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Visual Model of Electromagnetic Interactions of Sub-Photons

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Abstract

This paper provides a visual based conceptual model and framework to help explain the behavior of electrical, electromagnetic and gravitational phenomenon. The model is conceptual only and the hypothetical particles and interactions presented are simply designed as a way to visualize and understand electromagnetic interactions. Further research needs to be done regarding exploring the possibility that the proposed hypothetical particle and interactions may actually exist. Future improvements to the model may need to be made to help it conform to new scientific discoveries. Examples are provided showing how the framework conforms to many of the behaviors of electricity, electromagnetism and radiation. A hypothetical particle is introduced, referred to as a sub-photon by this paper. The proposed framework relies on previous research in controversial physical models such as repulsive gravity and a fractal universe. Despite its reliance on controversial models and assumptions, the model is intuitive in many respects, easy to visualize and not reliant on difficult mathematics. The model can help explain very complex interactions with visual explanations. Whether or not the existence of the sub-photon particle and its interactions are later supported by scientific literature, the model can remain a useful way to visualize and understand basic electromagnetic interactions. Since the predictive value of this model needs to be extensively explored by further research, this paper includes predictions about celestial bodies and gravitational waves that need to be scientifically tested.

Keywords: Nanotechnology; Nanomaterials; Photo-voltaics; Dendrimers

Introduction

Basic underlying assumptions

- Gravity is pushing or repulsive force. (All forces are repulsive/pushing). Objects and celestial bodies are pushed together by radiation pressure due to a difference in pressure [1]. One side of the celestial body is exposed to more gravitational waves while the other side is exposed to less (shielded area) (Figure 1).

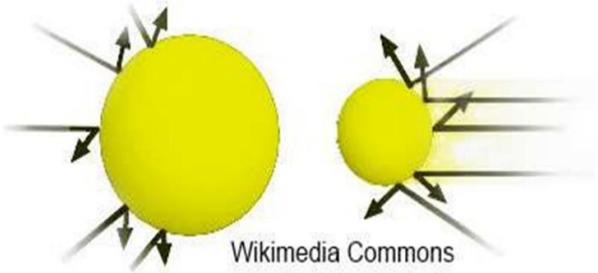

FIG. 1. **Basic underlying assumptions.**

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- The universe is fractal in nature, consisting of increasingly smaller and smaller particles [2].
- Smaller particles in the fractal universe are the building blocks of larger particles (Figure 2).

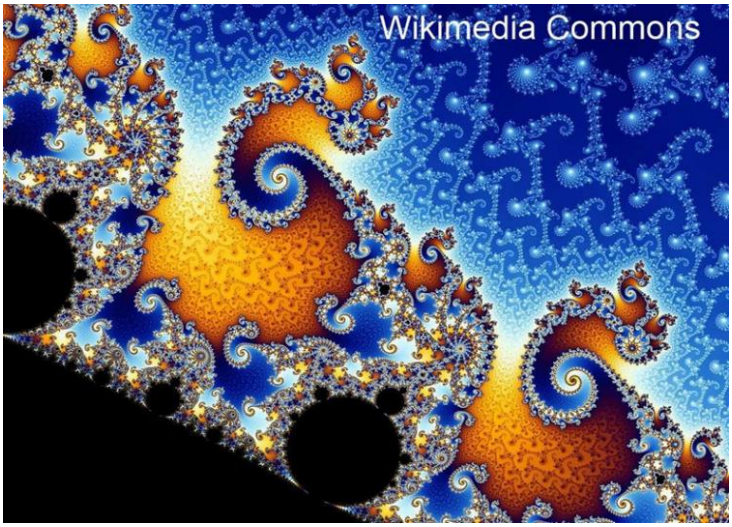

FIG. 2. **The universe is fractal in nature.**

New visual concepts

- Both gravitational and electromagnetic waves are caused by the same extremely small particles whose size is a fraction of the smallest electromagnetic wavelength.
- Gravitational and electromagnetic waves differ only in their wavelengths.
- The Sub-photon is the newly introduced particle that is the building block for construction of both gravitational and electromagnetic waves.
- Sub-photon is the particle that is the building block of elementary subatomic particles.
- A sub-photon consists of a nucleus (sun) particle and rotating planetary particles (Figure 3).

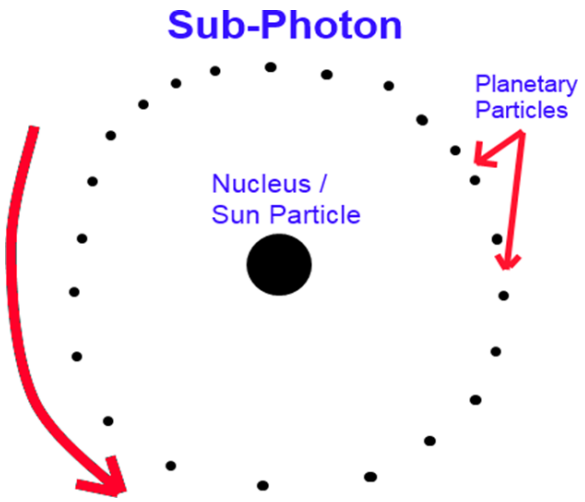

FIG. 3. **New visual concepts of sub photon.**

Electromagnetic waves

- Traveling sub-photons that are polarized in alternating directions create an electromagnetic wave or gravitational wave.
- Electromagnetic waves have a wavelength that resonates with atoms or larger objects [3].
- Sub-photon particles of electromagnetic waves originating in space have poor penetration compared to gravitational waves and predominantly resonate with atoms in the outer layers (atmosphere, crust) of celestial bodies. They tend to exert a force (radiation pressure) there.
- Electromagnetic waves typically have a higher frequency than gravitational waves (Figure 4).

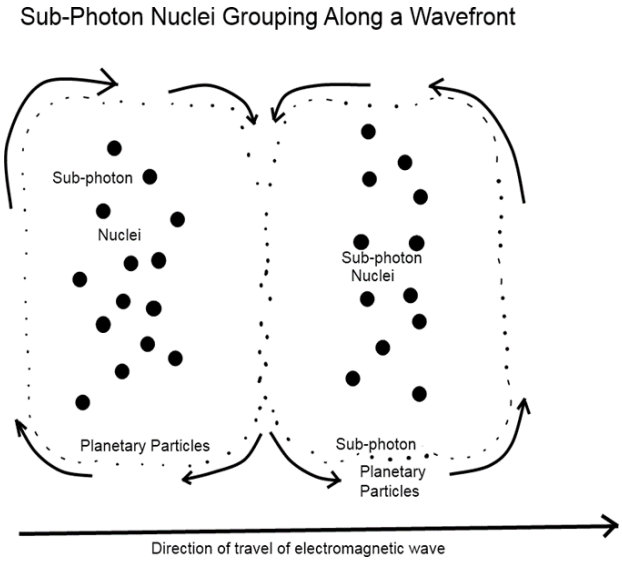

FIG. 4. **Electromagnetic waves.**

Literature Review

Gravitational waves

- Gravitational waves are composed of sub-photons with a wavelength that does not electrically resonate with entire atoms, molecules or larger objects.
- Gravitational waves typically have extremely long wavelengths.
- Waves of sub-photons can exhibit both gravitational wave effects and electromagnetic wave effects, especially for waves of very low frequencies.
- Sub-photons of gravitational waves weakly interact and exert radiation pressure on subatomic particles.
- Gravitational waves cause a weak radiation pressure when individual sub-photons impact with subatomic particles.
- Sub-photon particles of gravitational waves contribute to physical pressures in celestial bodies by a cumulative effect of weak interactions on large numbers of subatomic particles [4].
- The repulsive forces and interaction by sub-photons of gravitational waves supports the stability of subatomic structures.

Sub-photon interactions:

Sub-photons that are aligned along their planes of rotation and have planetary particles that are rotating in the same direction will have their sub-photon nuclei (sun particles) pushed together. The sub-photon's orbiting planetary particles will tend to follow the same path, causing a "shielding effect" around their respective sub-photon nuclei. This "shielding effect" provides the force that pushes the sub-photon nuclei together (Figure 5).

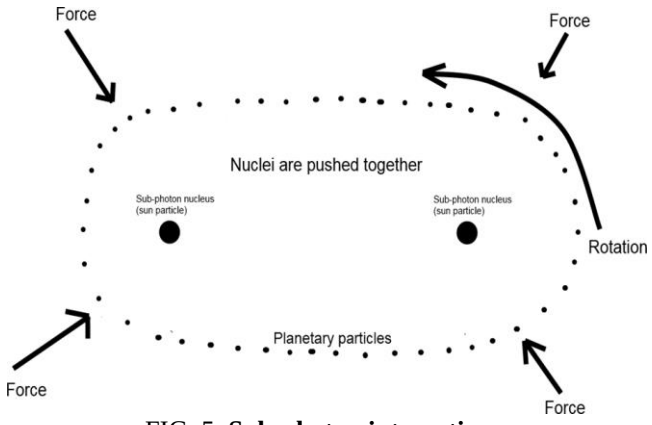

FIG. 5. **Sub-photon interactions.**

Sub-photons that are aligned on their planes of rotation but their respective planetary particles are rotating in opposite directions will repel each other (Figure 6).

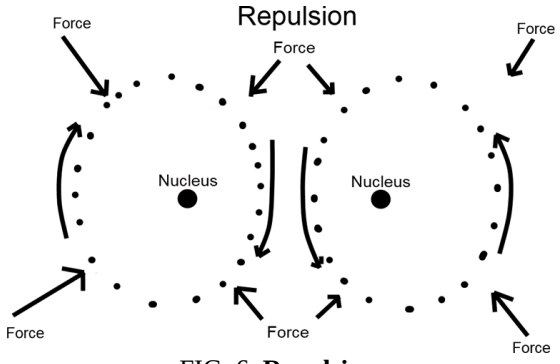

FIG. 6. **Repulsion.**

Sub-photons that are aligned along their axis of rotation (electrical axis) will repel each other if their planetary particles are rotating in the same direction (Figure 7).

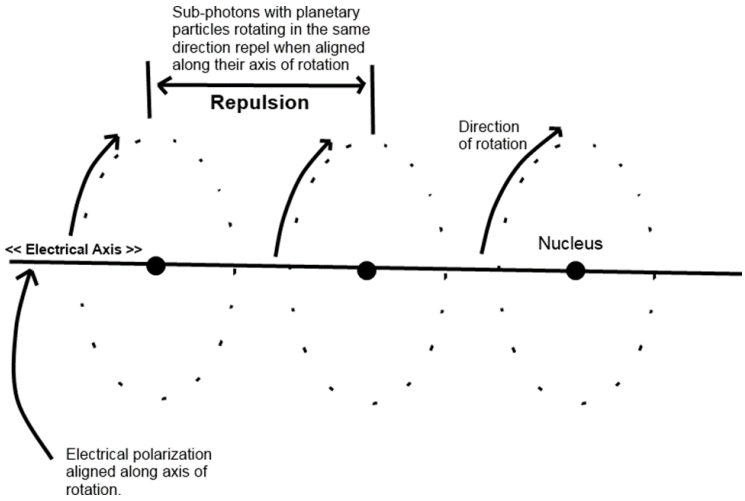

FIG. 7. **The above figure showing Sub-photons with planetary particles rotating in the same direction repel when aligned along their axis of rotation.**

Sub-photons that are aligned along their axis of rotation and have planetary particles that are rotating in opposite directions will be pushed together (Figure 8).

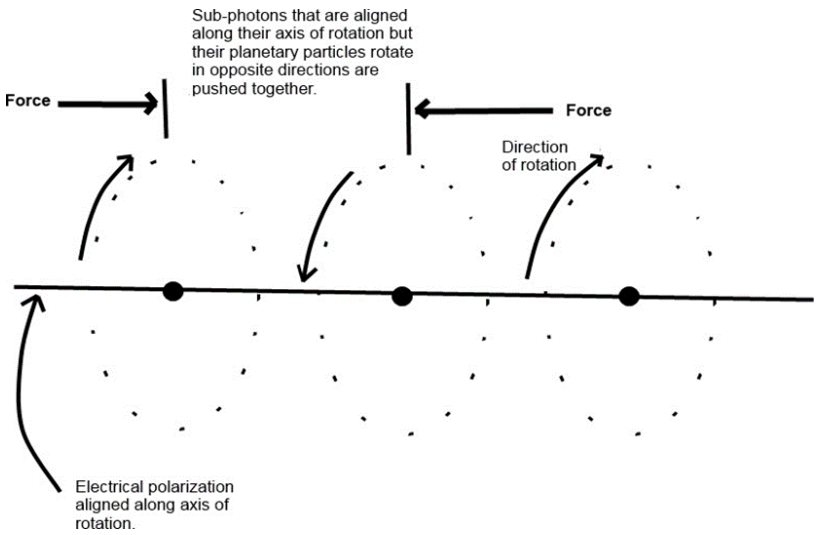

FIG. 8. **The above figure showing Sub-photons that are aligned along their axis of rotation but their planetary particles rotates in opposite direction are pushed together.**

Electrical current creates a rotating “cloud” of sub-photons around the conductor with their direction of rotation dependent on the direction of electrical current. The sub-photon nuclei of the inner layers of the "cloud" or "field" are integrated with the conductor (Figure 9).

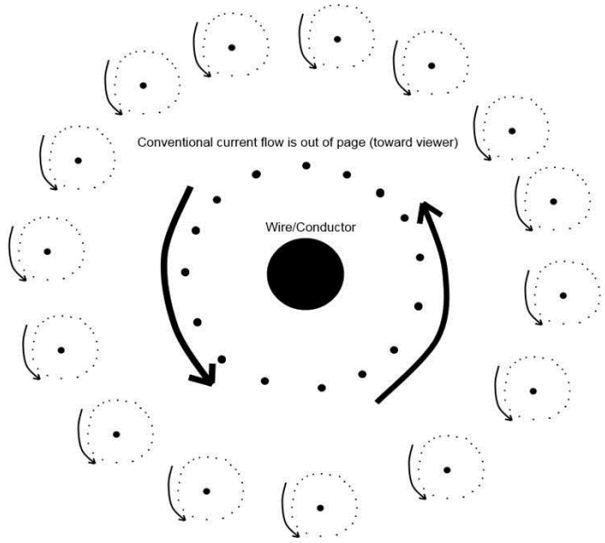

FIG. 9. **Conventional current flow is out of page (toward viewer).**

If the current flow in a conductor reverses (alternating current), a layer of sub-photons with opposite polarization will be created inside of the existing sub-photon “bubble.” Since these layers of sub-photons are oppositely polarized and oriented along their planes of rotation, they will repel each other [5]. This repulsion will cause the outer layer to be expelled into space, creating an electromagnetic wave (Figure 10).

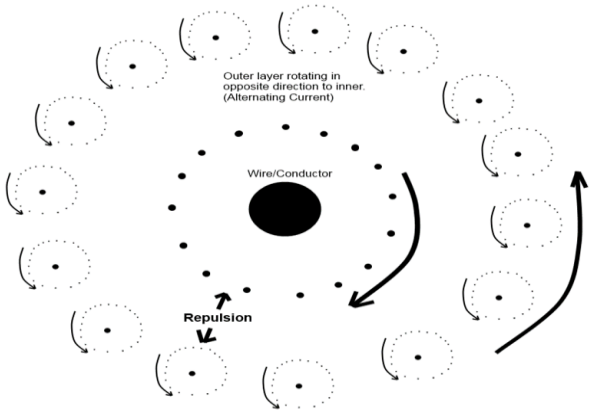

FIG. 9. **Figure shows Outer layer rotating in opposite direction to inner (Alternating current).**

Parallel conductors that have current flowing in parallel will have sub-photon “clouds” or "fields" rotating in the same direction and will be pushed together based on principles previously described. The integration of sub-photon nuclei into the atoms of the conductors creates a bond between sub-photon nuclei and the rotating "cloud" or "field" circulating around the conductor (Figure 10). This bond between the conductor and the sub-photon nuclei causes the conductors to be pushed together along with their sub-photon "clouds."

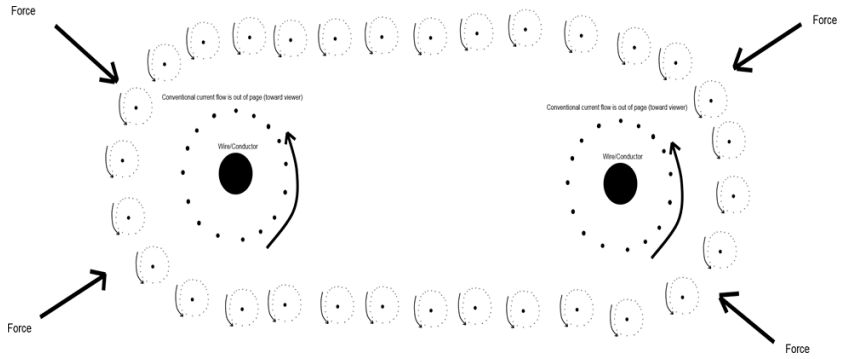

FIG. 10. **Conventional current flow is out page (Towards viewers) and wire conductor.**

Parallel conductors that have oppositely directed current flow (anti-parallel) will have sub- photon “clouds” that are rotating in opposite directions and will be repelled by principles previously discussed (Figure 11).

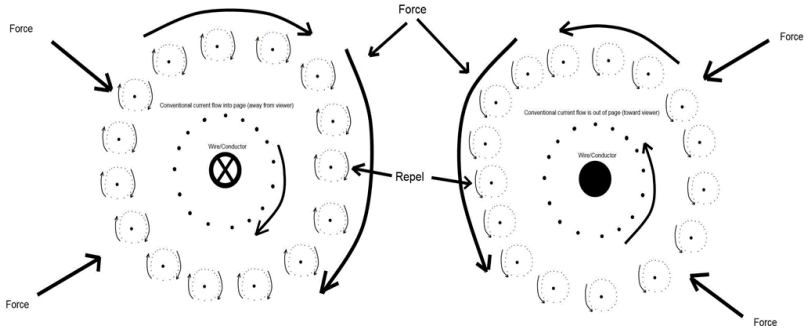

FIG. 11. **Repel forces.**

If sub-photons traveling together along a wave front of an electromagnetic wave are aligned along their planes of rotation and rotating in the same direction, these sub-photons will be pushed together and their nuclei will tend to clump [6]. This force that pushes similarly polarized sub-photons together along a wave front creates a magnetic axis and “magnetic lines of force" in traditional nomenclature (Figure 12).

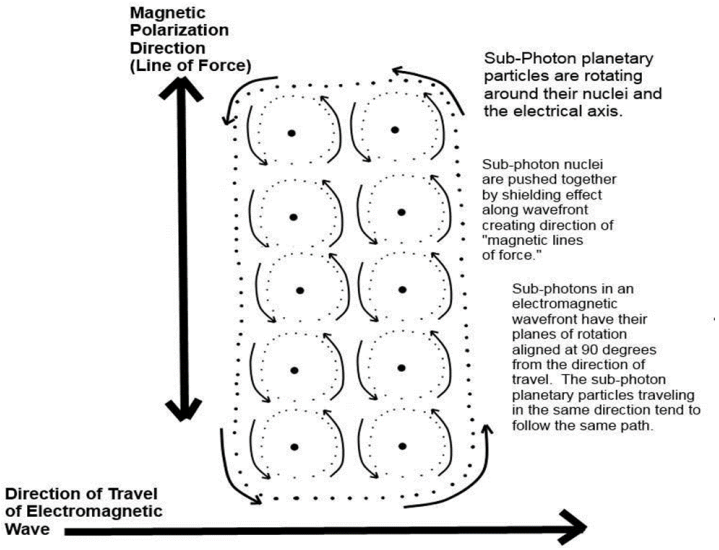

FIG. 12. **The above figure shows magnetic polarization direction (line of force) and direction of travel of electromagnetic wave.**

If an electromagnetic wave traveling through space encounters an antenna or other conductor, it creates an inductive "cloud" or "field" of rotating planetary particles around the conductor. As this outer "field" of polarized sub-photons surrounds the area around the conductor, the existing sub-photons of more interior layers are polarized in opposing directions in reaction to the incoming field. This outer field compresses the inner field of oppositely polarized sub-photons and pushes them closer to the wire and their sub-photon nuclei are incorporated into the atoms of the conductor. Notice the outer electromagnetic wave is rotating counter-clockwise in this example. The oppositely polarized inner field is rotating clockwise (Figure 13).

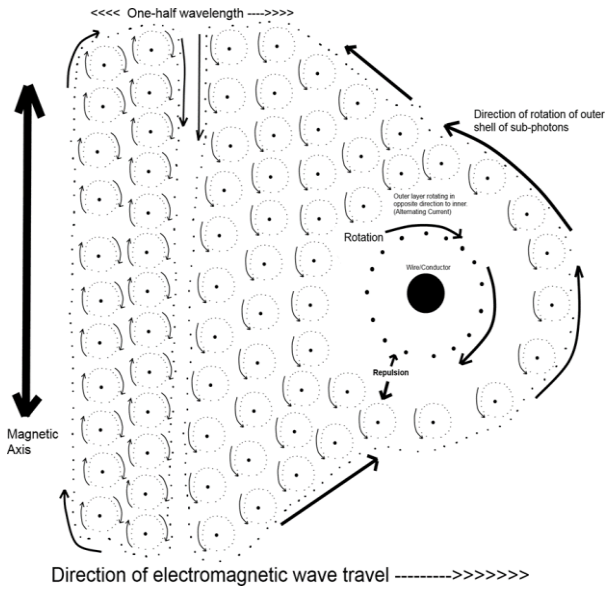

FIG. 13. **Direction of electromagnetic wave travel.**

After sub-photons are compressed along the antenna/wire, some sub-photon nuclei are incorporated into atoms of the wire. As the lower field of sub-photon planetary particles becomes compressed by the counter-rotating field above them, they are forced into an axial alignment. Once sub-photons are aligned axially and rotating in the same direction, the repulsion between sub-photon nuclei pushes these nuclei along the conductor in both directions. Since these axially aligned sub-photons have planetary particles rotating in the same direction but they travel axially in opposing directions, the axially moving planetary particles form right and left hand helical structures as they move along the conductor in opposing directions. Sub-photons traveling as left-handed helical structures cause electrons to be pushed into this direction. Sub-photons traveling as right-handed helical structures cause the formation of "holes", in agreement with common electrical terminology (Figure 14).

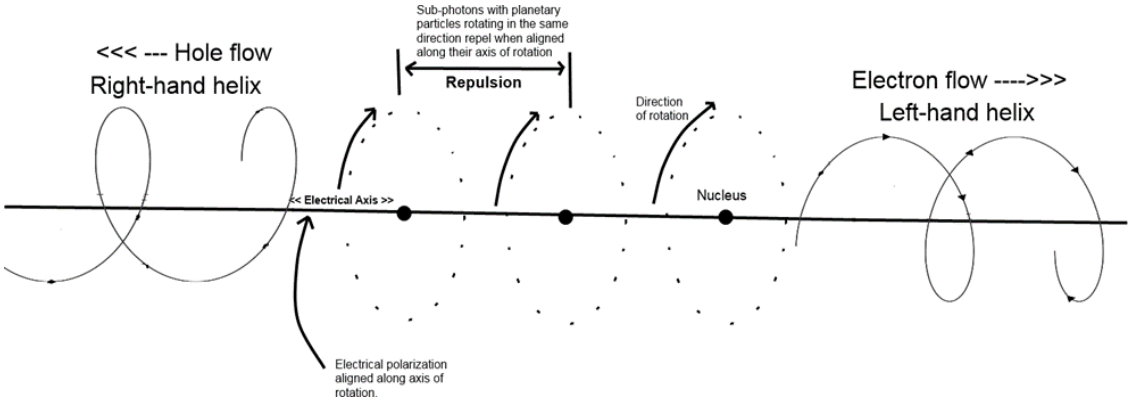

FIG. 14. **Hole slow right hand helix and electron flow left hand helix.**

The illustration below shows the right hand rule for determining the direction of magnetic field lines based on conventional current flow. Notice how that direction of rotation of planetary particles conforms to the direction of magnetic field lines as given by the right hand rule. Conventional current flow (hole flow) is in the direction of the thumb and electron flow in the opposite direction (Figure 15).

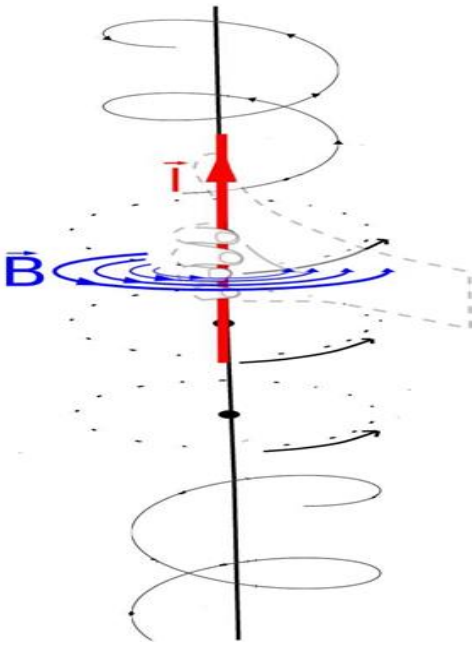

FIG. 15. **Magnetic force.**

Magnetic force is created when sub-photons are rotating around and bonded to atomic nuclei. Separate objects surrounded by a field of bonded sub-photons will be pushed together if their planetary particles rotate in the same direction along the plane of rotation. Objects will be pushed apart if their sub-photon planetary particles are aligned along their planes of rotation but are rotating in opposing directions.

Induction is an energy stored by the opposing force of the "bubble" of plane-aligned and rotating sub-photons pushing outward from the conductor while the impacting sub-photons or smaller particles impacting and pushing inward. This “bubble” of inductive energy can be created either by an electromagnetic wave of sub-photons that travels near a conductor or by current passing through a conductor. The larger the area and the more concentrated the plane-aligned sub-photons in the "bubble" is, the more energy is stored by induction.

Energy storage in the electromagnetic wave:

- As described earlier, the current flow in an antenna, conductor, atom, molecule or other structure creates a "field" or "bubble" of polarized sub-photons along the electrical axis of the sub-photons. This sub-photon "field" is bound to the conductor if electricity is in the form of direct current, creating a stable "bubble" or "field" of circulating sub-photons.
- Energy is input into an electromagnetic wave in two ways. Higher electrical current in a conductor or object polarizes more sub-photons and forces them into a limited space, requiring energy. The sub-photon nuclei form dense "clumps" as they are compressed into a smaller space and share planetary particles. Higher frequency waves will force oppositely polarized "clumps" of sub-photons closer together, requiring energy. Once the direction of current flow within an object changes direction, the inner field of sub-photons will repel the outer field, releasing the sub-photons into space.
- Higher current flow in the conductor will create a more concentrated sub-photon "field" causing a wave with a higher density magnetic field. The extremes of "high current" or high "magnetic energy" waves are typically very low frequency and can be seen in gravitational waves and plasma currents of the heliosphere current sheet (Figure 16).

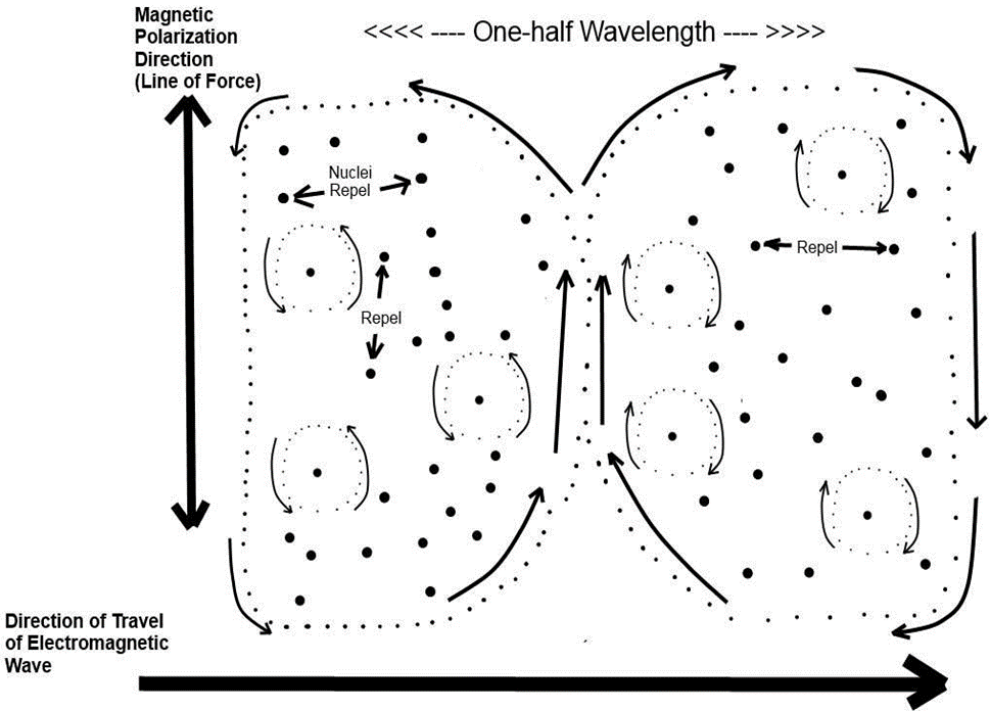

FIG. 16. **Magnetic polarization direction and direction of travel of electromagnetic wave.**

Particles and predictions

- The smallest elementary subatomic particles are constructed of “packaged” sub-photons.
- Larger sized elementary particles are constructed of groups of smaller elementary particles.
- Composite particles (electrons, protons, neutrons) are composed of “packaged” elementary particles with preference for stable arrangements.
- Atoms or groups of atoms can absorb and radiate sub-photons either as electromagnetic waves or packaged as subatomic particles.

Celestial body and predictions

- Atoms, molecules and larger structures within a celestial body create electromagnetic waves. These waves, due to their higher likelihood of resonance and interaction compared to gravitational waves, tend to exert their energy and radiation pressure on nearby atoms or larger structures, most of which are within the celestial body.
- Pressure created by electromagnetic waves within a celestial body creates an average force outward from the core that tends to oppose inward pressure caused by gravitational waves (Figure 17).

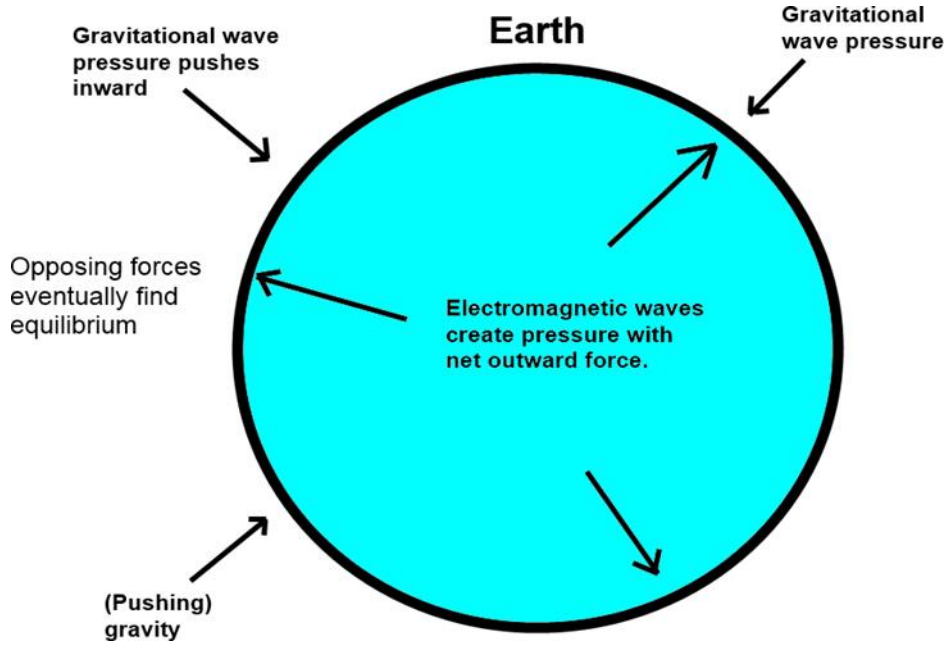

FIG. 17. **Electromagnetic waves create pressure with net outward force.**

Gravitational shielding and predictions

- Gravitational shielding is a concept that suggests the concentration of gravitational waves (composed of sub-photons) in space is finite and that large celestial objects can, by way of their large mass, transform most or all incoming gravitational waves into electromagnetic waves, creating internal physical pressure.
- The concentration of gravitational waves in a large celestial object will gradually diminish from the outer atmosphere towards the core of the object due to transformation of gravitational waves into electromagnetic waves or particles.
- The probability that a gravitational wave will interact with subatomic particles of an atom is increased when atoms are of higher atomic mass.
- Gravitational waves contribute to the internal pressures in celestial bodies needed to create atomic particles.
- Complete (or near complete) gravitational shielding contributes to the breakdown of larger atoms or particles into smaller atoms or particles and electromagnetic waves (nuclear fission).
- Areas in space of gravitational shielding (reduced concentration of gravitational wave sub- photon particles) are

present near and inside large celestial objects.

Large Celestial Object and Predictions:

Atmosphere and outer crust:

- Outer layers or celestial bodies are impacted by a high number of both electromagnetic and gravitational wave particles (sub-photons).
- Outer layers have a high "gravitational wave pressure" from sub-photons originating in space.
- Outer layers have a lower internal physical pressure than the mantle (middle layer) and core due to its more peripheral location.
- Atoms with a high molecular weight that may have migrated into the outer layers have more interaction (due to numbers of protons and neutrons) with gravitational waves and are pushed inward towards the core with more force than lighter elements.
- Heavier elements in outer layers gradually undergo nuclear decay (radioactivity) due to lack of physical pressure.
- Similar to the effect on heavy elements, radiation pressure exerted by gravitational waves pushes electrons toward the center of the celestial body and away from the atmosphere and crust. This phenomenon creates an electron (voltage) gradient with outer atmosphere more positive compared to the crust. This gradient contributes to the ionization of the gases of the outer atmosphere.

Middle (mantle) region (between crust and core):

- Has the highest theoretical concentration of electrons (and lowest ionization levels) of all the layers of the celestial body.
- High electron concentration and high physical pressure contribute to stability of neutrons and prevents radioactive decay.
- Combination of neutron stability, moderate gravitational wave radiation pressure and high physical pressure in this region contributes to nuclear fusion. Atoms and their nuclei are pushed together, forming heavier elements (nickel, lead, iron, uranium, etc).
- Physical pressure is higher than the outer crust.

Inner Core (Exists only if celestial body is large enough):

- Gravitationally shielded by outer layers
- Reduced or no gravitational wave pressure creates instability of subatomic particles.
- Instability of subatomic particles, very high physical pressure, high electromagnetic wave density (heat) creates an unstable atomic environment.
- Combination of low gravitational particle pressure (unstable subatomic particles), and high physical/molecular (actual) pressure triggers nuclear fission.
- Nuclear fission causes generation of electromagnetic waves (heat) in inner cores of large celestial objects.
- Fission creates lower molecular weight elements (hydrogen, helium, lithium, oxygen etc.) in cores of large objects.
- Fission creates subatomic particles from atomic particles and atoms.
- Earth likely has area of gravitational shielding at its core:
- Fission produces lighter elements from heavier ones contributing to the atmosphere, hydrocarbon content and water contents of medium to large sized celestial objects.
- Lower mass objects (asteroids, moons, small planets) are likely too small to have an active inner core. These lower mass objects are cooler in general compared to larger objects due to less heat production (no nuclear fission).
- Diameter of celestial objects (due to greater surface area) largely determines amount of heat produced and amount of lighter elements produced in their cores.
- Larger celestial objects have larger surface to contact gravitational waves which equates to larger electromagnetic wave (heat) production and higher amounts of light element production.
- Electromagnetic wave energy density and physical pressure in the core is proportional to rates of nuclear fission, thus heat production and light element (hydrogen, helium, etc) production.
- Larger celestial objects can produce rates of nuclear fission great enough to “shed” a substantial amount of mass due

to the creation of electromagnetic waves or particles with high kinetic energy. The "shedding" process, along with gravitational wave density, limits the size of celestial objects to those observed in the universe.

- A constant flow of gravitational waves, is necessary to maintain the size and energy production of celestial objects.
- If the celestial body is large-enough and rates of nuclear fission in the core is high-enough, the inner core of the celestial body may be much less dense than the middle and outer layers. This core layer may contain widely spaced atoms and electromagnetic waves predominantly in the infrared or higher range. Radiation pressure from electromagnetic waves keeps the atoms spaced apart in the core (Figure 18).

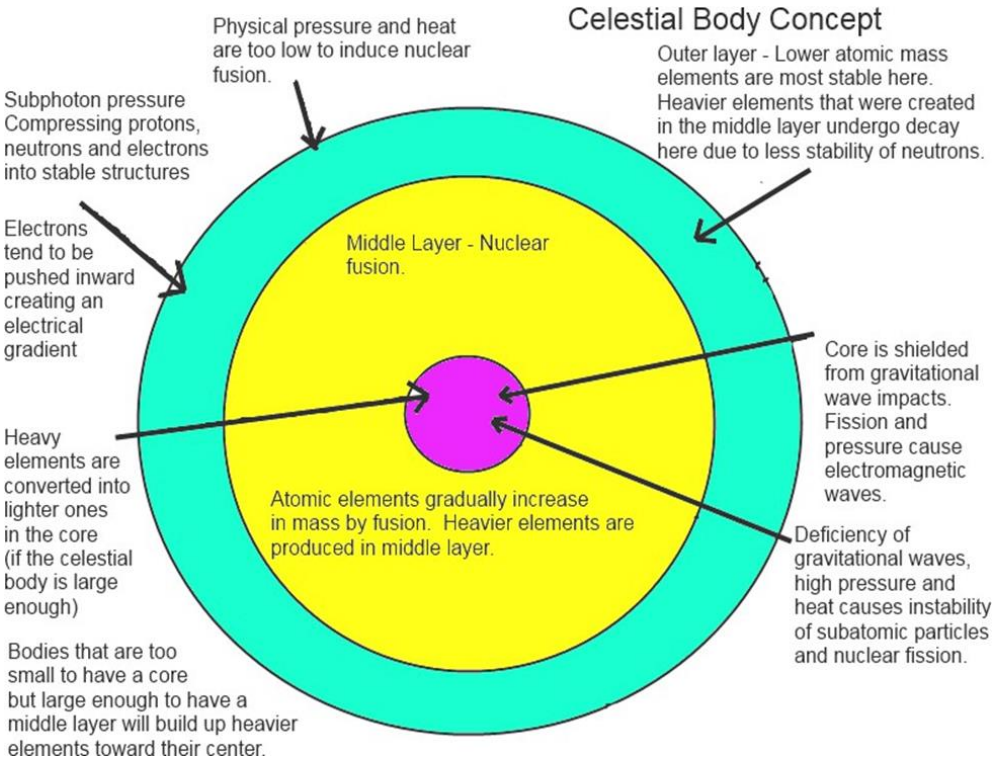

FIG. 18. **Celestial body concept.**

Discussion

The development of a visual model for electromagnetic interactions of sub-photons provides an innovative framework to conceptualize the fundamental processes occurring at subatomic levels. Traditional electromagnetic theory primarily addresses photon behavior in the context of wave-particle duality, often limited to macroscopic observations and quantum mechanics' probabilistic nature. The proposed visual model bridges the gap between these macroscopic interpretations and the intricate dynamics of sub-photons, offering a more intuitive understanding of electromagnetic interactions at the quantum scale.

This model can be seen as a valuable tool for visualizing the interactions that lead to the emergence of photons from sub-photonic components, shedding light on how these interactions contribute to phenomena such as wave interference, diffraction, and polarization. By breaking down photons into their constituent sub-photons, we gain insight into the underlying mechanisms that govern the propagation of light and its interaction with matter.

The visual representation also supports the exploration of new hypotheses regarding the behavior of electromagnetic fields in extreme conditions, such as near black holes or in high-energy particle collisions. By refining and expanding upon this model, future research could provide a more comprehensive understanding of how electromagnetic forces operate in these contexts, potentially leading to new discoveries in quantum electrodynamics and field theory.

However, the model's limitations must be acknowledged. It simplifies the complex nature of quantum interactions and might not capture all the nuances of sub-photonic behavior. The accuracy of this model in predicting experimental outcomes will depend on further empirical validation and the integration of advanced mathematical formulations. Additionally, while the visual model offers an accessible way to conceptualize these interactions, its reliance on visualization may oversimplify or obscure certain aspects of quantum mechanics that require rigorous mathematical treatment.

Conclusion

The visual model of electromagnetic interactions of sub-photons represents a significant step forward in our understanding of light at the quantum level. By providing a more tangible representation of how sub-photons interact to form photons, the model enhances our comprehension of electromagnetic phenomena and supports the development of new theoretical insights. While it offers an accessible approach to a traditionally abstract field, the model's efficacy will ultimately depend on further refinement and empirical testing. Future research should focus on validating the model through experimental data and extending its applications to broader contexts within quantum electrodynamics.

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