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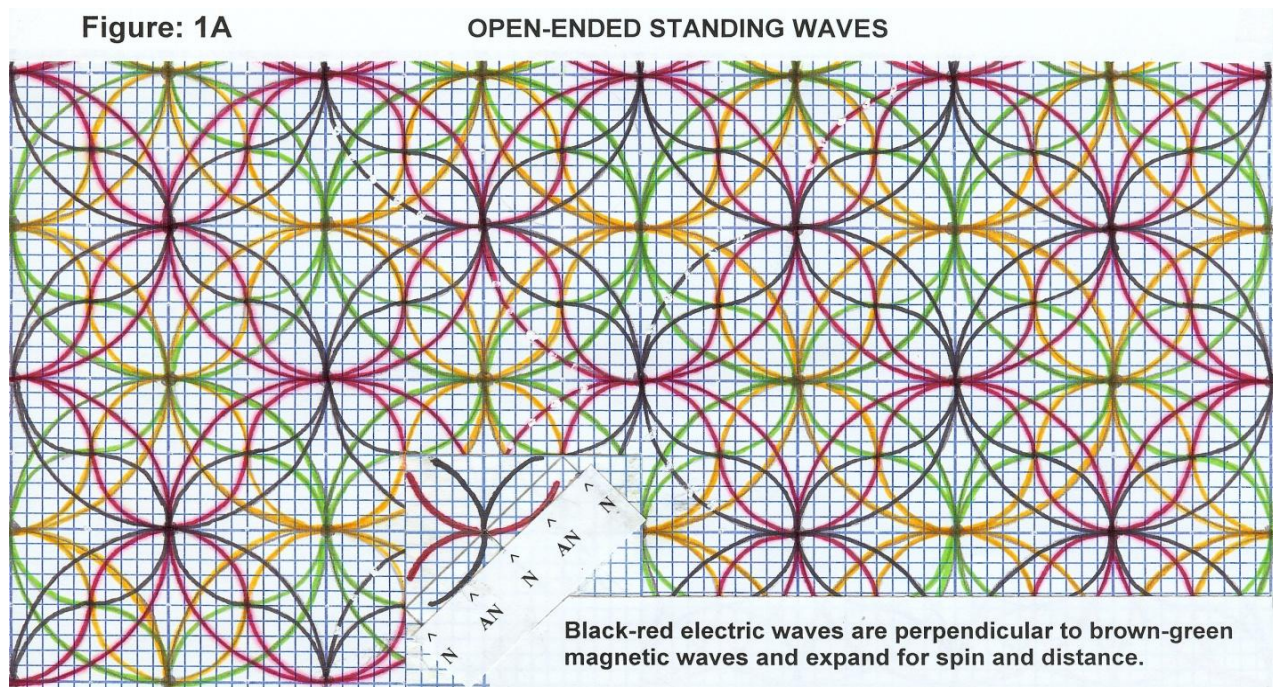
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Abstract: This report will show the coupling between QED and General Relativity. Space is from two types of energy; (1) energy with time which is finite energy and (2) energy without time which is infinite energy. Finite energy is mass energy linked to light and gravity from open-ended standing waves. Finite energy is expanding as mass in the electric field with light and gravity in the magnetic field. Magnetic field waves are light and gravity forces on the electric field and curved from mass in general relativity. Gravity forces at the anti-nodes in the magnetic field effect mass energy waves in the electric field at constant light speed. Photons in the magnetic field pack a punch as particles with wave-particle function from Planck's constant, $E = hf$. Electromagnetic waves are infinite from open-ended standing waves moving toward the static equilibrium. Infinity can be defined as energy without time where light speed is the common constant for what is finite and infinite. In effect, time does not exist outside of finite energy.

Keywords: Cosmology, Space-Time, Standing Waves.

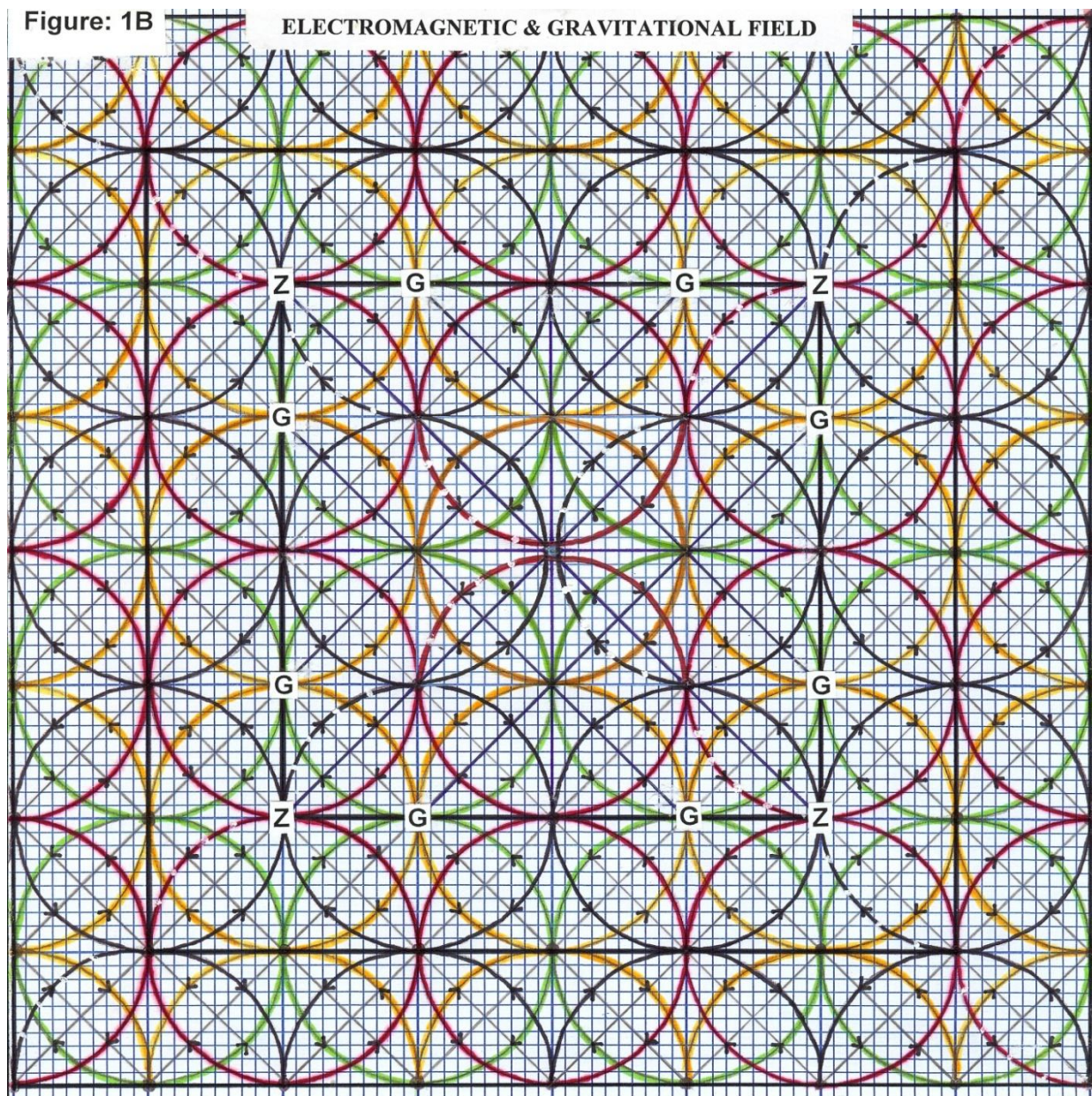
1. Introduction

From Figure 1A below, energy is formed into half wavelengths at ultra high frequency standing waves. The black-red (dark) electric waves are transverse waves and perpendicular to the brown-green (light) magnetic waves. Half waves are open-ended where anti-nodes are in the middle and nodes at the ends such that each half wave keeps multiplying indefinitely completing whole wavelengths. Each half wave cell is equivalent to two smaller half wave cells within it where light speed is a constant relative to mass in the electro-magnetic field, $C = f\lambda$.



2. Report

From illustration Figure 1B below, moving two steps in any direction from mass (center) and squaring, there are four complete green (light) circles in the square. On three steps from center and squaring, there are nine complete brown (light) circles in the outer square and so on in the inverse-square distance from mass. Light and gravity waves propagate in the magnetic field at the inverse-square distance from mass (center). The black-red electric waves and brown-green magnetic waves oscillate perpendicular to each other as circular and sinusoidal waves with electric energy propagating in the direction Z and magnetic energy propagating in direction G. For the next increase in electric wave amplitude moving in direction Z, the magnetic wave amplitude will be center at the anti-nodes. Magnetic energy is circular as brown-green circles around mass (center) where a change in one field will make a change in the other. Open ended mass energy in direction Z in conjunction with open ended photon energy in direction G as light and gravity provides Pythagorean Theorem and the inverse-square distance. Holding the illustration up diagonally at eye level show how electric wave nodes are in a straight line when the magnetic waves are at the anti-nodes.



The first harmonics are the span of finite energy from infinite free ends and the final harmonics and resonance is energy contracting into matter before the energy reverses into expansion. The frequency of the standing wave energy is so high that it changes into matter before the energy reverses into gravity attraction in general relativity. Electric and magnetic waves expand at twice the amplitude of the smaller waves giving distance to the field. Gravity forces are from the brown-green magnetic waves inside the black-red electric waves in Figure 1B (center) and an inward attraction force at the anti-nodes that conserve energy. Gravity magnetic forces are at the anti-nodes when mass electric forces are at the nodes. In Figure 1B, the black electric and brown magnetic are outward/inward circular waves respectively while the red electric and green magnetic are expanding/contracting sine waves. Quarks deep in the cone apex include the black electric circular waves, the black electric sine waves and green magnetic sine waves as the proton while the brown magnetic circular waves, the brown magnetic sine waves and red electric sine waves are the neutron. Gluons are the amplitude of the waves like the e coupling constant but are much stronger in the cone apex holding protons and neutrons together. Beta decay is the interaction of the black-red sine waves between the protons and neutrons. Electrons at the base of the quantum cone are the red-brown coupling waves while the positrons are the black-green coupling waves. Electron(s) as a mass particle continue outwardly to interact with photon waves which are the amplitude for the e coupling constant. [The e coupling constant as the inverse of its square: about 137.03597 is the amplitude for a real electron to emit or absorb a real photon.][1]. Finite energy equal MC^2 as light speed is a constant from A to B; otherwise, light speed has zero time without mass.

3. Conclusion

Extended Equation: $E = C = ZG^2$ Where ZG^2 is standing wave energy including space with time.

Open-ended standing wave energy is infinite relative to mass. Time-energy requires a boundary of finite energy as space and time expanding into space without time. Mass in the electric field already includes part of the magnetic field as subatomic forces; the remaining magnetic field spectrum is light and gravity on mass, the remaining electric field spectrum not subject to light and gravity is dark energy. [A star is formed when a large amount of gas (mostly hydrogen) starts to collapse in on itself due to its gravitational attraction.][2]. Mass as finite energy is receding due to expansion in the field evidenced by the redshift and distance. Light speed is standing having velocity only when mass is relative to it which is finite energy in curved space-time. [Space-time in general relativity is not flat but curved by the distribution of mass and energy in it.][3]. The propagation of standing waves at light speed relative to mass is finite energy and the orbital path of mass is gravity in general relativity. The photon effect is at the nodes in the magnetic field while the graviton effect is the photon at the anti-nodes 180° out of phase with mass in the electric field. This occur each half wavelength or twice light speed where $C = f \lambda$. Pi is due to the circles never closing from open-ended standing waves. Electro-magnetic waves propagate in space at light speed and that space was space without time. Since space can exist without time, there is no need for a first cause of action because infinite space includes finite space via stored matter where everything finite is time connected. The source of everything finite is from open-ended standing waves in the zero force state. In summary, there is no distinction in the existence between time and mass. Time is the changing of mass from finite energy into infinite energy. In the absence of mass; it follows that photons having no mass are standing timeless and are infinite. To this end, reality is on the energy side of the equation and not on the mass side because mass do not exist at twice light speed in standing waves.

References

- [1] Feynman, R.P. (1988) *QED The Strange Theory of Light and Matter*, Princeton University Press, p129.
- [2] Hawking, S. (1996). *The Illustrated A Brief History of Time*, Bantam Books, p105.
- [3] Ibid, pp 40-42. Note: Background field General Relativity Fig.2.16 p41 is similar to the Quantum Field in Fig.1B above.

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