\\
&B + X \underset{k_{-3}}{\overset{k_3}{\rightleftarrows}} Y + Z, && \text{c)} \qquad (2)\\
&2X + Y \underset{k_{-4}}{\overset{k_4}{\rightleftarrows}} 3X, && \text{d)}\\
&X \underset{k_{-5}}{\overset{k_5}{\rightleftarrows}} \Omega. && \text{e)}
\end{aligned}
$$

The kinetic constants k_i denote the relative propensity for the reaction to proceed forward, and k_{-i} denote the relative propensity for the corresponding reaction to proceed in the reverse direction. The forwarded reactions are mapped out in figure 3. Since the forward kinetic constants have values much greater than the reverse kinetic constants, the reactions have the overall tendency to proceed irreversibly to the right. Nevertheless, the reverse reactions, in particular that associated with reaction (2-b), play an important role. Not only does this one allow Model G to establish electro-gravitic field coupling, but as described below, it also allows the spontaneous formation of material particles in an initially subcritical ether.

Whereas the Brusselator and B-Z reaction conceive of a chemical medium consisting of various reacting and diffusing molecular species, subquantum kinetics conceives of a space-filling etheric medium consisting of various reacting and diffusing *etheric* species termed etherons. Being present as various etheron types (or states) labeled A, B, X, and so on, these diffuse through space and react with one another in the manner specified by Model G. Model G is in effect the recipe, or software, that generates the physical universe. Etherons should not be confused with quarks. Whereas quark theory proposes that quarks exist only within the nucleon, with just three residing within each such particle, subquantum kinetics presumes that etherons are far more ubiquitous, residing not only within the nucleon, but also filling all space with a number density of over 10^{25} per cubic fermi, where they serve as the substrate for all particles and fields.

The self closing character of the X-Y reaction loop, which is readily evident in figure 3, is what allows Model G and the Brusselator to generate ordered wave patterns. Model G is similar to the Brusselator with the exception that a third intermediary variable, G, is added with the result that steps (2-a) and (2-b) now replace step (1-a) of the Brusselator, all other steps remaining the same. The third variable was introduced in order to give the system the ability to nucleate self-stabilizing localized Turing patterns within a prevailing subcritical environment. This *autogenic* particle formation ability is what allows Model G to become a promising candidate system for

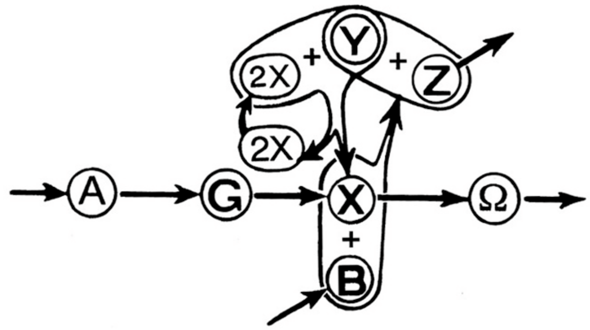


Figure 3. The Model G ether reaction system investigated by subquantum kinetics.

the generation of physically realistic subatomic structures.

Based on reaction equation system (2) we may write the following set of partial differential equations to depict how all three reaction intermediates G, X and Y vary as a function of space and time in three dimensions:

$$\left.\begin{aligned}\frac{\partial G(x, y, z, t)}{\partial t} &= k_1A - k_2G + D_g\nabla^2G \\ \frac{\partial X(x, y, z, t)}{\partial t} &= k_2G + k_4X^2Y - k_3BX - k_5X + D_x\nabla^2X \\ \frac{\partial Y(x, y, z, t)}{\partial t} &= k_3BX - k_4X^2Y + D_y\nabla^2Y\end{aligned}\right\} \quad (3)$$

where the D_g, D_x and D_y values represent the diffusion coefficients of the respective reactant variables.

A homogeneous distribution of the G, X, and Y reaction intermediates would correspond to a spatial vacuum devoid of matter and energy. Variations in the concentrations of these three variables would correspond to the formation of observable electric and gravitational potential fields, and wave patterns formed by these fields, in turn, would constitute observable material particles and energy waves. The etherons themselves would remain unobservable. Subquantum kinetics identifies the G concentration with gravitational potential, where G concentrations greater than the prevailing homogeneous steady-state concentration value, G_0, would constitute positive gravity potentials and G concentrations less than G_0 would constitute negative gravity potentials. A negative G potential well, G ether concentration well, would correspond to a matter-attracting negative gravity potential field, whereas a positive G potential hill would correspond to a matter-repelling positive gravity potential field. The X and Y concentrations, which are mutually interrelated in reciprocal fashion, are together identified with electric potential fields. A configuration in which the Y concentration is greater than Y_0 and the X concentration is less than X_0 would correspond to a positive electric potential and the opposite polarity, low-Y/high-X would correspond to a negative electric potential. Relative motion of an electric potential field, or of an X-Y concentration gradient, would generate a magnetic (or electrodynamic) force (LaViolette 1994, 2010). As Feynman, Leighton, and Sands (1964) have shown, in standard physics magnetic force can be mathematically expressed solely in terms of the effect that a moving electric potential field produces on a charged particle obviating the need for magnetic potential field terms. Also relative motion of a gravity potential field, of a G

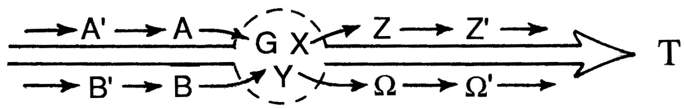


Figure 4. An expansion of the Model-G ether reaction scheme as it would appear disposed along dimension **T**. G, X, and Y mark the domain of the physical universe.

concentration gradient, is predicted to generate a gravitodynamic force, the gravitational equivalent of a magnetic force.

The subquantum kinetics ether functions as an open system, where etherons transform irreversibly through a series of "upstream" states, including states A and B, eventually occupying states G, X, and Y, and subsequently transforming into the Z and Ω states and from there through a sequence of "downstream" states; see figure 4. This irreversible sequential transformation is conceived as defining a vectorial dimension line termed the transformation dimension. Our observable physical universe would be entirely encompassed by the G, X, and Y ether states, which would reside at a nexus along this transformation dimension, the continual etheron transformation process serving as the Prime Mover of our universe. According to subquantum kinetics, the arrow of time, as physically observed in all temporal events, may be attributed to the continuation of this subquantum transformative process. Subquantum kinetics allows the possibility of parallel universes forming either "upstream" or "downstream" of our own universe wherever the ether reaction stream intersects itself to form a reaction loop similar to Model G. However, while there is a finite chance of such a material universe being spawned, the possibility that it would actually form are vanishingly small since the ether reaction parameters would need to adopt the proper precise values in order to spawn the necessary nucleon building blocks.

Since etherons both enter and leave the etheron states that compose material bodies and energy waves in our physical universe, our observable universe may be said to be open to the throughput of etherons. That is, our universe would function as an *open system*. In such a system, ordered field patterns may spontaneously emerge from initially homogeneous field distributions or they may progressively dissolve back to the homogeneous state depending on the criticality of the reaction system. In Model G, the system's criticality is determined by the value of the G variable. Sufficiently negative G potentials create supercritical conditions that allow matter formation and photon blueshifting while positive G potential values create subcritical conditions that cause tired-light photon redshifting and in extreme instances particle dematerialization.

The transmuting ether of subquantum kinetics bears some resemblance to the ether concept of Nikola Tesla. He proposed a gas-like ether that is acted on by a "life-giving creative force" which when thrown into infinitesimal whorls gives rise to ponderable matter and that when this force subsides and the motion ceases, matter disappears leaving only the ether. In subquantum kinetics, this creative force or Prime Mover is termed *etheric Force* while the resulting transmutative or reactive transformation of etherons from one state to another is termed *etheric flux*.

The transmuting ether also closely parallels the descriptions of Besant and Leadbeater (1919) who as early as 1895 said "the ether is not homogeneous but consists of particles of numerous kinds, differing in the aggregations of the minute bodies composing them." About the subatomic particle, which they refer to as the "ultimate physical atom", they state: "It is formed by the flow of the life-force and vanishes with its ebb. When this force arises in 'space'... [u.p.a] atoms appear; if this be artificially stopped for a single atom, the atom disappears; there is nothing left. Presumably, were that flow checked but for an instant, the whole physical world would vanish, as a cloud melts away in the empyrean. It is only the persistence of that flow which maintains the physical basis of the universe." Similarly, subquantum kinetics views our observable physical universe as an epiphenomenal watermark generated by the activity of a higher dimensional ether that functions as an open system.

Parthenogenesis: The creation of matter from zero-point fluctuations

According to subquantum kinetics, material particles nucleate from electric and gravity potential fluctuations that spontaneously arise from the ether vacuum state. Since etherons react and transform in a stochastic Markovian fashion, the etheron concentrations of all etheron species will vary stochastically above and below their steady-state values, the magnitudes of these fluctuations conforming to a Poisson distribution. It is known that such fluctuations are present in the chemical species of reaction-diffusion systems such as the B-Z reaction and their presence is also postulated in the theoretical Brusselator system. So the same would be true in the Model G reactive ether. Hence subquantum kinetics predicts that stochastic electric and gravity potential fluctuations should spontaneously arise throughout all of space, in regions both where field gradients are present and where they are absent. This is in some ways analogous to the concept of the zero-point energy (ZPE) background.

Provided that the kinetic constants and diffusion coefficients of the ether reactions are properly specified to render the system subcritical but close to the critical threshold, a sufficiently large spontaneously arising positive zero-point electric potential fluctuation (i.e., a critical fluctuation consisting of a low X concentration or a high Y concentration), with further growth, a further reduction of X and increase in Y, is able to break the symmetry of the initial vacuum state to produce what is called a *Turing bifurcation*. That is, it is able to change the initially uniform electric and gravity potential background field that defines the vacuum state into a localized, steady-state periodic structure. In subquantum kinetics this emergent wave pattern would form the central electric and gravity field structure of a nascent subatomic particle.

One advantage of Model G is that a positive electric potential fluctuation characterized by a negative X potential also generates a corresponding negative G potential fluctuation by virtue of the reverse reaction $X \xleftarrow{k_{-2}} G$, and this in turn produces a local supercritical region allowing the seed fluctuation to persist and grow in size. Consequently, if the ether reaction system is initially in the subcritical vacuum state, provided that it operates sufficiently close to the critical threshold, eventually a fluctuation will arise that is sufficiently large to form a supercritical region and nucleate a subatomic particle (e.g., a neutron). Thus spontaneous matter and energy creation is allowed in subquantum kinetics.

This parthenogenic, order-through-fluctuation process is shown in figure 5 which presents successive frames from a 3D computer simulation of equation system (3) (Pulver and LaViolette, 2011). Spherical symmetry was imposed as an arbitrary assumption to reduce the computing time necessary to carry out the simulation. The duration of the simulation consists of 100 arbitrary time units and the reaction volume measures 100 arbitrary spatial units, from -50 to +50, with one fifth of the volume being displayed in the graph. Vacuum boundary conditions are assumed. These space and time units are dimensionless, meaning that the units of measure are not specified. To initiate the particle's nucleation, a negative *subquantum* X ether fluctuation $-\varphi_x(r)$ was introduced at spatial coordinate $r = 0$. The rise and fall of the fluctuation magnitude reaches its maximum value of -1 after 10 time units, or 10% of the way through the simulation, and diminishes back to zero magnitude (flat line) by 20 units of time, or 20% of the way through the simulation. The reaction system quickly generates a complementary positive Y potential fluctuation $+\varphi_y(r)$, which together comprise a positive electric potential fluctuation, and also generates a negative G fluctuation $-\varphi_g(r)$, which comprises a gravity potential well. This is apparent in the second frame at t = 15 units. This central G-well generates a region that is

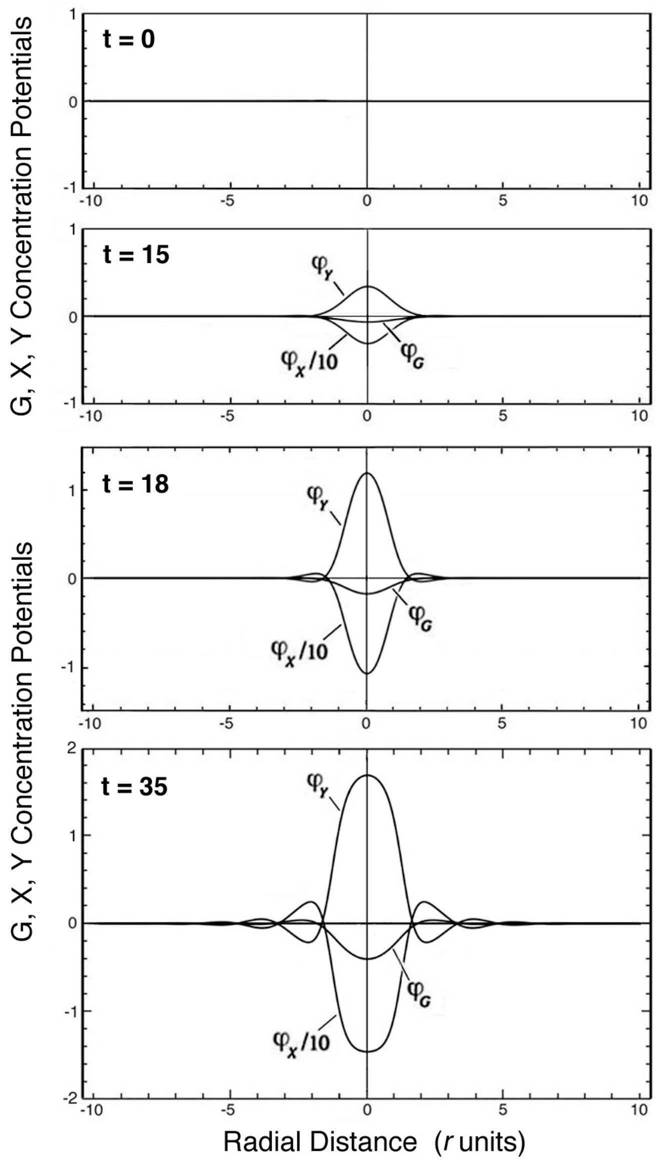


Figure 5. Sequential frames from a three-dimensional computer simulation of Model G showing the emergence of an autonomous dissipative structure particle: t = 0 the initial steady state; t = 15 growth of the positively charged core as the X seed fluctuation fades; t = 18 deployment of the periodic electric field Turing wave pattern; and t = 35 the mature dissipative structure particle maintaining its own supercritical core G-well. Simulation by M. Pulver.

sufficiently supercritical to allow the fluctuation to rapidly grow in size and eventually develop into an autonomous particulate dissipative structure which is seen fully developed in the last frame at t = 35 units. Movies of this and other Model G simulations are posted at www. starburstfound.org/simulations/archive.html.

The particle shown here would represent a neutron. It's electric field consists of a Gaussian central core of high-Y/low-X polarity surrounded by a pattern of concentric spherical shells where X and Y alternate between high and low extrema of progressively declining amplitude. Being a reaction-diffusion wave pattern, we may appropriately name this periodicity the particle's *Turing wave* (LaViolette, 2008b). The antineutron would have the opposite polarity, high-X/low-Y centered on a G potential hill.

The positive Y potential field (negative X potential field) in the neutron's core corresponds to the existence of a positive electric charge density, and the surrounding shell pattern which alternates between low and high Y potentials constitutes shells of alternating negative and positive charge density. On the average, however, these charge densities cancel out to zero in the case of the neutron, which is why the Turing wave for the simulated neutron shown in figure 5 has no positive or negative bias with respect to the ambient zero potential.

The appearance of these positive and negative charge densities necessitates the simultaneous appearance of the particle's inertial rest mass. The shorter the wavelength of the Turing wave, and greater its amplitude (greater its etheron concentration wave amplitude), the greater will be the inertial mass of the associated particle (LaViolette 1985b). Since acceleration requires a structural shift and recreation of the particle's Turing-wave dissipative space structure, the particle's resistance to acceleration, its inertia, should be proportional to the magnitude of its Turing-wave charge densities; that is, proportional to the amount of negentropy that must be restructured (LaViolette 2010).

Subquantum kinetics further requires that for Model G to be physically realistic, the values of its kinetic constants, diffusion coefficients, and reactant concentrations should be chosen such that the emergent Turing wave has a wavelength equal to the Compton wavelength, λ_0, of the particle it represents, this being related to particle rest mass energy E_o, or to its rest mass m_o, by the formula:

$$\lambda_0 = h\,c/E_o = h\,/m_o c, \qquad (4)$$

where h is Planck's constant and c is the velocity of light. The Compton wavelength for the nucleon calculates to be 1.32 fermis ($\lambda_0 = 1.32 \times 10^{-13}$ cm). This prediction that a particle's core electric field should have a Compton wavelength periodicity has since been confirmed by particle scattering experiments; see below. Moreover, unlike the Schroedinger linear wave packet representation of the particle, which has the unfortunate tendency to progressively dissipate over time, the localized dissipative structures predicted by Model G maintain their coherence, the underlying ether reaction-diffusion processes continuously combat the increase of entropy. Thus the Schroedinger wave equation used in quantum mechanics offers a rather naive linear approximation to representing microphysical phenomena, the quantum level being better described by a nonlinear equation system such as Model G.

Since this Turing wave particle representation incorporates both particle and wave aspects, we are able to dispense with the need to adopt a wave-particle dualism view of quantum interactions. Moreover the Turing wave subatomic particle has been shown to quantitatively account for the results of particle diffraction experiments, thereby eliminating paradoxes that arise in standard theories that rely on deBroglie's pilot wave interpretation or Schroedinger's wave packet concept. It also correctly yields Bohr's orbital quantization formula for the hydrogen atom while at the same time predicting a particle wavelength for the ground state orbital electron that is ~1400 times smaller than Schroedinger's wave packet prediction (LaViolette, 1985, 2008b, 2010). This more compact representation of the electron, allows the existence of smaller diameter sub-ground state orbits having fractional quantum numbers. Several researchers, such as John Eccles and Randall Mills, claim to have developed methods of inducing electron transitions to such sub-ground orbits and to thereby extract enormous quantities of energy from plain water (LaViolette, 2008b). So reformulating quantum mechanics on the basis of the subquantum kinetics Turing wave concept, opens the door to understanding and developing new environmentally safe technologies that could power our world.

In the course of dispensing with the Schroedinger wave packet and its associated probability function describing the indeterminate position of a mass point, it is advisable to also throw out the Copenhagen interpretation with its mysterious "collapse of the wave function" theorized to take place when the quantum "entity" through measurement becomes determined to be either a wave or a particle. In particular, Dewdney et al. (1985) have shown experimentally that the position of the particle is defined in a real sense prior to its deBroglie scattering event and from this conclude that in this particular case the wave-packet-collapse concept is flawed. More than likely, we should also be able to avoid using this collapse concept also in experiments observing the spin orientation of entangled particles or polarization of entangled photons. There appears to be the growing realization that its widespread use is mainly a convenient mechanism to cover up the fact that we currently have a poor understanding of the workings of the subquantum realm.

When a neutron spontaneously acquires *positive charge* and transforms into a proton, its X-Y wave pattern acquires a positive bias similar to that shown in figure 6 (shaded region in the left hand plot). Such a biasing phenomenon, which is seen in analysis of the Brusselator, is also present in Model G when an existing ordered state undergoes a *secondary bifurcation*. The transition of the neutron to the positively biased proton state is best understood by reference to a bifurcation diagram similar to those used to represent the appearance of ordered states in nonequilibrium chemical reaction systems, see figure 7. The emergence of the neutron from the vacuum state is represented as a transition to the upper primary bifurcation branch which branches past critical threshold β_c. Past threshold β' this primary branch undergoes a secondary bifurcation with the emergence of the proton solution branch. This transition is observed in the phenomenon of beta decay, which also involves the production of electron and antineutrino particles not charted here; i.e., $n \rightarrow p + e^- + \bar{\nu}^o + \gamma$.
The neutron's transition to the charged proton state involves an excess production rate of Y per unit volume in its core coupled with a corresponding excess consumption rate of X per unit volume. This causes a positive bias in its central Y concentration and a negative bias in its central X concentration, which in turn extends radially outward to bias the particle's entire Turing wave pattern. This extended field bias constitutes the particles long-range electric field. Analysis shows that this potential bias declines as the inverse of radial distance just as classical theory predicts. In fact, subquantum kinetics has been shown to reproduce all the classical laws of electrostatics, as well as all the classical laws of gravitation (LaViolette, 1985b, 1994, 2010).

It should be kept in mind that the charge densities forming the proton's Turing wave pattern, and that are associated with its inertial mass, are distinct from and additional to the charge density that centrally biases its Turing pattern and produces the particle's long-range electric

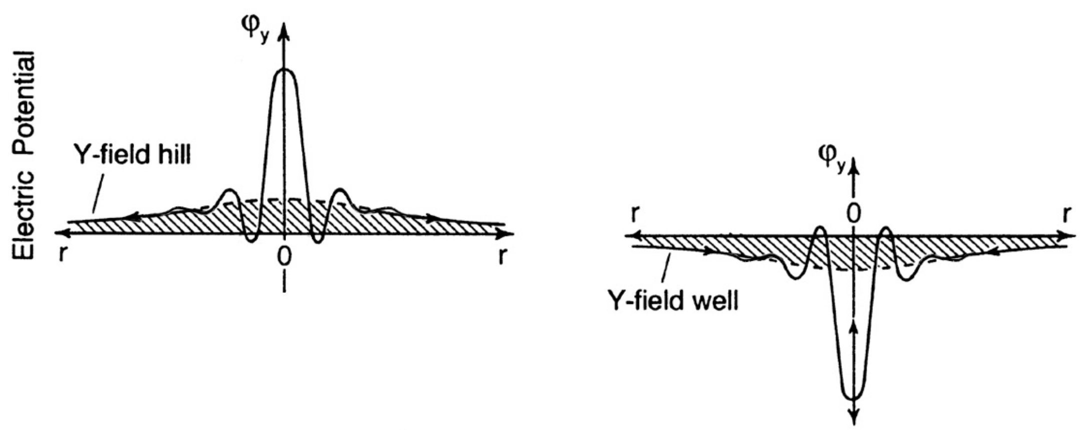


Figure 6. Radial electrostatic potential profiles for a proton and antiproton, positively charged matter state (left) and negatively charged antimatter state (right). The characteristic wavelength equals the particle's Compton wavelength.

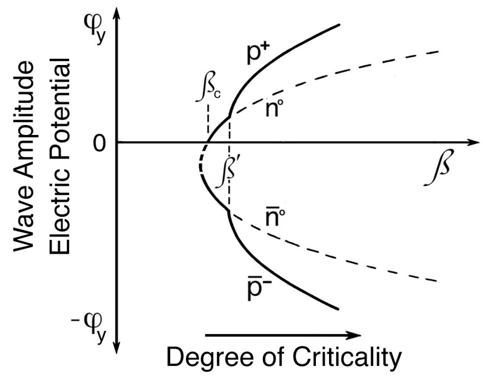


Figure 7. A hypothetical bifurcation diagram for the formation of nuclear particles. the secondary bifurcation past bifurcation point ß' creates electrostatic charge.

field. The former periodic densities emerge as a result of the particle's primary bifurcation from the homogeneous steady-state solution, while the latter aperiodic bias emerges as a result of its secondary bifurcation from an existing steady-state Turing solution.

Based on the results of the Sherwin-Rawcliffe experiment, we may infer that the creation and later displacement of the particle's Turing wave field would be communicated outward essentially instantaneously or at an exceedingly high superluminal velocity. The same would hold for the outward moving event boundaries of a subatomic particle's long-range electric and gravity potential fields. For their experiment, Sherwin and Rawcliffe (1960) performed mass spectrometry measurements of a football-shaped Lu^{175} nucleus to check for the presence of line-splitting and came up with a null result. This indicated that the mass of the lutetium nucleus behaved as a scalar instead of a tensor which implied that its Coulomb field moved rigidly with its nucleus and was thereby able to create instant action-at-a-distance (Phipps, 2009). Accordingly, the conventional practice of retarding force actions at speed *c* would be inappropriate.

Subquantum kinetics leads to a novel understanding of force, acceleration, and motion. In subquantum kinetics the energy potential field (ether concentration gradient) is regarded as the real existent and the prime cause of motion, "force" being regarded as a *derived* manifestation. That is, force is interpreted as the *stress effect* which the potential gradient produces on the material particle due to the distortion it manifests on the field pattern space structure that composes the particle. The particle relieves this stress by homeostatic adjustment which results in a jump acceleration and relative motion.

Particle scattering confirmation

The Turing wave configuration of the nucleon's electric potential field predicted by subquantum kinetics has been confirmed by particle scattering experiments that employ the recoil-polarization technique. Kelly (2002) has obtained a good fit to particle scattering form factor data by representing the radial variation of charge and magnetization density with a relativistic Laguerre-Gaussian expansion; see figures 8-a and 9-a. The periodic character of this fit is more apparent when surface charge density ($r^2\rho$) is plotted as a function of radial distance as shown in figures 8-b and 9-b. Kelly's charge density model predicts that the proton and neutron both have a gausian shaped positive charge density core surrounded by a periodic electric field having a wavelength approximating the Compton wavelength. Moreover he has noted that unless this surrounding periodicity is included, his nucleon charge and magnetization density models do not make as good a fit to form factor data.

Thus here we have a stunning confirmation of a central feature of the subquantum kinetics

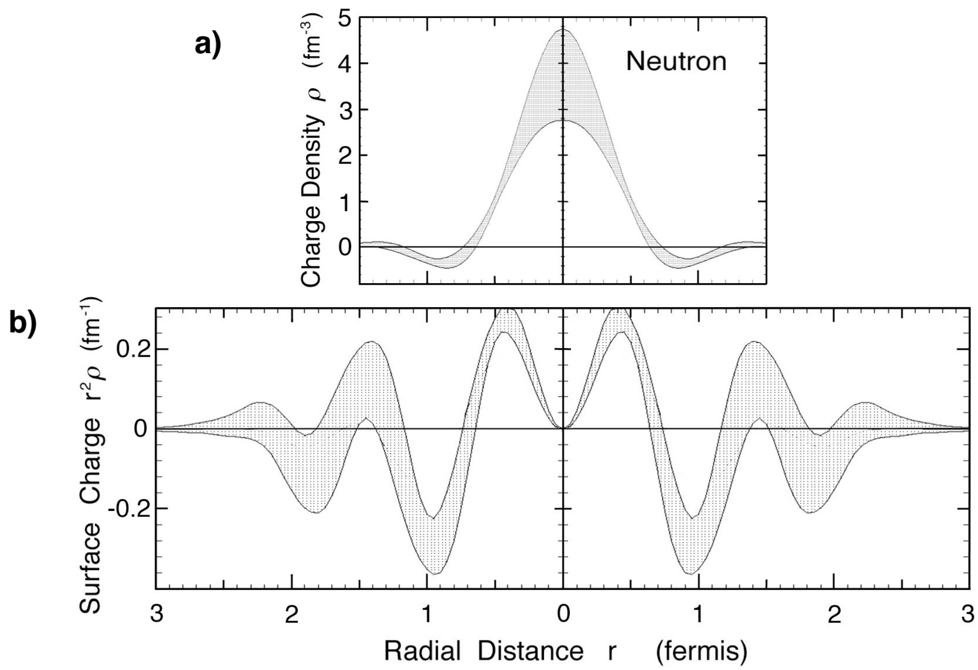


Figure 8. a) Charge density profile for the neutron predicted by Kelly's preferred Laguerre-Gaussian expansion models and b) the corresponding surface charge density profile (after Kelly 2002, Fig. 5 – 7, 18).

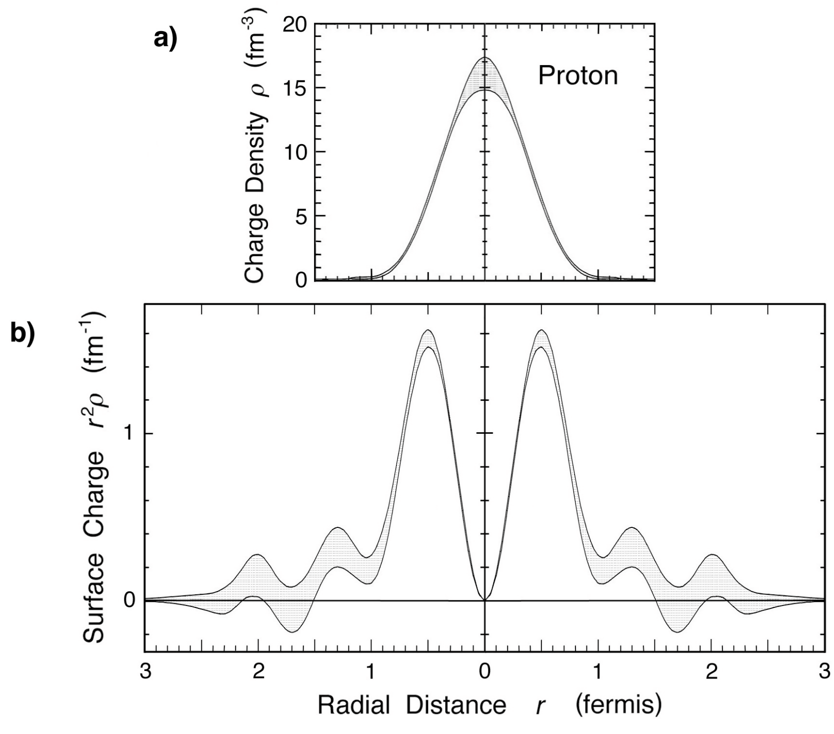


Figure 9. a) Charge density profile for the proton predicted by Kelly's preferred Laguerre-Gaussian expansion models and b) the corresponding surface charge density profile (after Kelly 2002, Fig. 5 – 7, 18).

physics methodology whose prediction was first made in the mid 70's at a time when it was still convention to regard the field in the core of the nucleon as rising sharply to a central cusp. Note also that Kelly's model confirms the positive biasing of the proton's central field, the bias increasing as the center of the particle is approached; compare the enhanced view shown in figure 9-b with figure 6. Furthermore, as in the subquantum kinetics model, Kelly's model shows the amplitude of the nucleon's peripheral periodicity declining with increasing radial distance.

Simulations performed on Model G show that the amplitude of the Turing wave pattern declines with increasing radial distance as $1/r^4$ at small radii ($r < 2\lambda_0$), which approximates the radial decline observed in the charge density maxima for Kelly's model. The Model G particle Turing wave pattern declines more steeply at greater radial distances, declining as $1/r^7$ at $r \approx 4\lambda_0$ and $1/r^{10}$ for $r \approx 6\lambda_0$, which may be compared to standard theory which propose that the nuclear force declines as $F_n \propto 1/r^7$. This localized particle wave pattern is possible only because the extra G variable has been introduced into the Model G reaction system. It allows a particle to self-nucleate in an initially subcritical environment while leaving distant regions of space in their subcritical vacuum state. Thus if we quantify the amount of order or negentropy created by a single seed fluctuation, integrate the total amount of field potential $|\varphi_x|$ or $|\varphi_y|$ forming the particle wave pattern, we should find that it converges to a finite value, comparable to the idea of a quantum of action. The two-variable Brusselator, on the other hand, fails to generate localized structures. Simulations show that a seed fluctuation in the Brusselator produces order only if the system initially operates in the supercritical state, which in turn causes its entire reaction volume to become filled with a Turing wave pattern of maximum amplitude. Thus in the Brusselator a single seed fluctuation potentially produces an infinite amount of negentropy or structure.

The confirmation of the Model G ether reaction model which has been forthcoming from particle scattering experiment data leads us to conceive of the subatomic particle as an organized entity, or system, whose form is created through the active interplay of a plurality of particulate structures existing at a lower hierarchic level. Thus we find that the very structure of matter, its observationally confirmed Turing wave character, stands as proof of an underlying Whiteheadian dynamic and interactive stratum, one that ancient cultures variously named the Aether, Akasha, Tao, or Cosmic Ocean. The physics of subquantum kinetics indeed has very ancient origins (LaViolette, 2004).

Contemporary quark models fail to anticipate the periodic character of the nucleon's electric field. No quark model can be devised after-the-fact that can reasonably account for this feature. Quarks themselves, or the "gluons" theorized to bind them together, have no script to tell them they should dance around in the complex manner that would be required in order to generate such an extended periodic field pattern. Subquantum kinetics, the viable replacement for quark theory, differs in several respects, one being the manner in which it handles the origin of mass, charge and spin. Quark theory does not attempt to explain how inertial mass, electric charge or spin arise. It merely assumes them to be physical attributes present in quarks in fractional form and which in triplicate summation appear as corresponding properties detectable in the nucleon. By comparison, etheron reactants of subquantum kinetics have no mass, charge, or spin. These are properties which are predicted to arise only at the quantum level, and which amazingly emerge as corollaries of the Model G reactions. Mass and spin, as properties of the subatomic particle, emerge at the time the particle first comes into being, and charge, as noted earlier, emerges as a secondary bifurcation of the primary Turing bifurcation.

The cosmology of continuous creation

As mentioned earlier, the energy potential seed fluctuations of subquantum kinetics, which play a key role in nucleating particles throughout space, bear a strong similarity to the conventional idea of zero-point energy fluctuations. But, there are some exceptions. In conventional physics, ZPE fluctuations are theorized to have energies comparable to the rest mass energy of subatomic particle and to emerge as particle-antiparticle pairs which rapidly annihilate one another. As a result, it is fashionable to quote unimaginably high values of the order of 10^{36} to 10^{113} ergs/cm^3 for the zero-point energy density of space. But because of their polarity pairing, they are unable to nucleate matter. By comparison, subquantum kinetics stands in strong opposition to the idea frequently circulated that the spatial vacuum is "seething with particles and antiparticles." It theorizes far lower ZPE densities, on the order of less than 1 erg/cm^3, or less than the radiation energy density at 2000° K. Nevertheless, because they are unpaired, they are potentially able to spawn material particles. But this only occurs when a fluctuation of sufficiently large magnitude arises, the vast majority being far too small to attain the required subquantum energy threshold.

We may assume that a large fraction of the ZPE fluctuations arising in the transmuting ether are of sufficient magnitude as to qualify as the causal basis for quantum indeterminacy. Bohm and Vigier (1954) have shown that random fluctuations in the motions of a subquantum fluid are able to generate a field probability density $|\psi|^2$ that provides an adequate causal interpretation of quantum theory. Similar reasoning could be applied to subquantum kinetics, except that in subquantum kinetics fluctuations arise as random concentration pulses (energy potential fluctuations) rather than as random mechanical impulses. As described above, the ZPE background arises as a direct result of the ether's regenerative flux and hence is conceived to be an indication of the ether's open system character. At the same time, these emerging ZPE fluctuations constitute the ether's incipient ability to create order.

Subquantum kinetics is incompatible with the idea of a big bang since a ZPE fluctuation large enough to create all the matter and energy in the universe in a single event would be a virtual impossibility. But one of the theory's advantages is that it does not need to resort to postulating an adhoc *big bang* to account for physical creation. For, the Model G reaction-kinetic ether allows primordial neutrons to continuously emerge throughout all space (LaViolette 1985c, 2010). Upon undergoing beta decay, these neutrons form proton-electron pairs, hence hydrogen atoms. Since fluctuations have a greater probability of nucleating particles in the vicinity of existing particles whose gravity well produces a fertile supercritical region, hydrogen will tend to beget more hydrogen, and sometimes nuclei of higher atomic mass will form. Unlike the big bang theory, primordial space is cold and so the gas in each locale eventually condenses into a primordial planet. Since creation proceeds more rapidly within celestial masses, each planet evolves into a Mother Star which produces daughter planets and stars, which with growth evolve into a primordial star cluster and eventually into a dwarf elliptical galaxy. With the onset of core explosions in the very old and massive Mother Star, expulsive activity causes spiral arms to form changing the galaxy into a spiral and in late stages into a giant elliptical. Observations with the Hubble telescope support this evolutionary scenario.

A mathematical analysis of the Model G reaction system shows that it has an inherent matter-antimatter bias in that only positive electric potential fluctuations are able to successfully nucleate matter, antineutrons being unable to nucleate spontaneously from the vacuum state. Thus subquantum kinetics explains why we live in a universe consisting primarily of matter as opposed to antimatter. In conventional cosmology, this asymmetry problem is solved only with great difficulty.

The cosmological redshift effect, which the big bang theory uses as its primary support and which big bang theorists cite as evidence for cosmological expansion, is shown to be more properly interpreted as a tired-light, energy-loss effect. That is, the tired-light interpretation has been shown to make a better fit to cosmological data than the Doppler shift interpretation

(LaViolette 1986, 1995, 2010). This outcome is a benefit to subquantum kinetics since if the transmuting ether were to expand with space its reactant concentrations would rapidly decrease over time and its state of criticality would become drastically altered. Subquantum must be conservative in this regard. It must assume that the ether is cosmologically stationary and that galaxies, excepting their peculiar motions, are at rest relative to their local ether frame.

One success of subquantum kinetics is that there is no need to introduce an adhoc assumption for the aforementioned photon energy loss used to account for the cosmological redshift. Rather, the effect emerges as a prediction of subquantum kinetics (Table 1, prediction 2). That is, Model G predicts that intergalactic space should be predominantly *subcritical* and hence that photons emitted from distant galaxies should progressively lose energy as they travel. But unlike the big bang theory, which requires that the entropy of the physical universe as a whole should everywhere be progressively increasing, subquantum kinetics predicts that at least in the vicinity of galaxies, where space is for the most part supercritical, entropy should be progressively decreasing. Furthermore whereas big bang theory places an unreasonably short age limit on the universe, one that conflicts with astronomical observation, subquantum kinetics allows the material universe to be immeasurably large and to have an age of many trillions of years, offering well enough time for galaxies to evolve. Subquantum kinetics also allows repeating aeonic cycles of matter creation and matter dissolution, but with the ether itself being virtually immortal. This very much resembles the idea of the cosmic cycles related in the ancient Hindu story of Vishnu.

For the same reason that subquantum kinetics allows entropy to progressively decrease in supercritical islands of creation scattered throughout space, so too photons may either lose or gain energy depending upon whether they are traveling through subcritical or supercritical regions. But, such phenomena only appear as violations of the First Law of Thermodynamics in standard physics which views the universe as a closed system. Even so, the photon redshifting or blueshifting rates that subquantum kinetics predicts are so small as to be undetectable in the laboratory, of the order of 10^{-18}/s. Nevertheless the photon blueshifting phenomenon has been measured locally in maser signals transponded through interplanetary space, a phenomenon which has become popularly known as the Pioneer effect; see prediction 5 of Table 1 (LaViolette 1985c, 2005, 2010). Although extremely small, this photon blueshifting effect has enormous consequences for stellar astrophysics; see predictions 3, 4, and 6 of Table 1. The *genic energy* excess from photon blueshifting is able to account variously for the energy powering planets, brown dwarfs, and red dwarf stars, as well as that powering nova, supernova, and galactic core explosions.

Spin formation, nuclear bonding, and proximal entanglement

Experiment shows that when two electrons are brought into close proximity so that their spins adopt compatible parallel and antiparallel orientations, that the particles retain their spin orientation link even when separated by great distance. Thus if one particle becomes magnetically forced into a particular spin orientation, its partner will correspondingly be found to have its spin always oriented in the opposite direction. This phenomenon of particle linkage across great distances of separation has become called quantum entanglement, and is a property that is believed to characterize the Akashic field (Laszlo, 2004). In the case of entangled photons, the polarization orientation of one photon has been observed to be linked to that of its partner even when the pair is separated by 18 kilometers, and the orientation of one has been determined to have been conveyed to the other at a speed in excess of 100,000 c (Brumfiel, 2008).

Subquantum kinetics provides an understanding of what spin is and why particle spins couple with one another. It identifies particle spin as being a vortical movement of etherons that takes place in the core of a subatomic particle. Because a subatomic particle's electric and gravity field consists of a periodic steady-state concentration pattern extending outward from its core in a symmetric fashion, etherons will continually diffuse radially inward and outward between the core and its surrounding inner shell, and between each successive pair of adjacent spherical shells. Of these etheron fluxes, those having the greatest magnitude will be those flowing to and from the particle core. For example, in the case of a nucleon (proton or neutron) where the core maintains a positive charge density, an X production rate deficit and Y production rate surplus, X continually flows into the core from the adjacent high-X shell and Y continually flows out of the core to this same shell, where Y maintains a low concentration. In macroscopic systems, an inward inward diffusive flux can develop into a free vortex. In a similar fashion, an inward diffusive X etheron flux could stimulate an X etheron vortex and this could also stimulate a rotational wave pattern to propagate circumferentially around the core. Such waves would appear as rotating modulations of the particle's X-Y concentration pattern, or rotating electric fields, which would give rise to magnetic effects (LaViolette 1985b, 1994, 2010). Since the particle's electric potential Turing wave is periodic, its spin magnetization is also expected to be periodic, which is in agreement with Kelly's findings.

A spin ether vortex in the core of a nucleon would increase the rate of etheron transport between the core and surrounding shell. This would have an effect similar to locally increasing the X etheron diffusion coefficient, which in turn broadens the nucleon core (since the Turing pattern wavelength increases with increasing radial diffusive flux). Simulations that increase the etheron diffusion rate in the central core bear this out (LaViolette, 2010).

Figure 10 shows how two such spin-broadened nucleon structures might look when separated by one Compton wavelength, λ_0, the separation distance observed between the proton and neutron in a deuteron. As shown here, the two particles are so close that their gaussian cores overlap one another, which in turn implies that the outer portion of their spin vortices should substantially intermingle. This close overlapping of the spin vortices automatically leads to a restriction on the alignment of the spin direction of each particle with respect to the other. That is, in order for the ether vortices to be mutually compatible, their etheric flows must be going in the same direction in their zone of intersection.

One possibility is that the two vortices align with one another tail to nose. This is shown in Figure 11-a, which is a hypothetical representation of how the proton (P) and neutron (N) spin vortices align in the deuteron when forming the spin triplet state. Due to their axial alignment, the spins of the two nucleons additively reinforce, accounting for why the deuteron is observed to have twice the spin magnitude of either a solitary proton or a solitary neutron, i.e., a spin of 1, rather than 1/2.

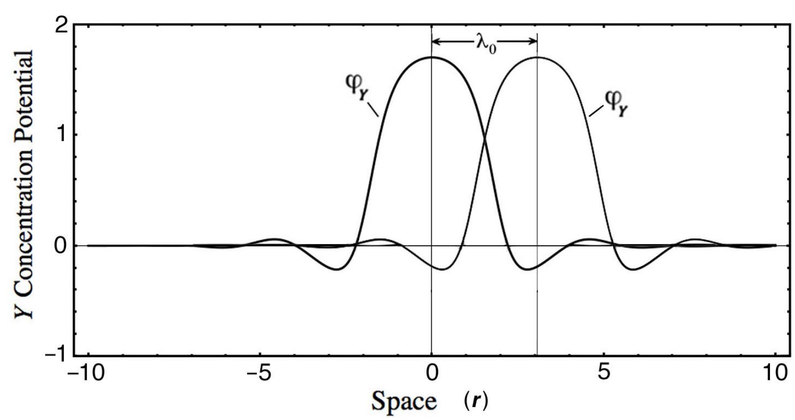


Figure 10. Two Model G Turing wave patterns separated by one Turing pattern Compton wavelength.

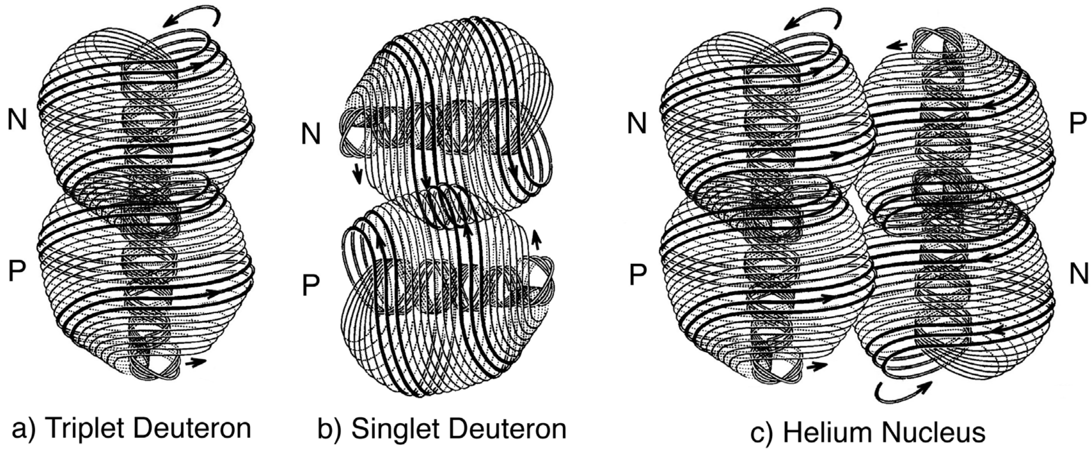


Figure 11. Intermingling of the ether diffusive flux vortices of individual nucleons in: a) the triplet state deuteron (s = 1), b) the singlet state deuteron (s = 0), and c) the singlet state helium-4 nucleus (s = 0); N: neutron and P: proton.

Alternatively, a proton and neutron can align so that their spins are parallel and antiparallel. In this case the proton and neutron would position themselves adjacent to one another similar to the configuration shown in figure 11-b, their spin vortices flowing in the same direction in their zone of intersection. A deuteron with this configuration is said to be in a singlet state and to have zero spin, its spin magnetic field directions canceling one another. This singlet state, however, is found to be transitory, the particles quickly adopting the axially aligned triplet state.

When two deuterons combine to form a helium atom (figure 11-c), the vortices of adjacent nucleons must orient antiparallel to one another in order for the flux streams in their zone of intersection to be going in the same direction and be mutually compatible. As a result, the spin of one deuteron subset in the helium nucleus cancels that of its partner, resulting in a spin of zero. This singlet zero-spin state is in fact observed for helium-4.

This model can also explain the stable spin state of lithium-6 which consists of three protons and three neutrons. Two neutrons and two protons adopt an arrangement similar to helium-4 and the remaining proton-neutron pair orients in the head-to-tail triplet configuration, attaching to the end of either a proton or neutron, e.g. to form an N-P-N-P sequence. The result is to produce a spin of s = 1 similar to that of the deuteron, and this is in fact observed. Adding one more neutron to this axial chain to form lithium-7 would yield a spin of 3/2, and this, too, matches the observed spin value. Proceeding in this manner, one is able to explain the spin values of all nuclear isotopes.

These spin diagrams suggest that the intermingling of the nucleon spin vortices is what creates the nuclear bonding force. Thus the nuclear bond may be magnetic in nature. When proximal particles entangle, they develop a spin linkage that produces a nuclear bond between the nucleons. When the particles separate from one another but remain entangled, it is as if the spin bond that developed between them has not yet been dissolved; their etheric space structure vortices still orchestrate their flows in a coherent fashion.

The T-matrix and distant entanglement

In the context of subquantum kinetics, superluminal speeds of entanglement are not an anomaly. The speed restriction that applies to the propagation of transverse electromagnetic wave quanta through the ether does not apply at the subquantum level. Bell's theorem tells us that no theory explaining quantum phenomena in terms of local hidden variables can account for distant entanglement. But subquantum kinetics does not have the problems of a local hidden variable theory: it allows phenomena at remote locations to communicate effects to a target location at superluminal speeds—etherons can diffuse or convect through space at speeds greater than *c*. The same is true of the speed whereby spin vortices communicate their orientations to distant partner spin vortices.

Up to this point we have reviewed how subatomic particles are created, the nature of their inertial mass and their extended Turing wave patterns, how they generate gravitational mass and electrical charge, how these in turn form extended gravity and electric fields, how transversely moving electric fields would produce magnetic forces, how particle spin would arise, and how spin vortices align to produce nuclear bonds. There is one other aspect of subatomic matter that we haven't yet discussed that is also predicted by subquantum kinetics, but whose existence has not yet become recognized by standard physics. That is, not only does an ether vortex form in the core of a subatomic particle, generating the property of spin, but also the particle's core should pulsate radially, producing longitudinal movements in the Turing wave pattern that propagate outward at superluminal speeds.

The idea that subatomic particles might pulsate radially was first suggested in 1895 by Annie Besant and Charles Leadbeater in a published report of clairvoyant observations they conducted of the ether in which they viewed a subatomic whorl-like entity that they termed the "ultimate physical atom," u.p.a. (also later named the "anu"). They described ether whorls forming currents both emerging from the u.p.a. core as well as entering it, which accords with what subquantum kinetics predicts should take place in the particle's core. The individual whorl structures diagrammed in figure 11 to represent protons and neutrons are copied from a diagram of the u.p.a. published in 1919 in their book *Occult Chemistry*. Besant's and Leadbeater's description of the u.p.a. preceded by two years Thompson's 1897 discovery of the electron, by 24 years Rutherford's 1919 discovery of the proton, and by 37 years Chadwick's discovery of the neutron. Their illustration of axial bonding of ultimate physical atoms, which was somewhat similar to that illustrated in figure 11-a, presciently anticipated the theory of nuclear bonding proposed 40 years later by Yukawa. Moreover they noted that the u.p.a. whorl pattern as a whole precessed about an axis much like the precession of a spinning top. Thus they not only predicted the property of subatomic particle spin 30 years prior to Goudsmit's and Uhlenbeck's proposal of electron spin in 1925, but also anticipated nuclear spin precession, a type of Larmor precession, as much as 50 years before its discovery.*

Besant and Leadbeater had also reported observing the u.p.a. pulsating radially, something that has not been observed by physicists in the more than one hundred years that has elapsed since. This, however, is not surprising since radial pulsation of the particle's core electric and gravity fields (X-Y and G potential fields) with wavelength $\sim\lambda_0$ are inherently difficult to detect in the laboratory.

In 1995 I had proposed that this core pulsation phenomenon follows necessarily for subquantum kinetics (LaViolette, 1995, 2004). Consider a nucleon in which a vortical X-on flux enters the nucleon's core, flowing from the adjacent high-X shell into the core where X maintains a minimum concentration. If a stochastic fluctuation were to cause a slight increase in this inward flux, this would in turn cause a slight expansion of the nucleon's core diameter since increased etheron transport always broadens a Turing wave dissipative structure. This would reduce the

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* Whereas their spin and precession predictions anticipated properties later observed in subatomic particles, the application of their discourse to current physics becomes unclear at the atomic level. For example, instead of proposing that hydrogen is composed of one such u.p.a. and oxygen of sixteen, Besant and Leadbeater instead envisioned hydrogen as being composed of 18 spinning u.p.a.'s and oxygen of 290. It cannot be certain whether they were referring here to monotomic hydrogen and oxygen or to molecular aggregations of these atoms.

X potential gradient between the shell and core, and this in turn would reduce the rate at which X-ons spiral into the core. The reduced X-on influx would cause the core Turing wave to contract, and this in turn would steepen the shell-to-core X potential gradient. This again would increase the inward vortical flow of X, causing the cycle to repeat. The Y and G field potentials would also pulse radially in step with X. In general, spin vortices in subatomic particles are always expected to be always accompanied by radial pulsations. Future computer simulations performed on Model G for a three dimensional reaction volume are expected to demonstrate both the phenomena of spin and radial pulsation. The source of energy driving these pulsations, like that driving the vortical ether flux, is ultimately traceable to the nonequilibrium reaction-diffusion processes that continuously animate the ether.

The radial pulsation of a particle's core would cyclically displace the particle's entire electrogravitic Turing wave pattern inward and outward from the core. Based on the results of the experiment by Sherwin and Rawcliffe (1960) discussed earlier, we may infer that this displacement would be communicated outward essentially instantaneously or at an exceedingly high superluminal velocity, causing the particle's Turing wave pattern to oscillate radially throughout its entire extent in coherent fashion.

Computer simulations of the theory proposed here suggest that the particle's Turing wave should maintain its wavelength unchanged throughout its whole extent, although its amplitude should decrease progressively. We may conclude that the radial oscillation produced by each particle space structure should persist to very great distances. In light of the results of Sherwin and Rawcliffe, it should be communicated to remote locations almost instantaneously. The relativistic speed-of-light restriction that applies to transverse electromagnetic waves would not apply to the movement of the Turing wave pattern. To an observer stationary with respect to the pulsation, the moving Turing wave pattern would act in a way similar to longitudinal Coulomb waves that Tesla was generating from the dome of his magnifying transmitter tower. But unlike macroscopic Tesla waves, these waves are subquantum, involving the conveyance of less than a quantum of action in any given direction. This could be a further reason why they are not easily directly detected in laboratory experiments.

Tesla waves are known to produce resonant energy beams that link the transmitter dome with nearby objects that develop a sympathetic oscillation. The high voltage waves that radiate from such a monopole antenna are absorbed and phase conjugated by any ionized region they might encounter, resulting in a phase conjugate wave traveling back to the antenna dome. Since the phase conjugate wave is the time reverse of the outgoing longitudinal wave, the two match perfectly in phase and amplitude to resonantly form a nondispersing soliton beam extending between the transmitter antenna dome and the remote ionized region. When such a resonant link develops, the antenna and remote target are said to have become "locked on" to one another. Although Tesla himself did not use the term phase conjugation to describe the resonance phenomenon he was observing, he nevertheless was aware of the phenomenon.

Applying the Hermetic maxim "as above so below," we may theorize that similar phase conjugate resonances develop amongst subatomic particles as a result of the radial oscillation of their intersecting Turing wave patterns; see figure 12. The ongoing radial oscillation of subatomic particle cores could seed the formation of interparticle soliton beams. These scalar wave beams would extend between particle cores, interlinking them into a vast matrix.

Soliton beams formed in the laboratory are observed to resonantly augment their field amplitudes to levels far in excess of the amplitudes of the original phase conjugated waves. This self-amplification process has variously been termed *field-induced soliton phenomenon* (LaViolette, 2008a), or alternatively, *force amplification by stimulated energy resonance*, the *faser* phenomenon (Obolensky, 1988). Unlike the particle Turing wave pattern, whose wave

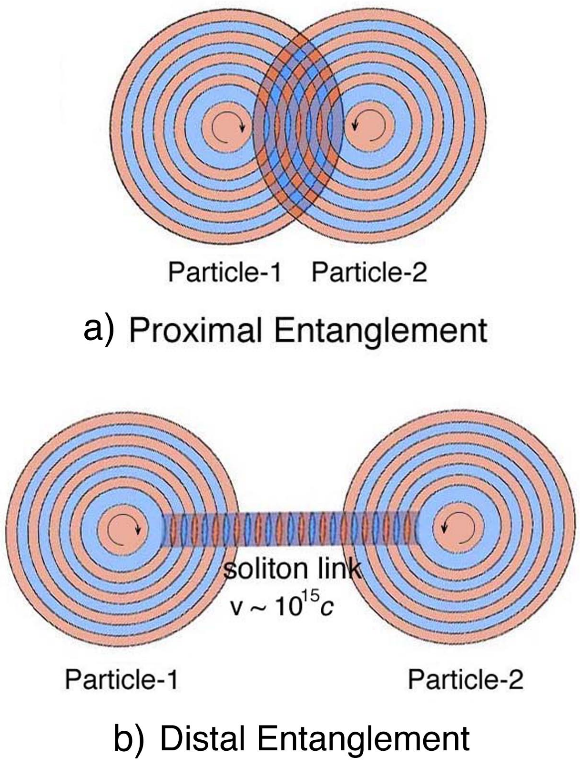

Figure 12. a) Proximal entanglement of two subatomic particles through phase-locking of their Turing wave field patterns. b) Maintenance of distal field entanglement through an interparticle soliton beam.

amplitude would rapidly diminish with increasing radial distance from the core, the wave amplitude within these self-amplified soliton beams would be relatively uniform along their length, maintaining an amplitude at least as high as exists immediately adjacent to the particle core. Thus in the case of two particles that had become mutually locked on to one another, or "entangled," each would experience the other's presence as if it were positioned immediately adjacent, even if they were separated by tens or hundreds of kilometers.

In the entangled state, particle cores would pulse in phase with one another to orchestrate a coherent oscillation. The spin alignment of two entangled particles would restrict one another just as if the particles were immediately adjacent to one another. Consequently, if the spin vortex of one particle were to be made to change direction through the action of a local magnetic field, this would change the spin polarization direction communicated through its soliton beam tunnel, which in turn would change the soliton beam's magnetization in the vicinity of the partner particle and cause the spin of the partner to adopt a compatible alignment. Thus a particle would exert an influence on its entangled partner particle even when separated by great distances.

To understand how spin alignment would be communicated through these soliton corridors, consider the following. The X-Y-G ether vortex that exists in a particle's core would induce flux vectors in its surrounding Turing wave pattern. That is, the radial etheric fluxes transpiring radially between successive Turing pattern shells would adopt transverse etheric flux components aligned in the direction of the particle's spin vortex. In other words, these oscillating subquantum fluxes would not be purely radial, but would incorporate a transverse "polarization." This explains why particle scattering experiments show a periodic stationary-wave, magnetization pattern around every nucleon that matches its periodic stationary-wave charge density pattern. Normally the intensity of this spin magnetization pattern decreases rapidly with increasing radial distance. But within a soliton beam, it would become resonantly amplified to a strength at least as great as that found in the immediate vicinity of the particle core.

One further point that should be made is that these soliton beams could serve as force transfer conduits, conveying force at superluminal speeds, perhaps as high as 10^{15} to 10^{17} *c*.* Events occurring at one point in this interconnected particle matrix would be rapidly communicated through these soliton "nerve pathways" to affect the entire entangled particle network. It may even be possible that intelligible information could be communicated through these entanglement conduits, or be sensed through these conduits at faster-than-light speeds. This is consistent with Ervin Laszlo's (2011) hypothesis of a hologram-like network formed of phase-conjugating, scalar, standing-wave fields that can instantaneously convey and store information exchanged to and from matter-energy systems. What name should be given to this phenomenal subquantum, soliton beam network? Perhaps it should be named the *T-matrix*, where "T" might stand either for Tesla, or Turing, or both.

Finally, to consider some more broad reaching questions, do particles maintain their entanglements throughout their existence? Subquantum kinetics predicts that most of the matter in our galaxy was created in the Galactic core, Sgr A*. So, if those entanglements were to persist, might we have some sort of superluminal connection to the massive Mother Star that resides there? Another question is how many entanglements might a given particle be expected to form at any one time? Furthermore, does the soliton T-matrix itself have inertial mass? Subquantum kinetics identifies a particle's inertial mass with the electric potentials forming its Turing wave periodicity. So, would the electrogravitic stationary wave that makes up the subquantum interparticle soliton beam also have some amount of mass? If so, how much? Also since force and information both appear to be conveyed through these beam links, couldn't human's unconscious or conscious use of such a network explain phenomena such as telepathy, telekenisis, materialization, and information retrieval from a shared Akashic record? Could all minds and consciousnesses be interlinked through such superluminal entanglements. These are questions that standard physics theories cannot ask, or even begin to reasonably approach, because they restrict their "universe" to the quantum level. By comparison, subquantum kinetics, which describes quantum phenomena by postulating activity on the subquantum level, appears to offer a promising framework for understanding nonlocal connectivity. With future

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* To figure the speed at which events might be expected to propagate through these soliton links, we turn to laboratory experiments on longitudinal wave propagation. In 2004 Guy Obolensky performed an experiment that measured the propagation speed of high voltage Coulomb shocks (electrogravitic potential waves) emitted from a dome-shaped electrode. The experiment not only demonstrated that these Tesla wave shocks propagate at superluminal speeds, but also confirmed a prediction of subquantum kinetics that the speed of the shock should be proportional to the shock front's potential gradient (LaViolette, 2008a); also see Table 1, prediction 11. The reason is that the electric potential shock wave rides forward on the ether wind generated at the shock forefront, the wind's forward velocity being proportional to the electric and gravity field gradient at the shock's leading edge. When the shock was close to its emitting electrode where the field gradient approached 10^6 volts per meter, the Coulomb waves were observed to have a speed of about 5 *c*. In another experiment performed by Eugene Podkletnov and G. Modanese (2011) Coulomb waves emitted from the surface of a superconducting disc at a field potential gradient of $>2 \times 10^5$ volts per meter were observed to generate a longitudinal gravitic impulse that traveled at a speed of 64 *c*. Because Podkletnov's gravity impulses are confined to a 10 cm diameter beam, they maintain a constant field gradient and hence constant superluminal velocity as they travel forward. By comparison, the electric field gradient in the core of the nucleon at a distance of 6×10^{-13} cm (0.6 fermis) from its center is estimated to be around 2.5×10^{20} volts per meter, or 10^{14} to 10^{15} fold greater than the gradients produced in the above laboratory experiments. Consequently, extrapolating from these laboratory results, Tesla wave-like field pulsations propagated along an interparticle soliton beam would be expected to travel along the beam a speed of 10^{15} to 10^{17} *c*. Just as in Podkletnov's collimated gravity impulse beam, this speed along every linear soliton connection should not diminish with distance. Theoretically, two entangled particles located on opposite sides of the Milky Way galaxy should be able to orchestrate their spin positions with a time delay of less than a millisecond.

development it could lead to a better understanding of phenomena that currently leave conventional physics in a quandary.

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