



On a Casimir-Dark Energy Nano Reactor

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Abstract: The paper is a general outline of the theoretical principle and basic design concepts of a proposed Casimir dark energy nano reactor. In a nutshell the theory and consequently the actual design depends crucially upon the equivalence between the dark energy density of the cosmos and the faint local Casimir effect produced by two sides boundary condition quantum waves. This Casimir effect is then colossally amplified as a one sided quantum wave pushing from the inside against the Möbius-like boundary with nothing balancing it from the non-existent outside. In view of our theory, this is essentially what led to the observed accelerated expansion of the cosmos. As in any reactor, the basic principle in the present design is to produce a gradient so that the excess energy on one side flows to the other side. Thus in principle we will restructure the local topology of space using material nanoscience technology to create an artificial local high dimensionality with a Dvoretzky theorem like volume measure concentration. Without going into the intricate nonlinear dynamics and technological detail, it is fair to say that this would be pure, clean, free energy obtained directly from the topology of spacetime. Needless to say the entire design is based completely on the theory of quantum wave dark energy proposed by the present author for the first time in 2011 in a conference held in the Bibliotheca Alexandrina, Egypt and a little later in Shanghai, Republic of China.

Keywords: Casimir Effect, Dark Energy, E-Infinity, Cantorian Spacetime, Nano Reactor, Free Energy, Möbius Boundary

1. Introduction

Based on his E-infinity Cantorian spacetime theory [1-21], it was recently argued by the author that the Casimir effect is a local manifestation of the quantum wave while dark energy is the global manifestation of the same [1]. The only difference is that of the details of the boundary conditions [1,2]. It was further reasoned by the author that the universe as a whole has a one sided boundary akin to that of higher dimensional Möbius band and consequently the “local” Casimir effect ramifies at this one sided boundary located at infinity to produce the negative gravity pressure of the conjectured dark energy [1-3]. In other words, three rather mysterious physical notions are tied together and explained in terms of each other. At the top resides the quantum wave [4], which is not a mathematical artifact [4-8] but according to E-infinity theory of dark energy, a real physical entity fully described by the empty set fixed by Connes-El Naschie bi dimension $(-1, \phi^2)$ where $\phi = 1/(\sqrt{5} + 1)$ [1-8]. On the other hand the gradient caused by different wave energy density in different bounded regions of space compared to the unbounded outside of the same space is behind the Casimir forces which in the limit can be show to be equal to the difference between the quantum zero set $(0, \phi)$ and the wave

empty set $(-1, \phi^2)$ leading to $\phi - \phi^2 = \phi^3$ topological energy pressure [1, 5-8]. Finally at the edge of the universe there is only internal Casimir quantum wave pressure not balanced by outside pressure which is the dark energy concentration of 96 percent as per the consequences of Dvoretzky’s theorem and the present author’s dissection of Einstein’s $E = mc^2$ to $E(O) = mc^2/22$ for ordinary energy of the quantum particle and $E(D) = mc^2(21/22)$ for the dark energy of the quantum wave [7,8].

The sources of the ideas contained in the present work go back to many years ago when we attempted to improve on the traditional fast and slow fission reactors using the modern mathematics of fractals and nonlinear dynamics [9-17]. The second source is our recent reinterpretation of Einstein’s $E = mc^2$ and finally the third source is the unexpected results of the earlier mentioned Dvoretzky’s theorem of Banach spaces [3,6]. However in the final analysis building an actual reactor could not be possible, not even in principle, without first a sound theory [1-56] and second the combination of modern nanotechnology and state of the art Casimir effect experimentation [18-24]. In addition a reasonable amount of imaginative thinking similar to that of the man who is famed

for inventing the 20th century is also recommended [49,57].

To keep the present paper short and yet to cover the large amount of the needed prerequisites we opted for a condensed presentation coupled to a large number of references. We recommend to start by reading Ref. 1 and Ref. 60, then it is a personal choice of how to proceed after that.

2. What is the Boundary of the Universe

The holographic boundary theory goes back to the pioneering work of 'tHooft and Susskind [25-27]. On the other hand the principle that the boundary of a boundary is zero goes back to the out of the box thinking of J.A. Wheeler [28]. Pushing their ideas further still, it became obvious to the present author that the boundary of the holographic boundary is not only a zero limit set but actually a hierarchy of empty and emptier still sets ramifying at a most general form of a one sided higher dimensional Möbius band [28-33]. This limit set resembles a fundamental polyhedron group or better still, a Schottky-Kleinian group [29-33] which changes the topology of our conventional Casimir experiment to that of a sphere with internal Casimir pressure inflating the balloon-like universe and makes it expand into the surrounding "nothingness" fixed by the well known E-infinity formula $d_c^{(-\infty)} = \phi^\infty = 0$ where $\phi = 1/(\sqrt{5} + 1)$ [34]. From the preceding elementary reasoning it is clear that Casimir-effect and dark energy have the same cause, namely the topology of a Banach-spacetime like manifold and the only difference is the difference of local exophysics and global endophysics and the respective associated boundary conditions [1,2]. There is already a vast body of literature on the subject published in the last three years alone by the present author and his associates [1-56]. However what we are aiming at in the present paper is to point out the way to move from theory to useful, practical application of which nothing could be more important and pressing than building a free energy reactor, based on real science rather than wishful thinking. Thus we will combine the dreams of visionaries like N. Tesla with hard nosed modern mathematics and physics which were not yet available in the time of Tesla [49].

3. The Role of Nanotechnology

There has been no want of imaginative experimental set ups for measuring, testing and visualizing the Casimir effect since it was proposed by Dutch physicist, H. Casimir [22-24]. In recent years nanotechnology invaded all scientific fields and played a significant role in Casimir effect experiments. Thanks to E-infinity we now know that the true physical-mathematical connection between dark energy and the Casimir effect. A natural consequence of this discovered reality of the quantum wave, is rendering it a relatively simple task to find a way to harness dark energy or Casimir energy. Of course this "simple" is extremely difficult but no longer impossible.

We can start with a highly complex sub-structuring of space using nano tubes and nano particles and create that way

nanosphere packing modelling the moonshine conjecture which relates superstrings to other fields of theoretical physics. We presently have, in embryonic form, the main idea of constructing a nano universe and extracting dark energy from its nano boundary of its holographic boundary. Our program to actually extract energy from such a nano reactor may still need five or more years but the road is marked and reasonably clear. It is only at the edge of the universe that 96% of the energy resides as dark energy. However we could create many nano universes from which its 96% energy concentration could be extracted without actually reaching to the boundary of our universe [3-8].

4. Some Experimental Proposals in a Nutshell

In noncommutative geometry as well as E-infinity theory, the Penrose universe plays a significant role as a generic concrete model for both theories [50-53]. On the other hand Penrose universe or Penrose fractal tiling is basically a quasi-crystal mathematical model with the forbidden 5-fold symmetry [53,54]. This form of matter not found naturally on earth, was produced experimentally by the great Israeli engineer D. Schechtman, who after facing a long period of fierce opposition from high profile scientists, for instance Nobel Laureate Linus Pauling, was rehabilitated and bestowed with a Nobel Prize. The 5 fold symmetry could be thought of theoretically as five Kaluza-Klein dimensions and using nano particles and nano tubes combinations we could build in the lab a nano holographic universe [5-8] akin to our own from which energy could be experimented with and extracted. For sure it will be a journey in uncharted seas with many trials and errors but sooner or later we will find out the right road to a Casimir dark energy nano reactor [1,22]. There are other conceivable ways of producing artificial nano universes with high dimensionality for Dvoretzky's theorem to be applicable. For instance we could use Ji-Huan He's ten dimensional polytope [42] as a skeleton to grow on it a hierarchy of nano particles using the methods applied in the clustering of diffusion limited aggregation. In other words, we can let our scientific imagination run free but checked with E-infinity mathematical rigor and nanotechnological facts.

5. Quantification of Casimir-Dark Energy Using E-Infinity Theory

It may come as a pleasant mild surprize that exact limits could easily be established for Casimir-dark energy using nothing more than the topology of our E-infinity Cantorian spacetime [56,60]. We can do this in a variety of ways which are essentially tautologies leading to the same basic conclusion in the limit. Thus we could view the energy density of the space outside the two Casimir plates as that of Einstein's $E = mc^2$ density, i.e. $\gamma(\text{Einstein})=1$. Inside the plate the energy density in the limit could only be a statical,

quasi potential energy of the quantum particle, i.e. $E = mc^2/22$ and consequently $\gamma(0)=1/22$. It follows then that the net pressure of the Casimir plates must be $1-(1/22)=21/22$ which is, in the meantime rather well known, as the dark energy density of spacetime. A second way to interpret the same situation and reach the same result is to argue that within the Casimir plates there is no "space" except for the empty set with a Hausdorff dimension ϕ^2 where $\phi = 1/(\sqrt{5} + 1)$. Outside on the other hand we have the zero set. The difference is a net $\phi - \phi^2 = \phi^3$ which is the universal fluctuation of spacetime and simply the reciprocal value of its Hausdorff dimension $(1/\phi^3) = 4 + \phi^3$ [3][52,56]. Finally we could see the situation as the difference of the completely empty set in the limit, i.e. zero between the Casimir plates and the spacetime fluctuation ϕ^3 [60]. That way the Casimir effect could be set in the limit equal to ϕ^3 and may easily be seen to be a relative to the Immirzi parameter ϕ^6 and the Unruh temperature ϕ^4 apart of Hardy's entanglement ϕ^5 , i.e. a member of a generalized quantum-topological entanglement family [60].

6. Conclusion

Exploding stars and galaxies are scientific facts. Consequently to presume that these are only topological defects in to near infinitely large spacetime is not outlandish nor science fiction [54-56]. In fact the near identity of the Casimir effect and dark energy and the fact that both originate from the quantum wave aspect of quantum mechanics clearly shows to any open minded scientific thinker that to pursue clean free energy is not a scientific 'crackpot' idea but a real and reachable aim. I ask the sensitive reader to forgive me for using the ugly word 'crackpot' which is not a proper English word but merely slang which invaded the scientific English language like a virus. The 4.5% of ordinary energy in the universe is nothing but the multiplicative volume of a five dimensional K-K zero set while the 95.5% dark energy is the additive volume of the same 5D Kaluza-Klein empty set [34]. Seen that way we think that making humanity free from oil and traditional sources of energy is a higher and moral aim worth investing heavily in for what is a million or even billion dollar research grant funding compared to the three trillion dollar Iraq war [59]. In fact the highly enlightened rules of the United Arab Emirates are already looking towards a future free of oil based energy [61]. It was Nobel Laureate in Economics, Prof. J. Stiglitz who calculated with Prof. L. Bilmes the true cost of the Iraq war for the USA. The staggering three trillion dollars do not actually include the loss and destruction for the economy of the entire world. The author dares to say with a tongue in cheek, that the mere sight of only one trillion dollars funding for our nano Casimir-dark energy reactor is sufficient to make this reactor spontaneously pop out of spacetime like virtual particles!

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