Compton Wavelengths for the Proton and Electron May Differ by Hyperspace Geometry: Are They the Same Particle Bifurcated?

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ABSTRACT. The discrepancy between the Compton wavelength of a proton and an electron has been assumed to reflect some shared variable with their respective masses. However this discrepancy of $1.83 \cdot 10^3$ is remarkably similar to the geometric constant $(21.3 \pi^4)$ derived from the product of four dimensional space-time for closed circular boundaries. This same formulation, when the appropriate powers for Newton’s Gravitational Constant and the mass, duration, and length of the universe were multiplied, resulted in a diffusivity value that has been considered a potential entanglement velocity. This value is the same order of magnitude as the ratio of $2\pi$ multiplied by the neutral hydrogen wavelength divided by a quantum “jiffy”. The quantifications suggest that the difference between the space, as inferred by wavelength, occupied by the electron and the proton are related by the geometric structure of space-time. Their distinctions as different particles are manifested when the temporal increments of observations are much, much less than the duration of the universe.

1. INTRODUCTION

For the last approximately two millennia most scientific perspectives have endorsed the concept that there are discrete units composing space, time and matter [1]. Recently the space-time continuum has been considered as manifestations of zero-point energies of a quantized field [2]. There has been a tacit assumption that a single, homogenous particle exists during the extent of space-time when the universe is considered as a single set. When smaller increments of space and time are measured (which are when processes emerge) different conditions of the prototypical particle can be discerned. Here we develop a quantitative solution that suggests the energetic quantum we measure at present as the space occupied by a given proton and an electron are related by the intrinsic geometry of space and that they may be the same particle during the final epoch.

2. CALCULATIONS AND MODEL

According to the conventional values [3] the discrepancy between Compton’s solution for the wavelength of a proton ($1.32 \cdot 10^{-15}$ m) and the electron ($2.42 \cdot 10^{-12}$ m) has been attributed to an intrinsic mass difference ($1.67 \cdot 10^{-27}$ kg, $9.11 \cdot 10^{-31}$ kg, respectively). However the resting values for the concentrated space occupied by these particles are more similar in magnitude. According to the most recent estimates [4] the proton radius is $0.8775$ to $0.842 \cdot 10^{-15}$ m while the classic radius for an electron is $2.818 \cdot 10^{-15}$ m. In addition to the intrinsic angular velocity of the unit which is the fine structure value for the electron and much slower rotational speeds for the proton, the two particles exhibit differences in magnetic moment.

Although parity is an important apparent property of elementary particles and one assumes that digital (0,1 or +,-) charge qualities are reflective of these properties, there is the possibility that the two particles reflect a different manifestation of a singular geometry from nth dimensional organization of space between $10^{-15}$ m to $10^{-16}$ m (where measurements are highly correlated with conditions labeled as matter) and $10^{-35}$ m where the smallest conceptual increment of space exists. At this level of space geometric forms abound within the domain of theoretical considerations.
There may be an alternative approach that is more parsimonious for numbers of particles, that is, there is only one particle that is not necessarily the Higg’s boson [5] manifested in one of two forms mediated by a fundamental and universal geometry. The essential concept is the difference between the electron and the proton is an artifact of the limited space and time of measurement from our current perspective compared to the entire set or universe which is $\Delta T=10^{18}$ s and $\Delta S=10^{78}$ m$^3$ for the final epoch [6]. Within smaller increments of space where there are potentially multiple successive increments of time, persistent processes emerge that are reflected as rudimentary bifurcations which exhibit the different properties of the electron and the proton.

This is an important concept. Within the total set, in the final epoch, because there is only one increment of space and increment of time there is no process because there can be no subsequent $\Delta T$. Consequently the energies of change and process coupled to the appearance of increments of time become transitional properties of the sampling or measurement increments of time ($\Delta t$) and space ($\Delta s$) which are much smaller than the total set. There is evidence that emergence of properties can be restricted to a particular quantity of $\Delta s$ and $\Delta t$ [7]. For example there may be phenomena at quantum levels that are not apparent at more macroscopic levels. The most classic example is the intricate and ultimate relationship between movements of electrons through orbital shells and photon emissions or absorptions that create the conditions for at least one type of excess correlation or entanglement [8,9].

The traditional approach to the taxonomy of matter is that dichotomous units with relatively fixed properties in space exist in diametric opposition. They interact by processes which involve discrete increments of time. For the proton and the electron the process is the photon. If the final epoch exhibits no process and the photon reflects this property than there would be at least one condition of the photon where there could be no indicator of time and at least one condition where a subordinate property could be the bases of time. In the former condition the electron and the proton are the same phenomena either before or after the effects through the geometry that produces the excess correlation or entanglement throughout the universe. The manifestation of that process would occur through the subordinate property.

3. POTENTIAL SOLUTION

We are suggesting this property is a unified geometry that is decomposed at each of the three spatial planes and temporal representation of space-time. The entropic shape defined by the equity of each of the components that compose the geometry is optimally represented as a circle because its perimeter can be considered infinite but bounded and any process moving through this closed path is always accelerating. Consequently the phenomena that emerge are rates of change such that time becomes integral to the phenomena and the apparent “stable unit” or “single event” is itself composed of processes [10]. In many respects this is similar to the concept of the quantized field of points that compose space [11]. They are not units per se, but the cumulative point aggregations that have been integrated across the totality of successive Planck’s times between the original and final epoch of the universe.

From this perspective anomalous phenomena are manifested when deviations from this condition (such as baryons) occur and require elegant mathematical descriptions to rationalize the discrepancy. When the eccentricity of the circular motion is not equal to zero, more and more proportions of the infinite but bounded series of successive non-linear components that produce the circular continuity differ from each other. Consequently the infinite numbers of increments of angular momentum [12] decrease and are reflected in emergent geometric complexity that we measure as different types and variants of particles. Applications of parsimony and geometric conditions that approach the limit of symmetry to larger-scale phenomena were pursued by Borowski [13-15] and his simplified model of gravity. Within this context quantitative solutions rather than complex mathematical descriptions emerged as more parsimonious convergences between the predicted and observed values.
To relate the quantitative relationships between space and matter which is considered a special condition of the geometry of space, Persinger and Koren [16] multiplied the four dimensions of a sphere: 2πr, 4πr², 4/3 πr³ and 2πrf (for time). The resulting quantity of 2.078·10⁵ with accompanying dimensional aggregate of units m⁻¹·s⁻¹ when set to the combination of universal constants, such as G (6.67·10⁻¹¹ m³·kg⁻¹·s⁻²), the universe’s mass (~10²² kg), duration (~10¹⁷ s), and length (~10²⁷ m), resulted in a “diffusivity” term that was 2.8·10⁻³² m·s⁻¹. The same order of magnitude was independently derived from the ratio of the electric field per meter divided by the magnetic field strength within the universal volume during the final epoch [17]. The total energy from which the values were obtained was estimated to be ~10⁶⁹ J derived from ~10⁵² kg of mass. A similar “velocity” (~2·10⁻²³ m·s⁻¹) emerges when 2πλ (where λ=the neutral hydrogen value of 2.1·10⁻¹⁴ m) is divided by the ratio (a “jiffy”) of the radius of an electron (2.818·10⁻¹⁵ m) to the velocity of light in a vacuum (3·10⁸ m·s⁻¹).

The additional contemporary validity of this term of diffusivity was suggested by the temporal solution for G·σ or the product of Newton’s Gravitational Constant (6.67·10⁻¹¹ m³·kg⁻¹·s⁻²) and average density (σ) for the universe with the assumption of one proton per cubic meter (1.67·10⁻²⁷ kg·m⁻³). This is remarkably consistent with Eddington’s Number. The square root of 11.14·10⁻⁵⁸ s² for G·σ is 3·10₁⁸ s (95 billion years) which is approximately 13-14% of the present cumulative time. This proportion is within error measurement of the estimates for baryons or matter compared to dark matter and energy. This solution suggests that dark matter and dark energy are matter and energy yet to occur during the subsequent evolution of the universe [6, 18].

The product of the four geometric dimensions: 21.3 π⁴ or 2.0748·10⁵ multiplied by the Compton λ for the proton (1.3214·10⁻¹⁵ m) results in 2.746·10⁻¹² m which is within 0.320 of the Compton value for the electron. The discrepancy is an extension of 1.13 or about 13%. This value may not be spurious. The estimated current age (t) of the universe is 13.3 billion years. The ratio with respect to the total time before the final epoch is 13%. Consequently one simple relationship between the Compton wavelength for the proton and electron would be:

\[
\lambda_Cp=\lambda_Ce·21.3 \pi^4 - \left[ t \cdot ((G \cdot \sigma)^{1/2})^{-1} \right]
\] (1)

This would suggest that at the final epoch, the negative quantity would approach zero and the relationship between the wavelength of the proton and the electron would reflect their relationship to the pure geometric relationship that is defined by four dimension space-time.

4. CONCLUSION

The Compton wavelengths of the proton and the electron reflect their quantum energies. The ratio of the discrepancy of the wavelengths can be accommodated by the geometric constant 21.3 π⁴ for circular forms within four-dimensional space. The accompanying metric of m⁷·s⁻¹ when equated with the optimal combinations of the boundary values for the universe’s mass, length, duration and gravitational integrity results in a velocity of about 10⁻²³ m·s⁻¹ which is similar to the product of 2π and the ubiquitous neutral hydrogen wavelength divided by a quantum “jiffy”. The quantifications are consistent with the perspective that the space (wavelength)-energies occupied by protons and electrons are connected through a four dimensional circularity where acceleration is persistently present. One interpretation is that the electron is the proton once it has been transformed by the geometric constant through which entanglement and excess correlation is mediated.
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