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The Product of the Calculated Impedance and the Capacitance of the Universe Solves for Planck's Time and 8π

Michael A Persinger and Stanley A. Koren
Laurentian University, Sudbury, Ontario, Canada P3E 2C6
mpersinger@laurentian.ca; SKoren@laurentian.ca

ABSTRACT

The prominence of 8π in cosmological solutions regarding the structure of space might be accommodated by factors other than the presence of mass. When the total set is considered a LC (inductance-capacitance) circuit, the "time constant" differs from Planck's time by a factor of 8π which satisfies the numbers of turns (N) within the geometry of a universal solenoid. The calculated separation between two concentric spherical Casimir boundaries whose energies and pressures define the current universe is ~54 μm. If the volume of the universe was held constant the linear distance of this extraordinarily flat space would require the hypothetical entanglement velocity ($\sim 10^{23}$ m·s^{-1}) continuing until the final epoch ($\sim 10^{18}$ s) of the universe to be integrated into a singular entity. We suggest that 8π may be a reflection of the temporal properties of an implicit solenoid-like spatial structure that will ultimately be manifested quite differently as the temporal boundary of the universe is approached. Two perspectives emerge. The first reflects the topological properties of a line that become the second derivative of the surface of a sphere. The second is the shape would be extraordinarily flat.

Indexing terms/Keywords

Universal Inductance; Universal Capacitance; 8π; Planck's Time; Universe's Ultimate Shape

Academic Discipline And Sub-Disciplines

Quantum Physics, Physical Cosmology

SUBJECT CLASSIFICATION

Universal Parameters; Capacitance; Inductance; Casimir Boundaries

TYPE (METHOD/APPROACH)

Quantitative Analyses; Convergent Operations

INTRODUCTION

In the optimal physical world all of the properties displayed by the plasma membrane of cells, their interactions with other cells, the emissions of photons during dynamic processes, and the intercalations with appropriately patterned magnetic fields should be expressible in the equations and functions that define modern physics. Although biophysics has benefited from application of classical approaches such as Faradic induction, the quantities of energy within the organism occupying the volume within the magnetic field, and balanced Bessel functions for optimal magnetic field configurations, there are less frequently applied concepts that could reveal critical phenomena related to quantum effects [1,2].

The shape (curvature) of the universe, assuming it is singular and exhibits boundaries for its spatial domains and properties, has been predicted by multiple models. Friedman's model implied three degrees of freedom with the reference of unity (one) that determined if the universe would be open, closed, or constant [1,2]. Common explanations for the structure of space rely upon parameters inferred to represent the distribution of mass [3].

Recent descriptions have considered dark matter and dark energy which have been hypothesized as matter yet to occur by the time the final epoch of $\sim 3 \cdot 10^{18}$ s is approached [1]. This value was derived from the product of G ($6.67 \cdot 10^{-11}$ m^3·kg^{-1}·s^{-2}) and an assumed density of $1.67 \cdot 10^{-27}$ kg·m^{-3}. The presence of dormant and asymmetric properties, now expressed as dark energy and matter, is reminiscent of Eddington's concepts [4] that resulted in the 256 numbers or states that were central to the development of his Number ($126 \cdot 2^{256}$) which is the same order of magnitude as the estimated total mass of the universe if the proton unit is assumed. Combinations of models such as Hoffman et al's [5] approach emphasize a Cosmological Constant in conjunction with cold dark matter and an open system with cold dark matter. The long-term fate of the large scale structure is conceived as commoving coordinates determined in large part by the density of matter.

On the other hand the discrepancies between the total magnetic and electric field energy of the universe compared to empirical measurements for present interstellar and intragalactic strengths were shown quantitatively to be contained, potentially, within the structure of space with minimal contribution from matter, per se [6]. The transformation value that accommodated the difference was closely approximate to the coefficient 21.3 π^4 which was derived from the product of the most symmetrical forms (a circle) of closed dimensions: the circumference ($2\pi r$), surface area ($4\pi r^2$), volume ($4/3\pi r^3$) and $2\pi r f^{-1}$ for duration [7]. The construct validity for $21.3\pi^4$ r^7·s^{-1} was supported when its dimensional equivalence as the product of:

$$21.3\pi^4 \cdot r^7 \cdot s^{-1} = G^2 \cdot M^2 \cdot d \cdot t^3 \qquad (1),$$

where G is Newton's Gravitational constant, M is the total mass of the universe, d is the diameter and t is the duration, solved for the same order of magnitude of diffusivity value ($\sim 10^{23}$ $m \cdot s^{-1}$) as that from the total estimates for the magnetic field of the universe divided by its potential difference per meter [6]. This was obtained by calculating the magnetic field strength from the square root of the total energy estimate ($2.2 \cdot 10^{69}$ J) within a volume of $8.38 \cdot 10^{78}$ m^3; the value was 25 nT. The voltage equivalent was $\sim 10^{14}$ $V \cdot m^{-1}$. Consequently, the quotient was 10^{23} $m \cdot s^{-1}$. From a more classically quantum terminology, this is the same order of magnitude as a "jiffy" (the time required for a photon traveling at c ($3 \cdot 10^8$ $m \cdot s^{-1}$) to traverse the width of an electron (10^{-15} m) when divided into the wavelength (21 cm) of the neutral hydrogen line.

One of the prevalent constants in cosmology is 8π. It appears in the constant of gravitation in general relativity as $f=8\pi G c^{-2}$. The value appears in the energy equivalence specified by:

$$8\pi G M^2 R^{-1} = M c^2 \qquad (2),$$

where c is the velocity of light and R is the radius of the universe. The persistence of 8π in multiple configurations of cosmology has been attributed by some thinkers to the second derivative of the surface of a sphere or to a necessary universal constant to balance the right-hand side of Einstein's fundamental law [8]. This may be correct. However we have found an alternative explanation that is based upon the inductance of the entire universe. We had reasoned that if we could estimate quantitatively the inductance (L) and the capacitance (C) we could estimate its inverse resonance frequency or fundamental Δt (increment of time) as if it were an LC circuit. In this process 8π became prominent as N, the number of turns in a hypothetical space occupied by source fields. The subsequent application to the concentric shell Casimir model of the universal boundary revealed a geometric representation within integrated space-time properties that was unexpected.

PLANCK'S TIME AND 8π LC SOLUTIONS

The relationship for inductance of a closed solenoid is:

$$L = (\mu N^2 A) \cdot l^{-1} \quad (3),$$

where μ is the magnetic permeability ($1.26 \cdot 10^{-6}$ $N \cdot A^{-2}$), A is the estimated area of the universe ($4.98 \cdot 10^{52}$ m^2) and l is the length of the universe ($2.52 \cdot 10^{26}$ m). Here we employed values that were averages of the median values for a variety of universal constants such as mass and energy [9]. The aggregate units are $kg \cdot m^2 \cdot (A^2 s^2)^{-1}$. The inductance in Henrys is $1.57 \cdot 10^{23}$. Capacitance is $A^2 \cdot s^4$ $(kg \cdot m^2)^{-1}$. The aggregate was fragmented to the square of Coulombs divided by energy, such that ($2.56 \cdot 10^{-38} \cdot A^2 \cdot s^2$) was divided by the total energy in the universe of $2.2 \cdot 10^{69}$ $kg \cdot m^2 \cdot s^{-2}$. The result was $1.16 \cdot 10^{-107}$ F. Although we appreciated this was a very small value and that partial dimensional analyses might be considered non-conventional, we reasoned that an indicator of its validity would be the rational and convergent solutions resulting from this approach.

The product of $kg \cdot m^2$ $(A^2 \cdot s^2)^{-1}$ or inductance and $A^2 \cdot s^4$ $(kg \cdot m^2)$ or capacitance is s^2. For the above two values the solution is $1.77 \cdot 10^{-84}$ s^2. The square root of that value is $1.33 \cdot 10^{-42}$ s. This duration is within the range of Planck's time which is $5.3 \cdot 10^{-44}$ s. If the derived value is divided by Planck's time the solution is about 25.1; 8π=is 25.13. Consequently, depending upon subsequent decimal points which are indeterminate at this point, the value may be 8π.

If this is valid then this persistent value (8π) may be equivalent to the numbers of turns around a universal solenoid or human perception and conceptual representation of this condition. It might be conceived as a helical geometry which is effectively an infinitesimally discontinuous, nearly closed circle that is displaced in one axis before the circumference is generated again. Some solutions indicate it would display the properties of a line that become the second derivative of the surface of a sphere. The second approach is that the shape would be extraordinarily flat.

CASIMIR-UNIVERSAL PRESSURE AS DISTANCE BETWEEN DOUBLE SHELL UNIVERSAL BOUNDARIES.

In previous analyses [10] we examined the model in which the universe is two closely adjacent concentric shells that constitute higher dimensional Casimir forces. Our approach was inspired for the concentric shell metaphor by Bordag and Khusnutdinov's [11] application of a spherical plasma shell. We reasoned that the concentric shells would contain potentially the second derivative of the surface area (8π) which is a type of rate of rate of change required to produce the phenomena.

The classic Casimir equation reported by Bordag et al [12] was reconstituted to solve for the distance between the two plates, a, to be:

$$a = [-(\pi^2 \hbar c \cdot S) \cdot (240F)]^{1/4} \quad (4),$$

where F is the finite force, ħ is the modified Planck's constant, c is the velocity of light in a vacuum, and S is surface area where $S >> a^2$. The value for pressure in this instance was assumed to be $1.5 \cdot 10^{-10}$ Pa [12] which was the solution based upon the product of an average density of 1 proton ($1.6 \cdot 10^{-27}$ $kg \cdot m^{-3}$) and the velocity of light squared. The value is ~54 μm.

If this value was one axis of the three dimensional space, then the two remaining domains would produce a very flat sheet that extends far beyond the $\sim 10^{26}$ m. If the volume of the universe was $8.38 \cdot 10^{78}$ m^3 and the linear distance

(thickness) of one plane was $5.4 \cdot 10^{-5}$ m, the remaining product must be $1.55 \cdot 10^{82}$ m^2 for which the linear distance is $3.9 \cdot 10^{41}$ m.

This value is significant. The time required to traverse this distance moving at what we [7] have hypothesized to be an "entanglement" or "excess" correlation velocity (~$2 \cdot 10^{23}$ $m \cdot s^{-1}$) would be in the order of $2 \cdot 10^{18}$ s. This is the estimated time for the final epoch of the universe according to at least two approaches with different assumptions [5,13]. Consequently the perception of the universe as a flat sheet with the thickness of 54 μm would only be evident when viewed from the context of the final age of the universe.

Finally the relevance of the width 54 μm could reveal recondite properties of the nature of space itself. The electromagnetic frequency associated with that distance is $0.56 \cdot 10^{13}$ Hz. The energy from a quantum perspective is the product with Planck's constant or 0.4 and 10^{-20} J. This value has emerged from multiple perspectives as the energy associated with the force per unit Planck's voxel distributed over the neutral hydrogen wavelength [14] and may constitute a homogenously distributed increment by which non-local space is integrated.

CONCLUSIONS

The dependence of curvature and shape of space have traditionally been attributed to differential mass density with persistence of the constant 8π. Solving the universe as an LC circuit produces a temporal parameter that is remarkably similar to Planck' time when that constant is included. A solenoid-like geometry for this condition requires 8π for the numbers of turns to accommodate the universe indicators of inductance and capacitance. The helical but non-closing movement along a single axis might be considered a macrocosmic equivalent of single photons with helical phase structures that display no upper limit to the numbers of quanta of orbital angular momentum [15]. This is a central correlate of entanglement. When the value of 54 μm for the Casimir concentric shell model for the universe is pursued as one plane of the three dimensional volume, the entanglement (diffusivity) velocity required to traverse the remaining two planes is the final age of the universe. The equivalent electromagnetic energy for 54 μm would be within the range of 10^{-20} J which has been shown to be the intrinsic energy when total universal force per Planck's voxel within the total volume is applied over the distance of the neutral hydrogen wavelength.

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Authors' biographies with Photos

Michael A. Persinger, Ph.D. is a Full Professor at Laurentian University in Sudbury, Ontario, Canada. He is affiliated with a number of different programs including Biomolecular Sciences, Behavioural Neuroscience and Human Studies as well as the Quantum Molecular Biology Laboratory where he is examining the relationship between 10^{-20} J events within the brain and complex functions. Dr. Persinger and his colleagues have experimentally demonstrated the validity of Cosic's Molecular Resonance Recognition Model, Bokkon's Cerebral Photon Field Hypothesis and the efficacy of proton driving patterned magnetic fields that inhibit the growth of cancer cells but not normal cells. He is an interdisciplinary scientist whose primary goal is to integrate the physical sciences, social sciences and humanities according to their fundamental operations. Within the last 50 years he has published more than 500 technical articles in a variety of areas that range from Astronomy to Zoology. His present experiments are focused upon understanding the relationship between the structure of space and distribution of energy, the shared dimensional equivalence of quantized gravitational and electromagnetic fields, and the empirical demonstration of an intrinsic entanglement velocity.

Stanley A. Koren is the creator of the Digital-to-Analogue (DAC) optocoulpler technology for complex magnetic field circuits and the Complex software that operates the systems. He has published extensively in the areas of physical cosmology, electronic systems analyses, and application technologies. He is trained as an Electronics Engineering Technologist and holds a degree in Mathematics and Computer Science. Professor Koren and Dr. Persinger, while at Laurentian University, have collaborated on multiple projects over the last 30 years that included the creation and disruptions of excess correlations in physical and biological systems. They developed a neurophysics model that relates the nature of the proton and electron to cosmological variables such as the Hubble parameter and their connection to the physical substrates of living matter. His favorite focus is discerning the relationship between time, Casimir phenomena, and the intrinsic nature of the neutral hydrogen line. Professor Koren has been systematically pursuing the application of quantum theory beyond the single particle. He holds a number of patents with Dr. Persinger and is a licensed radio amateur: Canadian call sign VE3PSE.