The Genesis of Fundamental Forces Acting at a Distance and Some Practical Derivations

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Abstract ——— This paper proposes a new geometrical theory for the formation of subatomic structures underlying electric polarities and the atom, and describes their interactions at the sub-elemental particle level. The structures are derived from two basic observations and their interpretations. It is observed that spiral motion is a fundamental action of matter and that all material manifestation is a type of crystal. The observed generality of crystalline structures is extended to the so-called vacuum space proposing it to be "crystalline." Vacuum space lattice sites are postulated to be populated with fundamental energy vortices called Space-Time Array Resonators (STARs). STARs are units of energy tied into a pulsating spiral vortex called a circumvolution cissoid and are the basis for all particles of matter.

The space lattice is described as a non-compressible, frictionless "fluid" comprised of unit cell cubes of energy vortices. Elementary particles of matter arise from the space lattice by absorbing resonant frequencies of electromagnetic radiations and are defined as stationary waveforms inside the atom. Based on this understanding, we present a new model of the atom that suggests that atoms, just like their elementary particle constituents, are energy circulators and subsequently provide a theoretical model for low-energy nuclear reactions. In addition, we demonstrate the illusionary nature of particles and the quantum.

The specific directions of circulating fluid space lattice determine electric polarities. Attraction of free charges is governed by a directional flow of fluid space lattice between the opposite electric poles. A unidirectional flow of space lattice also occurs between separated positive and negative charges, causing a directional motion of the charged object (*e.g.*, a capacitor). This conclusion leads to an inertialess propulsion method, which provides an experimental proof of this theory. Electrostatic and magnetic fields are defined as space lattice currents, which follow specific geometries. The principle of a method is also described for extracting electrical energy from the electrostatic field of the Earth that can become the source of an unlimited supply of electrical energy.

An analysis of the physical attributes of gravitation is also presented. We show that gravitation as generally perceived on this planet is not a single force, but a composite of several phenomena and that it should not be considered central to the cohesion of our planetary system.

We consider the physical nature of electromagnetic radiation and visible light in particular, and propose that the expanding universe concept is possibly due to an optical illusion. We also suggest that only magnetic forces can alter the curvature of light, and that the velocity of light is inconstant.

The effects of radioactive decay on geomagnetic processes are also discussed, suggesting that global radioactive pollution from nuclear weapons tests may be an important component of the current trend of global climate change and suggests that a global remediation program is urgently needed in order to avoid potentially catastrophic consequences if the current trends continue unabated.

The Universal Spiral

This paper attempts to explain the genesis of the stable elementary particles—the electron, proton and neutron—based on geometric or space relationships, and describe their interactions at the sub-elemental particle level. The advantage of such an approach is that it can be visualized, and not just expressed mathematically. It is also important to recognize that physical phenomena cannot be discovered by mathematical means. In other words, physical modeling followed by experimental verification and quantitative treatment is possibly the only path for the discovery of subatomic physical reality. In addition, we want to highlight sometimes centuries old observational and conceptual errors that form the bases for a number of contemporary physics theories.

By definition, the word "structure" implies a geometric relationship, and such a relationship must be of great importance in atomic structures even though they are hidden from direct view. The study of geometric relationships of macroscopic structures of matter may provide important insights into the properties of matter at the microscale. In stellar formation, attraction and velocity generate a rotary vortex. Even in the relative absence of such factors, all objects spiral at some given rate peculiar to their special influences. A spiral is created when an object moves forward while rotating. Earth's movement in space is an example of this process. Earth orbits the sun, while the sun pulls it along towards the direction of Vega in the constellation Hercules. The combined circular and forward motion creates a spiral. Our sun has the same motion in relation to the galaxy center. Our galaxy, the Milky Way, also spirals away from the "Big Bang" center.

Water going down a drain demonstrates some of the special influences affecting spiral formation. The spiral, caused by Coriolis forces, changes dynamically under the effects of gravitational pull, drain diameter, obstructions, temperature, pressure, volume, viscosity, and stirring. The spiral changes shape and acceleration but maintains the universal shape of a spiral. The water flow is responsive to all possible factors, and so is the spiral.

Remarkably, the spiral vortex has a "memory" of itself. When a vortex is distorted into an ellipse, it spontaneously returns to its original circular form when the distorting influence ends. The vortex is a self-sustaining type of motion; its resiliency is comparable to that of atomic bodies.

Spirals condense energy and sine waves transmit it along a frictional line of force between them (Figure 1). Spirals and waves could be considered complementary aspects of each other. Two opposed spirals form a wave, or a wave produces two spirals. A sine is the producer of waves of spiral forces. Any medium capable of supporting wave motion can also

support vortex motion.

The spiral is the prominent form of organization of matter. The large proportion of spiral galaxies among celestial bodies visibly demonstrates this. On the microscale, even the building block of life, DNA, uses this structure, and spirals are likely to be dominant at the level of the atom and below. We propose that all stellar formations, molecules, atoms, and subatomic constituents use the mutable spiral to adapt to their spiral environment.

The Crystal Universe

Another proposition is that all mediums of matter can be considered a type of crystal. Crystallinity is readily recognizable in the mineral world, but it is also a more general state of matter. By definition, a crystal is a regularly repeating atomic arrangement, such as a chemical element, compound, or isomorphous mixture. Besides solid crystals, liquid crystals also exist. Therefore, the term crystal can be applied to material expressions where crystallinity is not obvious, *e.g.*, gases, complex biologics, and various life forms, including viruses, bacteria, and higher organisms.

Air and water could be considered loose crystals subject to fast molecular drift. At low temperatures where molecular drift is reduced, gases form solid or liquid crystals. Even helium, the most volatile of all gases, can be crystallized under the appropriate conditions. Soil and stone and metal are opaque cryptocrystals with slower rates of molecular drift. On the macroscale, the Earth could be seen as faceted crystal with its mountain ridges as the ridge of a geodesic sphere. Biopolymers such as DNA, proteins, or polysaccharides fit

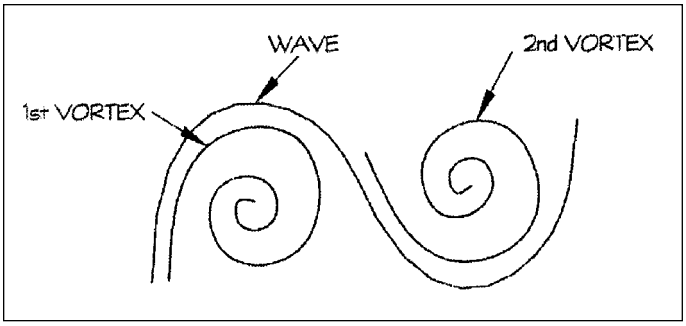

Figure 1. Spiral-wave relationship.

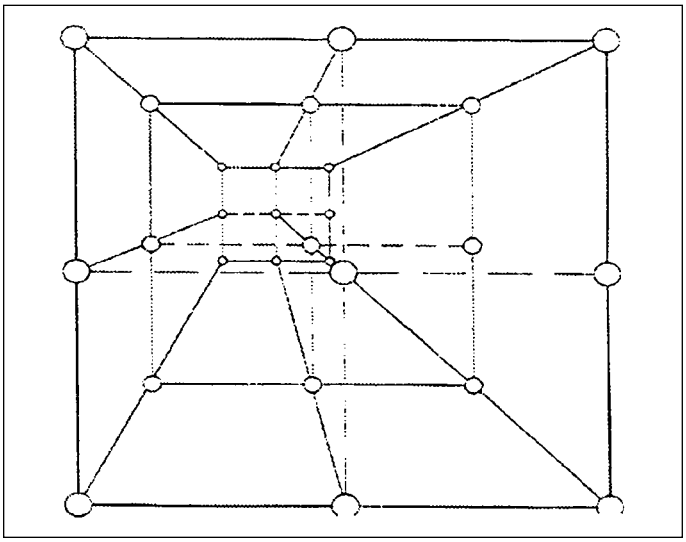

Figure 2. Geometry of the space lattice.

the definition of a crystal and are commonly made into crystals for analysis and other purposes. All life can be seen as a crystal. From microbes to humans, we are liquid crystals on a skeletal lattice.

Crystals are the shape of discrete units of matter and notably the channelized direction of energy, that is, the direction in which energy flows unforced. Crystals form the basis for corpuscle-wave conversion. Crystals create resonance and conduct the flow of energy between states. Crystals can also be considered lenses. By definition, a lens is a device capable of refracting, or bending, light. Light is an energy flow, so on a more general term a lens can be defined as any object capable of changing the direction of energy flow.

By this broader definition, even an electric wire is a lens, as it is capable of changing the direction of flow of electrical energy. Lenses communicate energy as part of the principle that all matter vibrates, all matter transmits, and all matter receives energy. The universe changes energy states with lenses. Following this line of reasoning, the universe could be viewed as a resonant crystal lens.

This observation is compelling because the universe is considered to be largely empty, the largest component of which is the so-called vacuum space. Since Nature seems to use the same geometrical organizing principles from micro to macro, we suggest that the vacuum space must also be "crystalline." Since the term crystalline is associated with material of which the vacuum space is substantially devoid, we will use an extended meaning of structure when discussing the "crystallinity" of vacuum space.

The concept of "crystalline" vacuum space was introduced by Simhony.[1,2] Simhony reasoned that three-dimensional physical phenomena must have three-dimensional physical causes and explanations. He demonstrated that physical reality could be described by the laws of classical physics supplemented by the presence of a space lattice. This led to the development of the theory of an electron-positron lattice space (epola for short). In the epola, bound electron-positron pairs reside at the lattice sites of a face-centered cubical "crystal" structure similar to that of NaCl crystals.[3] The face-centered cube geometry allows the densest packing of spherical particles.

The epola theory allowed a physical explanation of all yet unexplained postulates of quantum mechanics and relativity including the particle-wave duality, the quantized nature of electron orbits in the atom, electromagnetic radiation, the photon, and gravitational interactions as well as the relationship of electrostatic, magnetic, and gravitational interactions. Simhony demonstrated gravity to be a derivative of electromagnetism.

The Organization of Vacuum Space

There is a large body of evidence suggesting that the vacuum space is not empty at all. Experiments verify that the vacuum space contains an enormous residual background energy[4-16] called zero-point energy (ZPE). The ZPE is believed to manifest as a pervasive and vast electromagnetic field called the zero-point field (ZPF).[5] A dynamic field, ZPF is virtual plasma, with particles arising and disappearing of a background energy field serving as a baseline, or zero-point, for all physical processes. The ZPE remains even at absolute

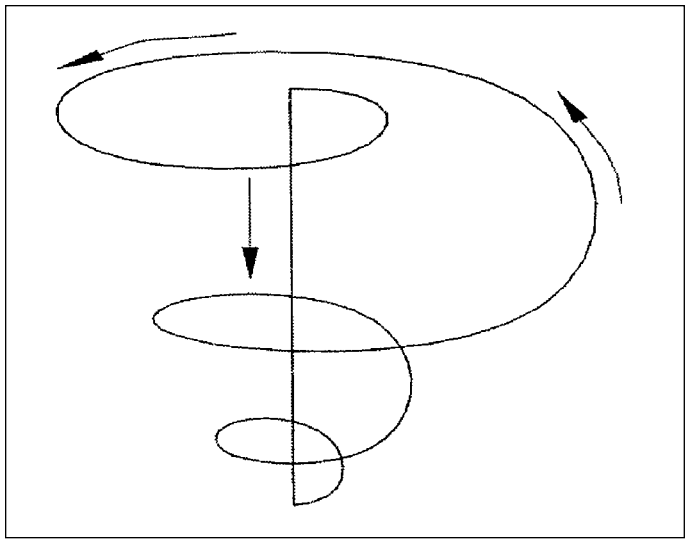

Figure 3. The circumvolution cissoid.

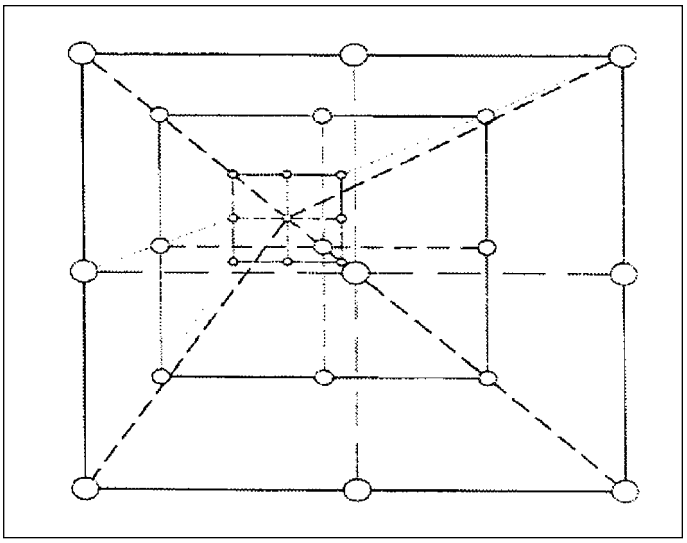

Figure 4. Rearrangement of the unit cell.

zero. Simhony has described zero-point energy fluctuations as analogous to Brownian motion of epola particles around their lattice sites. A potential alternative term for the lattice space is the zero-point field. This area remains an active field of research.

Simhony also suggested that all particles of matter are formed directly from the lattice space,[1] the mechanism of which remains undetermined. The present theory intends to answer this question in terms of lattice space.

We propose that the vacuum space has a lattice structure similar to that introduced by Simhony. This structure is a face-centered cube having 27 lattice sites (Figure 2). On the lattice sites reside the elemental "particles" or vortices forming all particles of matter.

These are "particles of energy" rather than particles of matter. We propose that the "particle of energy" of the space lattice, called here the Space-Time Array Resonator (STAR), is a spiral energy vortex tied into itself in the form of a circumvolution cissoid. The circumvolution cissoid is a spiral turning around an axis converging into an apex, in a self-imploding, self-sustaining vortex motion (Figure 3). The vortex pulsates and its vibration is a function of $(2\pi\phi)^x$, where ø is the Fibonacci series number and x = 0, 1, 2, 3, the number of turns the circumvolution cissoid makes. Once started up, such a vortex would run practically indefinitely inside the space lattice.

The internal friction of such a space lattice must be so low that it would only be noticeable as a red shift in the spectra of distant galaxies. The space lattice, like its constituent elementary vortices, must also be a resilient structure with only limited compressibility. At the same time, it must have fluidity since it is capable of transmitting waves with transverse displacement. In the absence of atomic oscillators, the space lattice would be incapable of dissipating energy in the form of heat.

Vortices maintain their circular forms as well as their proportions and dimensions. The adjacent vortices have a coordinating effect that establishes axial alignment and rolling contact between vortices within the space lattice. In that sense, there is a great deal of similarity between crystals of material bodies and the structure of the space lattice. We postulate that the space lattice is an incompressible, frictionless "fluid," or an incompressible continuum, made out of unit cell cubes of elementary vortices.

We can consider the space lattice equivalent to motion. A space lattice in motion necessarily has inertia. Although inertia is generally attributed to moving material bodies, it is actually a property of motion. Inertia is just the continuity of motion. In the case of vortex motion, the inertia is localized. Localized inertia can also be called momentum. To account for the elemental particles of matter, we just need a space lattice that is capable of moving.

Anderson discovered in 1932[17] that when 1.02 MeV energy of electromagnetic radiation is absorbed into the vacuum space, an electron-positron pair may appear. This observation is interpreted here as a glimpse into the formation of elemental particles of matter. To become matter, energy must become more angular. This hypothesis is derived from the observation that all material expression is a type of crystal, and is the compound and derivative of a fundamental triangular shape from which all the seven crystal systems can be derived.[3]

The mechanics of this expression at the level of the space lattice are explained as follows: As the energy of electromagnetic radiation propagates through the space lattice, it polarizes the STAR vortices (for analogy see Figure 1). Subsequently, the cubic unit cells of the space lattice undergo a "phase transition" similar to the condensation of gases. This happens at the resonant frequency of 1.02 MeV gamma radiation for the electron and positron. The 27 STAR vortices of the unit cell of space lattice rearrange into a pyramidal segment of the cube (Figure 4) on six levels, forming six circles of vortices. An open-flat presentation of the rearrangement is shown in Figure 5. This structure is the postulated smallest unit of matter. Note that the cube is composed of six interlocking pyramids, making the cube and the pyramid resonant structures. Inside the pyramid, the STAR vortices form a higher order vortex capable of circulating the fluid space lattice. The pumping action is driven by the self-sustaining, pulsating vortex motion of its constituent STAR vortices (Figure 3). The overall shape is a cone fitting inside the lattice.

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3). The overall shape is a cone fitting inside the pyramid. The formation of matter follows the geometry of the space lattice (Figure 4) and thus we may conclude that the blueprint for matter is built into the space lattice.

The Vortex Elementary Particles

An electron is produced when two cones are joined in a tip-to-tip configuration (Figure 6). The positron is made out of two vortices (cones) facing base-to-base. The energy vortices that make up the electrons have a resilient vibratory structure, which should be capable of vibrating at various frequencies and modes. This would allow us to account for the series of spectral lines, a signature of energy absorbed and emitted at various frequencies.

The pumping effect and circulation of the fluid space lattice by these complex vortex particles proceeds as follows: For the electron, the space lattice is drawn in polarly and expelled equatorially; for the positron, the space lattice is drawn in equatorially and expelled polarly (Figure 7). The direction of the circulation of the fluid space lattice determines the positive or negative polarities. When in close proximity, a specific flow coupling occurs between the electron and positron (Figure 7).

The instability of the electron-positron pair is also derived from this model. The perfectly fitting, counter-rotating cones of energy extinguish each other instantaneously, releasing a combined energy of 1.02 MeV. This results in the reconstitution of the respective unit cells of the space lattice along with the release of the phase transition energy as electromagnetic radiation.

The size of the STAR vortices is estimated at 0.005 fm based on the "nuclear radius" of 0.1 fm for the electron. The lattice constant for the unit cell of the space lattice is approximately half the "nuclear radius" of the electron, *i.e.* 0.05 fm. This suggests that the space lattice is quite dense compared to atomic bodies.

The proton is produced by two vortices facing base-to-base, however, the vortex proton may contain additional components or have a different oscillatory rate that accounts for its higher rest mass. The neutron comprises three vortices and in a sense, the neutron is a product of an overlapping electron and proton. By shedding the bottom vortex ring, a neutron can be transformed into a proton (Figure 8).

We propose that the pumping effect and circulation of the fluid space lattice by these complex vortex structures proceeds as follows: For the electron, the space lattice is drawn in polarly and expelled equatorially; for the proton, the space lattice is drawn in equatorially and expelled polarly (Figure 9). The electron's space lattice flow is coupled to that of the proton, and through the proton, to that of the neutron.

The Vortex Atom

This suggests that the constituents of the atom form a balanced coupled system that explains the stability of the atom. This also means that external impulses are transmitted over the entire atomic structure, thus impacting the total atomic

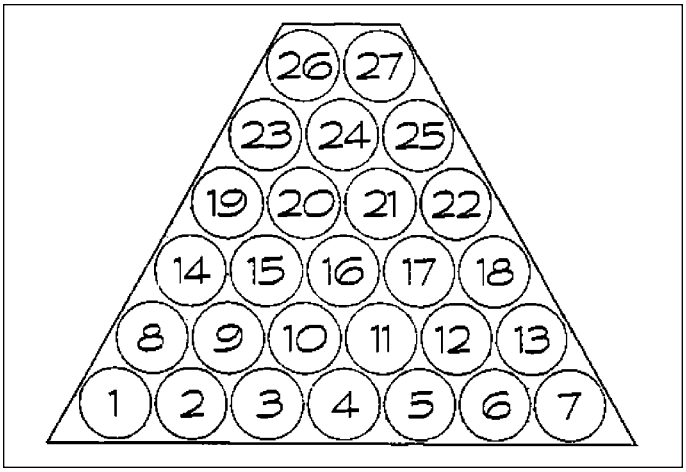

Figure 5. The model of the smallest unit of matter.

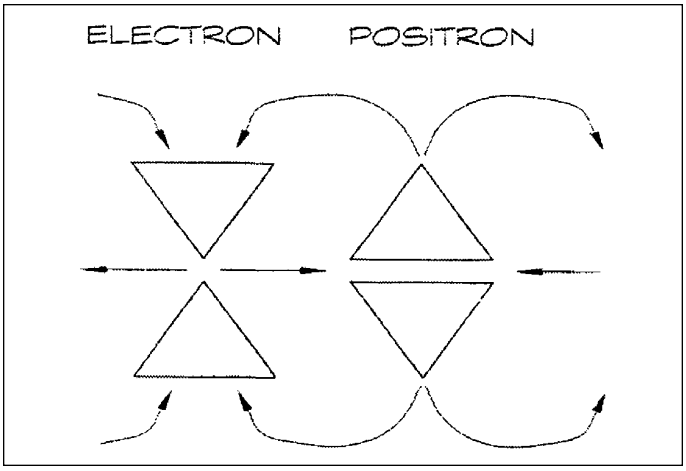

Figure 7. Flow coupling of electron and positron.

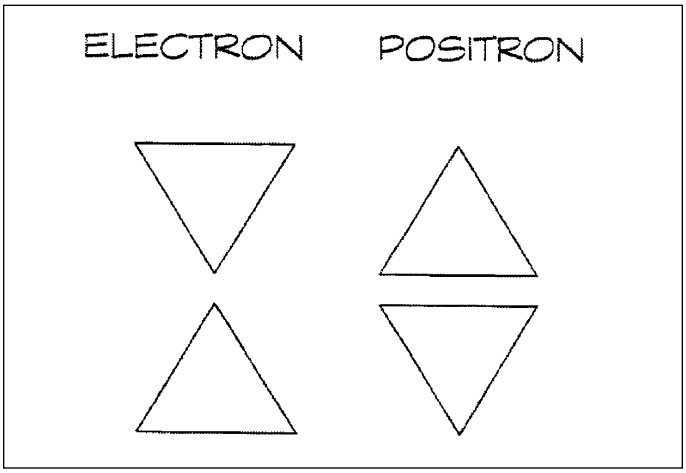

Figure 6. Structure models of electron and positron.

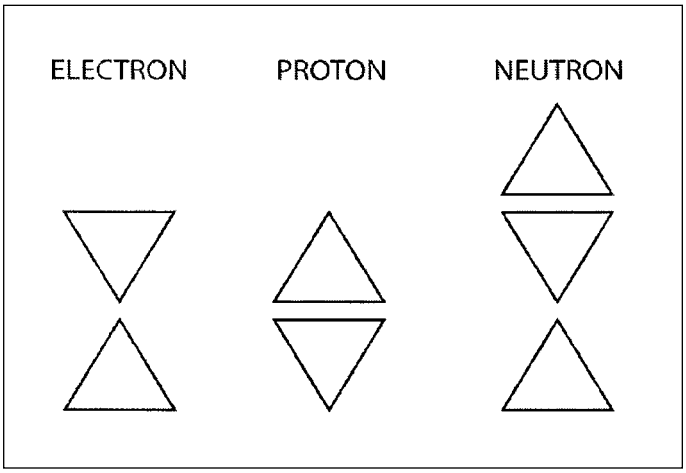

Figure 8. Structure model of electron, proton, and neutron.

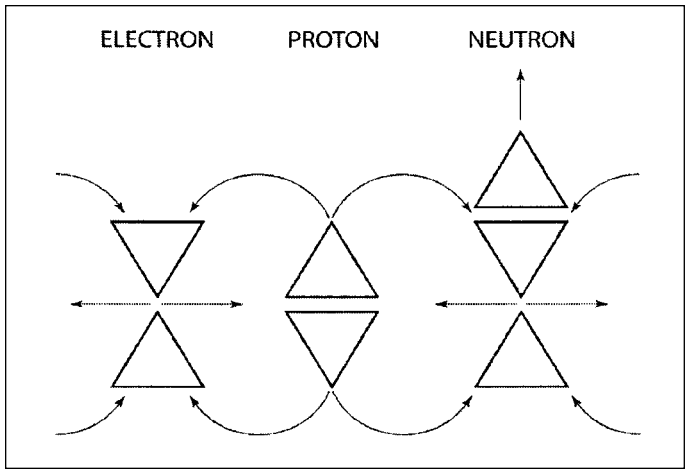

Figure 9. Flow coupling of electron, proton, and neutron.

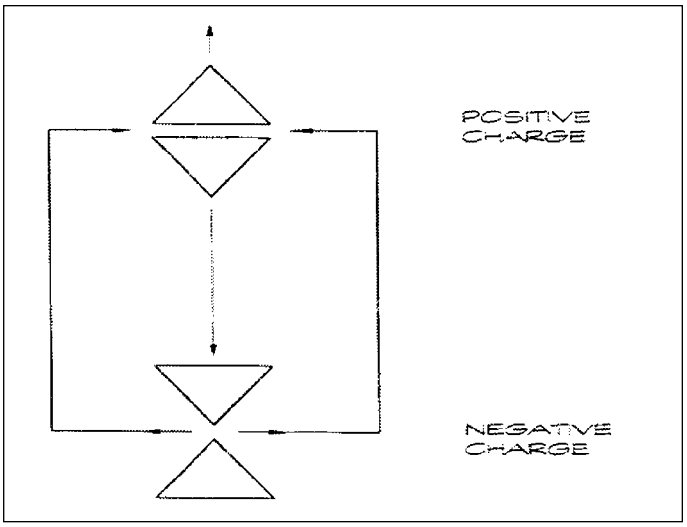

Figure 10. Attraction of electric charges.

arrangement. This raises the question of energy emission by excited atomic structures. For very short wavelength electromagnetic radiation (*e.g.*, gamma rays) for which no resonant frequencies may exist inside an atom, no absorption of the radiation will take place. However, when resonant frequencies are available, the atom will absorb excitational energy and subsequently releases radiation on its own.

We propose that the emitted electromagnetic energy is the product of the entire atomic structure rather than just the orbital electrons or the nuclei, and is a function of the energy of excitation. As matter manifests by adsorption of resonant frequencies of electromagnetic radiation by the space lattice "fluid," the reversal of this process takes place during emission of radiation, *i.e.* the release of transformational energy as transformed space (matter) reverts to its untransformed form (vacuum space) in a natural recycling process. This suggests that with properly chosen excitation methods matter could be made to "disappear." Such discovery could find application in waste remediation, for instance the selective decomposition of greenhouse gases present in the atmosphere. A focused beam of the fluid space lattice should be able to facilitate this process.

The elemental vortex subunits of the atom are stationary oscillating entities or waveforms; their surrounding, incompressible space lattice currents create the illusion of solidity in particle collisions. This indicates that particle collision studies are not an effective way of gaining insight into the structure of elemental subunits of the atom.

We therefore propose that particles themselves are illusionary, as is the apparent solidity of stable elementary particles or atomic bodies in general, since their underlying wave structure remains hidden. These stable elementary atomic subunits exist as stationary wave forms inside the atom, or moving waveforms outside the atom. The various so-called electron orbits are merely specific wave structures oscillating with their particular, dissimilar frequencies. Therefore, they can occupy the same spatial domain. This observation also resolves the enigma of particle-wave duality.[18]

If electrons are waveforms, it is easy to explain the "uncertainty principle."[19] The electron, being a stationary waveform inside the atom, is at all times everywhere "around" the atomic nucleus. The quantized nature of the electron's energy can subsequently be explained. As an electron is a pulsating spiral vortex (just like its STAR vortex subunits, *i.e.* self-sustaining, self-imploding vortex structures), its pulsation creates the illusion that energy moves in packets, although it is actually continuous as demonstrated by the continuity of its energy spectrum. The same observation applies to electromagnetic radiation. Therefore, the quantum must be considered another illusionary concept.

Over the past decade, a number of reports have appeared presenting data on so-called low-energy nuclear reactions, of which cold fusion was the most extensively studied.[20] In these reactions, in the presence of catalysts like platinum, deuterium atoms were shown to produce tritium and/or helium atoms at around ambient temperatures. This was not explainable by current models of the atom, and thus the data were generally received with skepticism. A very recent publication has described a novel, pyroelectric crystal driven D-D nuclear fusion.[21]

Catalysis is a powerful tool in chemical reactions.[22] In the new model of the atom in which all atomic vortex subunits are coupled via shared space lattice currents, we predict that interactions between the space lattice flows of reactants and a catalyst could induce, similarly to molecular chemical catalysis, the formation of atomic transitional complexes. The dissociation of these may lead to new nuclear reaction products, accompanied by the release of energy. Metals of the platinum group are frequently used catalysts for hydrogenation reactions in organic syntheses due to their ability to "dissolve" hydrogen isotopes, possibly by the formation of such atomic transitional complexes. Their ability to promote nuclear reactions of deuterium atoms is now cast in a new light and adds support to the theory of atomic structure discussed here.

We predict that reaction conditions determine if new compounds or elements are formed in the presence of a suitable catalyst. Furthermore, it is likely that low-energy nuclear reactions, although of low frequency, are commonplace in nature, and methods of chemical catalysis may provide insight into avenues of catalysis for nucleosynthetic reactions. The new atomic theory also predicts that radioactive decay can be influenced by the presence of a suitable catalyst. Indeed, reduced radioactivity of tritium on titanium microparticles has been shown to follow the laws of chemical equilibria.[23] Other solid-state environmental effects on the decay of several radionuclids have also been

reported.[24]

We propose that in a comparable catalytic reaction, the generation of matter out of the space lattice occurs every time a magnetic field interacts with material bodies. This process is best observable on conductors. In this event, under the influence of catalytic atomic nuclei of conductors, the magnetic field induces at the point of intersection a deformation of the space lattice and the *de novo* formation of electrons. This is why electron flow (electric current) is present in the outer shell of conductors. As soon as the deforming effect of the magnetic field ceases, the STAR constituents of electrons revert into the space lattice. Therefore, conductors are effective both as electron sources and sinks.

Similarly, electromagnetic radiation (*e.g.*, gamma rays) may produce electron-positron pairs (pair formation) or electrons (Compton effect) in the presence of atomic nuclei by a comparable deformation of the space lattice. In the latter case, the electromagnetic waves lose some of their wave compression. This demonstrates the mechanistic similarity of magnetism and electromagnetic radiation, as both phenomena propagate through the fundamental energy field of the universe (space lattice), and represents specific geometric expressions therein.

Derivation of Electric and Magnetic Interactions

The model explains the interaction of free electric charges as follows (Figure 10). The movement of opposite charges toward each other is due to the equatorial circulation of fluid space lattice from the negative charge to the positive charge and the polar circulation of space lattice from the positive to the negative charge. The attraction of the vortices pulls the two partners together. The electrostatic field between separated charges is defined as the flow of the space lattice from the protons to the electrons and the outside return flow of space lattice from the electrons to the protons. In other words, charges can be treated as sources and sinks in the space lattice continuum and such approach could match elastodynamics and electrodynamic fields in their most general expression.[25]

Interestingly, there is a net unidirectional flow of fluid space lattice in the axial direction of the free electric charges flowing in at the negative pole and flowing out at the positive pole (Figure 10). If the charges have a steady parallel orientation, *e.g.*, as in a parallel plate capacitor, then a pressure differential must arise in the space lattice around the opposite poles of the capacitor. To fully appreciate the significance of this conclusion, one must first examine how material bodies accelerate through the space lattice.

Accelerating objects encounter resistance, facing an increased pressure of the space lattice at the front end and a reduced pressure at the rear end. This situation is common to all propulsion methods that accelerate the physical object by a mechanical force. It is logical to suggest that a pressure differential of space lattice at the opposite sides of material bodies is always accompanied by a change in the rest or motion of such bodies. To achieve propulsion, instead of applying force to the physical object we should transfer the space lattice that controls the behavior of the object from the rear end of the object to its front end.

Therefore, a charged capacitor with its own generated space lattice pressure differential should behave as an accelerating object, *i.e.* it should move toward the direction of its positive pole. In fact, such an observation was made as early as 1926, the so-called Biefeld-Brown Effect.[26] Biefeld and Brown found that a charged capacitor suspended on a thread moved in the direction of its positive pole. Without a plausible theoretical explanation, the observation received little attention.

However, the Biefeld-Brown Effect might provide an experimental proof for this theory of electric polarities. Although no widely-accepted theory exists that explains this phenomenon, Bahder and Fazi[27] have argued that the effect can be explained through conventional electrodynamics, based on an effective non-linear coupling between the applied electric field and the external environment. But this argument requires that the effect is related to how the external fields couple to the atmosphere. It does not apply if the effect is observed as the atmospheric pressure is reduced to a negligible value, and there is evidence that effect has been observed in a vacuum-like environment. Within the context of the model that is presented here, a more complete picture emerges that can explain how the Biefeld-Brown effect might be observed in any environment. Now that the fundamentals are explained, the Effect may provide the basis for a new propulsion method.

The theory also allows the development of strategies for tapping into the energy of the space surrounding us. Separated charges in a capacitor cause a directional flow of the fluid space lattice. Conversely, if we could induce or discover naturally occurring domains of a directional flow of the space lattice (*i.e.* a natural pressure gradient within the space lattice), such flow would cause a separation of charges in material objects, *e.g.*, in a capacitor. Earth's electrostatic field represents just such a pressure gradient within the space lattice that can be tapped.[28,29]

We have described the physical basis for the electrostatic field as an axial flow of a space lattice current from the positive charges to the negative charges and back along the outside to the positive charges. We shall now explain how these space lattice currents flow in an electric wire. The space lattice flow that connects the electrons to the protons of the atoms in the wire becomes extended along the length of the wire. This is the same direction as the direction of movement of electrons that, in the current, flow in the outer shell of the wire. The external return flow of the space lattice spirals in the opposite direction in the space around the wire. This flow constitutes the magnetic field.

In a solenoid, the surrounding space lattice flows in the opposite direction relative to the path of the electrons. The magnetic effect will appear as either N or S magnetic poles. The magnetic poles are mirror images of each other. This suggests that a single isolated magnetic pole cannot exist.

In the electrostatic field, the outside space lattice current flows between electrically charged particles. The magnetic field, on the other hand, exhibits a closed circuit flow of the space lattice along the path of a solenoid or a circuit. Movement of the space lattice in spirals or whorls produces electric and magnetic forces.

The Illusion of Gravitation and the Expanding Universe

Describing the physical nature of gravity remains a chal-

lenging area of contemporary physics. Gravitation is thought to be responsible for the cohesion of our planetary system and a critical organizing principle of matter.[30] It is generally accepted that in planetary mechanics, the solar gravitational pull is balanced out with the centrifugal force of orbital motion of planetary bodies. This concept, however, is incomplete because if solar gravitational attraction were resisted by a centrifugal force, this would lead to a loss of energy, resulting in the planet spiraling into the Sun. As the Earth develops two types of centrifugal forces (one due to axial rotation, the other due to orbital motion), the energy loss doubles. However, a source of power remains unaccounted for, specifically one that could launch the planetary bodies into their orbits, and then to continually replace the lost energy to keep them in motion.

Another observation is that in vacuum, all objects exhibit the same gravitational acceleration regardless of mass.[31] When this observation is applied to the solar system, as all planetary bodies are suspended in the vacuum of interplanetary space, one must conclude that the Sun exerts the same gravitational force on all planets irrespective of their masses. Therefore, no relationship exists between masses and gravity. These findings argue that gravitation cannot be central to planetary mechanics, and compel us to further analyze the gravitational phenomenon.

Interestingly, whenever an object falls or rises in the vicinity of the Earth's surface, a density-related phenomenon can be identified. Objects denser than air fall, while objects lighter than air rise. Oil falls in air, while helium rises. However, when oil is mixed with water, it rises above the water level. The same happens to iron particles in liquid mercury.

Sulfur or iodine vapor rises even though it is denser than air. Hot air rises in a medium of ambient temperature air. These observations suggest that temperature is another factor in modulating the behavior of objects in Earth's immediate environment. Elevated temperature has a dual effect; first, to reduce density, second, to reduce the magnetic force of bodies. Therefore, we propose that magnetic properties are the reason that all bodies fall in vacuum with the same acceleration.

An additional factor in the attraction of material bodies is radiant pressure that manifests in the vacuum of space. In the close proximity of our planet, one side of an object is always shielded from this pressure; the presence of a pressure differential between its two sides causes the object to fall to the surface of the Earth.

Here, we present a model that explains planetary mechanics without the need to assume the existence of an external power source or a mass/gravitation effect. It has been known since Kepler that the orbits of the planets are elliptical, and that the Sun does not reside in the point of equilibrium of masses of the solar system.[32] We propose that the point of equilibrium is a magnetic point of equilibrium, around which all planetary bodies orbit, including the Sun itself.

We suggest that while being attracted by the magnetic point of equilibrium of the solar system, planetary bodies are also repelled by solar radiation. This sets up equilibrium between the forces of attraction and repulsion. The flattening of a comet's coma and the development of its tail on its approach of the Sun demonstrates the intensity of solar radiation. We further propose that solar radiation is responsible both for the axial rotation and orbital motion of planetary bodies. A simple radiometer device can demonstrate this effect.

A radiometer consists of a wheel held in a vacuum tube; the wheel is divided into fan-shaped blades, with one side of the blades painted black and the other painted white. Upon irradiation with light, the wheel rotates on its axis. Similarly, high-altitude balloon flights have been hampered by problems of violent spinning,[33] which can be attributed to the same phenomenon. The motion is due to a potential difference set up by incident light (photo/thermoelectric effect) on the two sides of an object in a vacuum or sufficiently low-pressure environment. As planets with one side always in the dark are immersed into the magnetic field of the solar system, they begin to rotate just like the rotor of an electrical motor when the current is turned on. This axial rotation subsequently sets the planetary bodies in motion in their orbits, similar to the movement of a spinning top.

We propose that a full revolution of the Sun around the magnetic point of equilibrium corresponds to the solar year, while the seasons are caused by the Sun's rotation around this center at an angle from the plane of the ecliptic. When the Sun is in the ascending node of its orbit, Earth's Northern Hemisphere receives more solar radiation (summer solstice), while in the descending node the same happens on the Southern Hemisphere. This movement of the Sun gives rise to the optical illusion that the axis of the planet changes with the seasons.

When the planets are closer to the Sun during perihelion, they receive more light and rotate faster which, similarly to the spinning top, increases their orbital velocity. On Mercury, due to its close proximity to the Sun this effect is quite pronounced and provides the explanation for the precession of its perihelion. Doppler radar measurements of the axial rotation of Mercury show a very slow rotation rate.[34] However, as its axis of rotation is likely parallel to the plane of the ecliptic, it thus remains undetectable by this method. We predict that Mercury actually has a very rapid axial rotation.

Orbital motion is probably also common at the level of galactic organization and above. Based on this hypothesis, we propose an explanation for the flight of the galaxies that is the basis for the prevailing theory of expanding universe.[35] Spectroscopic evidence suggests that the galaxies are

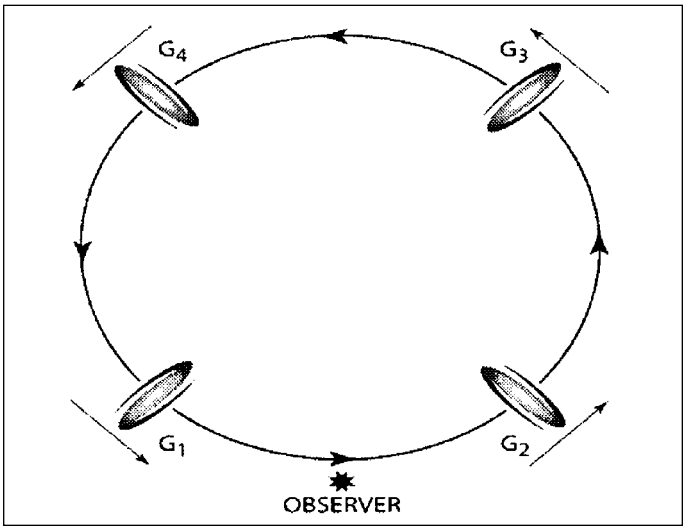

Figure 11. Orbital movement of distant galaxies.

rushing away from a hypothetical center at a rate proportional to their distance. As an anomaly, a lower proportion of blue-shifted celestial bodies have also been observed[36] which could be difficult to explain within the same context.

However, if the diameter of the orbits of distant galaxies and the time to complete a rotation on their orbits is extremely large, a far-away observer is not in the position to recognize their orbital motion. In Figure 11 (not to scale), galaxies 2, 3, and 4 appear to move away from the observer and produce red shifts, while galaxy 1 appears to move towards the observer producing a blue shift. The quantization of the red shift, *i.e.* a change in red shift over distance changing in discreet jumps,[37] supports the orbital motion of distant galaxies. Therefore, the theory of an expanding universe may be based upon an optical illusion. However, it is still probable that the universe is expanding, due to the enormous radiant pressure produced by billions of constituent stars of individual galaxies. The question remains if our present instrumentation is capable of detecting this phenomenon.

A New Light on Light

The physical basis of electromagnetic radiation is another unresolved issue in contemporary physics. We proposed that untransformed space, an infinite and dimensionless entity, is the foundation for the manifest universe. Electromagnetic radiation was defined earlier as transformed space (matter) reverting to untransformed lattice space in a recycling process. Therefore, matter is not energy and vice versa; both are merely manifestations of an all-encompassing vacuum space. Even though they are interrelated, the equivalence of matter and energy thus becomes another illusionary concept. The physical essence of electromagnetic radiation (discussed briefly earlier) was explained as waves of spiral forces propagating through the space lattice. According to this explanation, the particle nature of light, represented by the photon, is illusionary as well.

The space lattice cannot be conducive to the propagation of visible light or thermal radiation as interplanetary space is cold and dark. Most likely, only high-energy radiations can propagate through the space lattice. This observation was probably incorporated into the design of the solar observatory SOHO satellite, the telescope of which operates in the ultraviolet wavelength range.[38] Earth, similarly to all material bodies, has a bound layer of circulating fluid space lattice, possibly stretching far beyond the boundary of the atmosphere that, besides Earth's gaseous masses, participates to a significant degree in the attenuation of incident radiation energies.

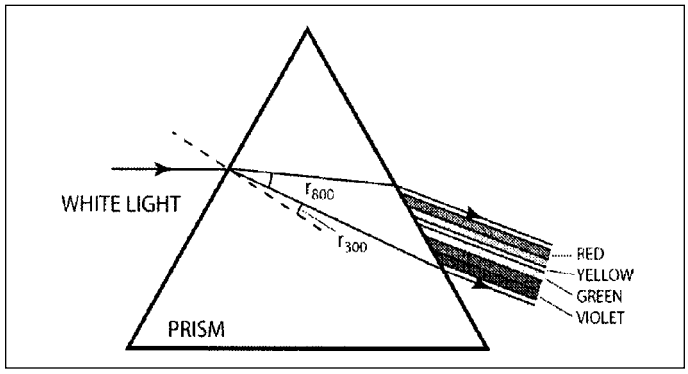

Figure 12. Light dispersion on a prism.

We propose that visible light and thermal radiation are produced by molecules of the atmosphere interacting with attenuated solar or other, comparable cosmic radiations. Surface temperatures are higher at noon than at sunrise or sunset because solar radiation at noon, incident at the smallest angle to normal, exerts the greatest pressure on the atmosphere. Compression of gases leads to the production of heat. This also explains why it gets colder at higher elevations.

The constancy of the speed of light is a central tenet of contemporary physical sciences. Although it is evident that light loses velocity in dense media, the vacuum speed of light is considered to be constant. However, as visible light cannot propagate in the high vacuum of interplanetary space, such a definition is meaningless. Light refraction on a prism may be a useful tool to study the actual velocities of components of visible (white) light (Figure 12).

The refractive index for longer wavelengths (red) is lower than those for shorter wavelengths (violet). This results in a greater angle of refraction for the longer wavelengths than for the shorter wavelengths. This phenomenon is quantified as the index of refraction; the fact that refractive indices differ for each wavelength of light demonstrates that they propagate through the prism at a different velocity. Our model suggests that this happens as follows.

As white light enters a glass prism (Figure 12), the space lattice currents surrounding its atomic vortices at the point of entry of the light beam deflect its compression wave front, as these currents cannot penetrate each other. The sine of angle of refraction is proportional to the individual velocities of light components. Subsequently, the light wave propagates through the dense medium, advancing from one atomic spiral vortex unit to the next as sine waves that are transmitted in a frictional line of force between them (Figure 1). The greater numbers of such vortices in the medium of glass lead to a larger number of contacts than in air, resulting in a reduction in the propagation velocity of light. After exiting the glass prism, light components regain their initial velocity due to the lower number of contacts with atomic vortices in the surrounding air, and can be recombined into a composite white light. In agreement with this model, recent experimental data indicate the possibility of extremely low (17 m/sec)[39] as well as superluminal (310 *c*) velocities for visible light.[40]

Therefore, this model establishes the inconstancy of velocity of visible light and electromagnetic waves in general. We propose that the velocity of the electromagnetic wave is a function of its frequency both in vacuum and dispersive media.

Gravitational theory suggests that masses, such as that of the Sun, may alter the direction of propagation of light—a phenomenon called gravitational lensing. We have earlier reported the observation that there is no relationship between masses and "gravitation"; therefore, the concept of gravitational lensing is meaningless. If masses could alter the curvature of light, it would be readily observed in the vicinity of planets or, optimally, at the eclipses of the Moon. However, light is deflected only in the vicinity of the point of magnetic equilibrium of the solar system, creating the illusion that Sun is responsible for the phenomenon.[41]

Therefore, bending light is a purely magnetic field effect

which we will rename here as magnetic field lensing. Our theory has explained that both magnetic fields and electromagnetic waves are propagating "pressure zones" inside the space lattice that cannot penetrate but distort each other's flow patterns. Therefore, magnetism must deflect light and vice versa.

The difference in the temperatures of equatorial and polar regions of Earth demonstrate this effect. First, the magnetic field strength is higher at the poles than at the equator[42] that should lead to the deflection of more of the incident light at the poles. Second, incident light reaches the equator at an angle closer to the normal than at the poles leading to a smaller degree of deflection by Earth's magnetic field and thus higher surface temperatures. Therefore, the Earth's magnetic field possibly plays an important role in the thermal equilibrium of Earth's surface.

Recent Geomagnetic and Climate Anomalies

The magnetic field strength of Earth has been decaying over the past 150 years,[42] and this process has accelerated since 1980, coinciding with an accelerated increase in global surface temperatures (Figure 13).[43] Earth's magnetic field seems to have been disappearing most alarmingly near the poles for the past 20 years,[44] and the decline has recently become very pronounced. Also, using the International Geomagnetic Reference Field (IGRF) data set, the magnetic field at the equator in the open ocean has declined 1.5% in intensity since 1980 (from 34,821 nT to 34,301 nT), whereas the entire decline over the period from 1900 to 1980 was only 2.7% (from 35,808 nT to 34,821 nT).[45] It is possible that the very recent acceleration of Earth's magnetic field decay plays a major role in the ensuing epoch of global warming (Figure 13).

We propose that the accelerating decay of Earth's magnetic field is a latent side effect of widespread radioactive contamination, resulting from over 2,000 nuclear weapons tests carried out since 1945.[46] The majority of the nuclear weapon detonations occurred in the Northern Hemisphere, which also happens to be the site of the largest geomagnetic and surface temperature anomalies[43-45] demonstrating an asymmetry of global climate change. Radioactive decay produces high-energy electromagnetic radiations as well as charged particles, the energy of which is dissipated via Compton scattering leading to secondary production of large numbers of charged particles as well as low-energy electromagnetic radiation, all of which are capable of modulating an external magnetic field.

In the 1930s, Wilhelm Reich experimentally demonstrated the existence of a life energy field, called orgone, which is not electromagnetic in nature but can produce electric and thermal effects in a reproducible and quantifiable manner.[47] He found that radioactivity causes far-reaching excitation in the surrounding orgone field, which persists long after the removal of the radioactive source.[48,49] Reich warned that dangers associated with radioactivity go beyond its radiation hazards and suggested that orgone energy can reverse radiation damage.

Reich's orgone field shares properties in common with the space lattice field of this theory and may in fact be related to it. We therefore propose that radioactive decay is associated with physical processes which are not yet understood, but which may have prolonged, far-reaching environmental consequences. A decaying radioactive atom may create a miniature nuclear blast wave that propagates through the space lattice to great distances and induces remote, long-lasting electromagnetic effects.

Radioactive deposits in Arctic ice cores testify to the magnitude of global nuclear fallout since 1950.[50] The well-studied Chernobyl accident,[51,52] the single largest release of radioactive contamination in history, allows us to put global radioactivity fallout in perspective (Figure 14). After factoring in the decay of long half-life fission products,[51] nuclear fallout levels in the Northern Hemisphere could have exceeded that of Chernobyl's over a prolonged time period, perhaps 15 to 20 years. This could have placed diverse, long-lasting anthropogenic pressure on delicate geomagnetic and climate systems.

We suggest that Earth's axial inclination is set, similar to a spinning top, by the uneven distribution of landmasses between the Northern and Southern Hemispheres. If the

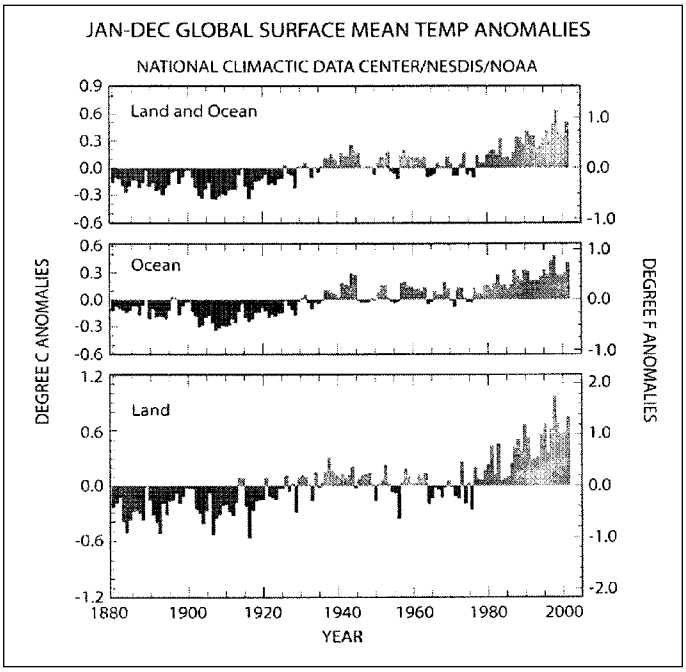

Figure 13. Global surface mean temperature anomalies.[41]

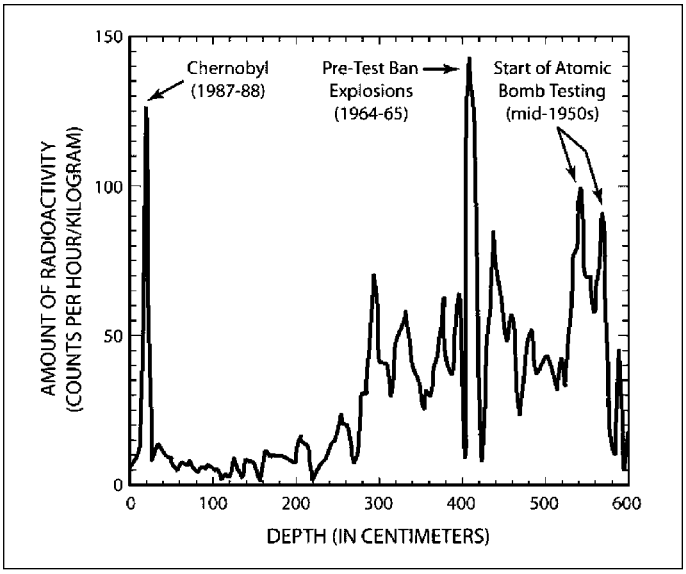

Figure 14. Nuclear fallout levels in Greenland ice core specimen.[44]

melting of polar icecaps occurs at the same rate at the poles, coastal regions and other low lying landmasses would get flooded, but the inclination of Earth's axis would not change. However, a higher rate of melting of Arctic ice would change the tilt of Earth's axis, reducing its inclination, which could lead to a redistribution of landmasses between the two Hemispheres.

Some landmasses in the Northern Hemisphere would sink into the ocean, while others reappear in the south from the Atlantic and Pacific Oceans. After reaching a critical level of ice mass loss, this change could happen quite suddenly, establishing conditions very different from those currently prevailing on our planet. Therefore, changes in Earth's axial inclination could be an indicator of the progression of global climate change.

The Intergovernmental Panel on Climate Change (IPCC), in its Special Report on Regional Impacts of Climate Change,[53] as well as in the IPCC Second Assessment Report on the impact of climate change on the cryosphere,[54] produced an assessment of the impacts of climate change on the Arctic and the Antarctic. The main points arising from these documents were that the Arctic is extremely vulnerable to projected climate change, while the Antarctic would respond relatively slowly, with much smaller impacts expected by 2100.

Data from satellites and submarines has indeed provided observational evidence of substantial changes in the Arctic ice cover, but small changes over the Antarctic.[55-57] These observations underline the asymmetrical nature of global warming and suggest that radioactive pollution, primarily impacting the Northern Hemisphere, represents a secondary source of climate change in addition to the well-recognized effects of greenhouse gas accumulation. Therefore, it is imperative that a global remediation program is initiated at the earliest opportunity to mitigate this situation.

With our new understanding of the physical bases of the formation of matter, electromagnetism, and planetary electrification and the connections between electromagnetism, the orgone energy field, and climate processes revealed by Reich's research,[58] it may be possible to develop methods to reduce the impact of climate change on both the Arctic and the global scene.

Conclusions

We suggest that Nature's phenomena resolve itself into readily understandable laws that require little analysis or mathematical treatment. Following this lead, the theory presented here is derived from the observations that spiral motion is a fundamental action of matter and that all material manifestation is a type of crystal. The theory allows the development of a fully physical model of reality, and provides a framework for addressing basic properties of matter as well as interactions between material bodies. The theory of vacuum space—the fundamental matrix of the universe (space lattice)—leads us to experimentally testable conclusions. The possible outcomes of the theory may include the basis for an inertialess propulsion method as well as a method for extracting electrical energy from Earth's electrostatic field.

The theory of the elementary vortex subunit of the space lattice, the STAR, leads us further into the mysteries of matter. We predict that by modulating the vibratory status of STARs, matter would not be able to interact with electromagnetic radiation, leading to invisibility of matter, while simultaneously becoming free of the restrains of external electromagnetic fields. This would allow acceleration of objects to velocities in excess of the speed of light and could open up the avenue for developing interstellar space flight capability.

The new model of the atom, which proposes that atoms and their elementary vortex subunits are tied together with space lattice currents, provides a theoretical framework for low-energy nucleosynthetic reactions, and explains the generation of electric current. In addition, the theory suggests an illusionary nature of particles and the quantum.

Analysis of the physical attributes of gravitation suggests that gravitation is not a single force but a composite of several phenomena that cannot provide cohesion for our planetary system. Therefore, gravitation is revealed as another illusionary concept. With this new perspective, we propose that the motion of planetary bodies in their orbits is governed by equilibrium between repulsive solar radiation and magnetic attraction.

We have also considered the physical nature of electromagnetic radiation and visible light, and proposed that the prevailing theory of an expanding universe is based on an optical illusion. This observation, however, does not exclude the possibility of an expanding universe. In addition, we have provided an explanation for the alteration of the curvature of light by magnetic fields, and the inconstancy of the velocity of electromagnetic waves.

Finally, we have discussed the effects of radioactive decay on geomagnetic processes and proposed it to be the secondary driving mechanism for global climate change. This paper intends to be an appeal for the evaluation of technological advancements that could be derived from it and which could be used to combat global warming, a mainly anthropogenic phenomenon that threatens to destroy our civilization in the not so distant future. Specifically, a global remediation program should be initiated at the earliest opportunity targeting greenhouse gases and radioactive pollution along with the world-wide deployment of a clean, renewable energy technology(s), like the one referenced here.[28,29] Such concerted global action will be essential for ensuring the continuing development and prosperity of our species on this planet.

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