Energy Conversion From The Exotic Vacuum--Revised

by
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Abstract
A connection is shown between electron clusters, or EVs, and energy conversion processes yielding thermal energy in excess of the input energy used to form the electron cluster. This energy conversion process is traced to all known forms of cold fusion claims for over-unity or excess energy production. A theory of like charge binding as well as highly effective nuclear acceleration using the charge cluster is presented based on local gravity coupling arising from manipulation of the Exotic Vacuum.

Prologue
In earlier papers by Shoulders [3,4,5,6,7,8], it was shown that electrons could be clustered far beyond the densities normally allowed by classical considerations of charge repulsion. This dense state of charge clustering has produced a range of electronic devices with properties surpassing those of any other known technology. In addition, many new manifestations of anomalous energy production were shown on a laboratory scale. Although these energy gain measurements satisfied the numerous tests applied to them, they were unsupported by any theory due to their extreme divergence from classical considerations.

During the search for a highly advanced space propulsion system, Sarfatti [2] originated a theory covering many aspects of a new physics based on manipulation of the exotic vacuum that appeared relevant to the measured energy gain arising from charge clusters, or EVs, herein called Exotic Vacuum Objects, or EVOs. This writing is the first attempt to combine theory with practice on this new frontier of both physics and engineering as applied to new energy production methods. From present observations, it appears likely that future considerations will cover not only energy production processes but totally new experimental propulsion methods as well.

EVO Formation and Characteristics
In the simplest of EVO formation methods, electrons are extracted from a conductor by quantum mechanical tunneling when applying sufficiently high fields to exceed what is termed the space charge limit of emission. In this trans-space charge region, electrons are emitted as a coherent stream of fluid having number densities equal to that of the conductor lattice template, being in the region of Avogadro's number. The fluid-like properties of this emergent stream, along with incidental electrodynamic forces, determine how much emission occurs before quenching, hence, the size and spherical shape of individual, emergent EVOs as well as the stream flow properties producing the bound and entwined groups of entities emitted. In this scenario, the foundation properties of the EVO always existed within the confines of the conductor lattice. When the electron substance is pulled from the lattice by intense fields, a new container form must be found. Sarfatti, in Appendix I-III, presents the formulation of an adequately valid theory for this containment for the first time.

EVO Interaction With Solid Material
As shown in the paper by Shoulders [4], EVOs have the ability to bore clean holes through a wide range of solid materials and either forcibly eject the material as a fluid or withdraw it back into the initial borehole through a sloshing process due to electromagnetic mismatch of the EVO itself. In the same reference, it was shown that large quantities of ejected material could reach velocities of nearly 10^8 cm/sec., an astonishingly high value for the small input energy used. No explanation could be given at that time for the measurements other than that an apparent reduction of mass was somehow in effect while the substance was embedded within the EV control arena. An alternative explanation is now available, through manipulation of the exotic vacuum, to explain the increased energy of the propelled particles. Once the increased energy of the material slug is imparted to the lattice of surrounding material through momentum transfer, an overall energy gain is achieved that is the foundation for the anomalous energy gain seen in all types of cold fusion processes. Again, Sarfatti has presented a theoretical formulation for this apparently anomalous behavior in Appendix II by couching it in terms of the exotic vacuum behavior afforded EVOs.

Energy Production Using EVOs

One of the better-known fields of endeavor for the production of anomalous energy is called ***Cold Fusion***. This field is divided into segments having apparently distinct properties, but in fact, rely on only one basic process allied with EVO usage. The nominal divisions of cold fusion are: electrolytic, sonically produced bubble collapse, gas discharge and thermal cycling. Tests for EVO involvement in each of these divisions were run by Shoulders [8] and found to contain conclusive evidence of EVO action. The EVO production process used in each division was different but the end result was the same, namely, the EVO converted material to a fluid and transported it at high velocity into the lattice of the experiment where the momentum energy was recovered as heat.

The following SEM images were selected from reference 8 generated by Shoulders. This 350 MB CD shows many examples of EV involvement in various cold fusion processes

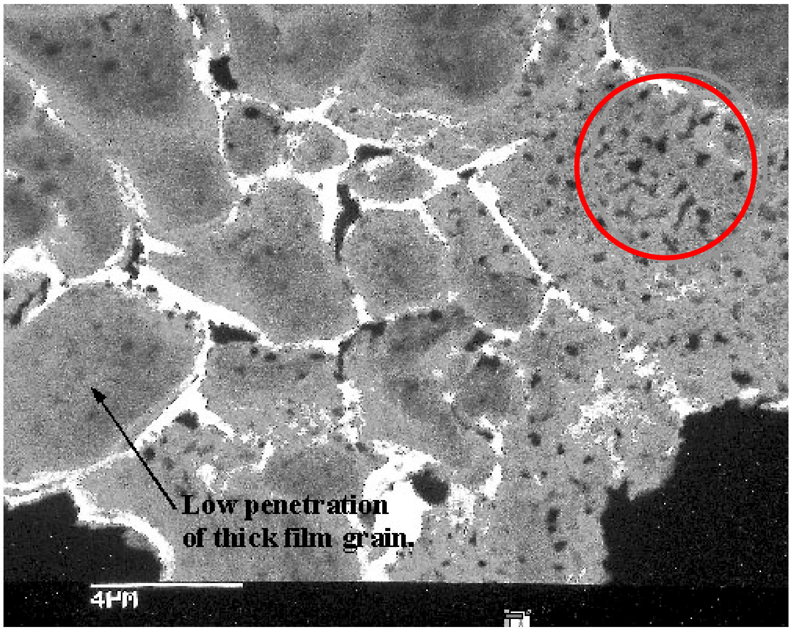

Fig. 1

SEM of the underside of an electrolyzed palladium-nickel film produced by George Miley and associates at the University of Illinois.

Boreholes near circle are shown passing through the film particles and then turning and running laterally along the surface of a supporting alumina substrate in typical EV fashion.

The approximate size of the boreholes shown is 0.2 micrometers in diameter

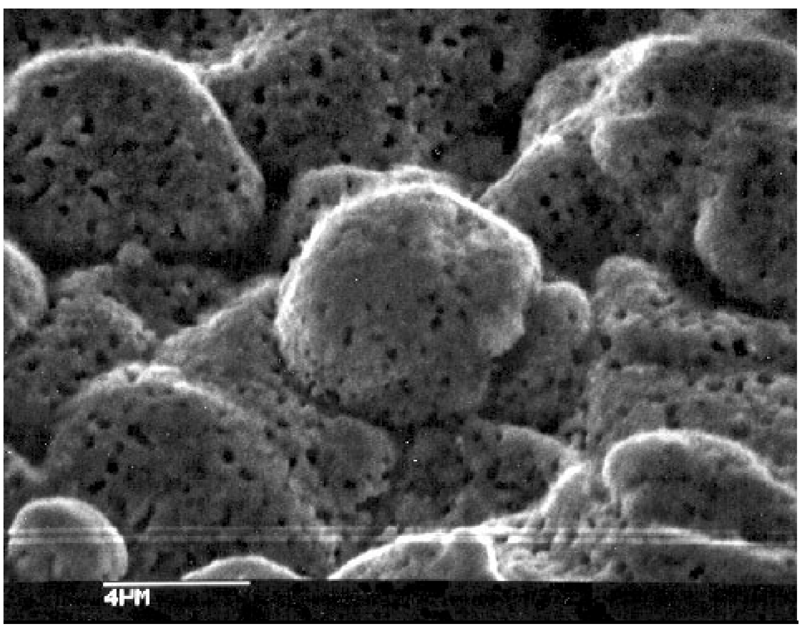

Fig. 2

SEM photo of the topside of an electrolyzed palladium-nickel film produced by George Miley and associates at the University of Illinois for cold fusion measurements.

Boreholes can be clearly seen as can a fuzzy surface covering that is probably a polymer growth developed from plastic bag storage over the one-year time before SEM analysis.

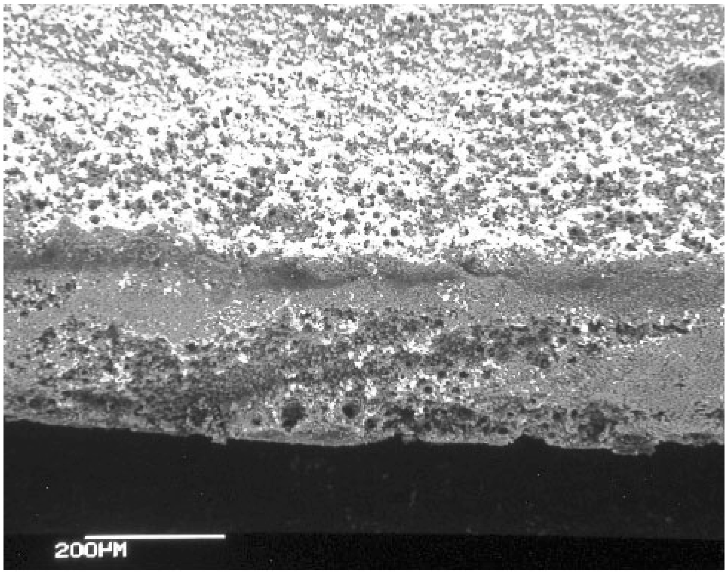

Fig. 3

SEM image of a Pt-Pd electrolytically prepared cold fusion sample by John Dash and associates of Portland State University.

The view is taken from the edge of the sample showing a surface layer of active metal in the form of electroplated fibers with many boreholes produced by EVO action. Most boreholes are accompanied by a metallic splash surrounding the hole indicative of EVO penetration.

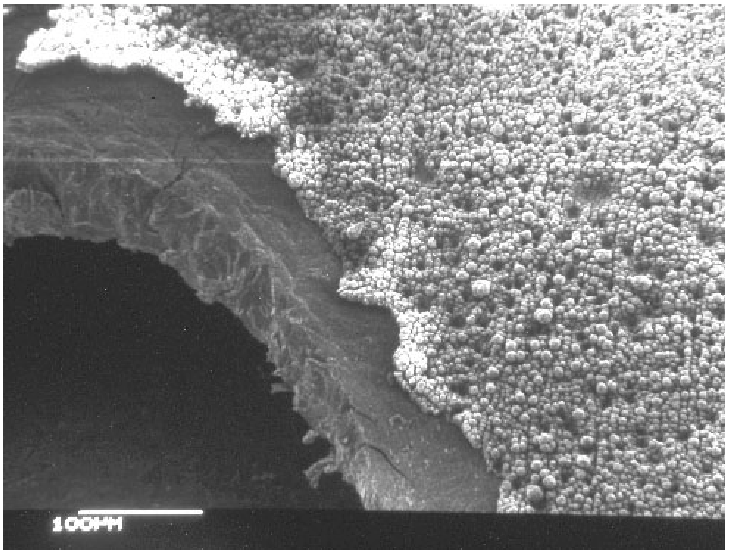

Fig. 4

SEM image of a niobium foil processed in a low-pressure electrical discharge of hydrogen by Tom Claytor of Los Alamos National Laboratories.

The process simultaneously grows a “black”, low-density coating of niobium that is concurrently bombarded by EVOs ejected from a nearby cathode. This type of black coating is very interactive with EVOs and capable of high-energy gain. The process was used for the production of tritium instead of for energy gain measurements.

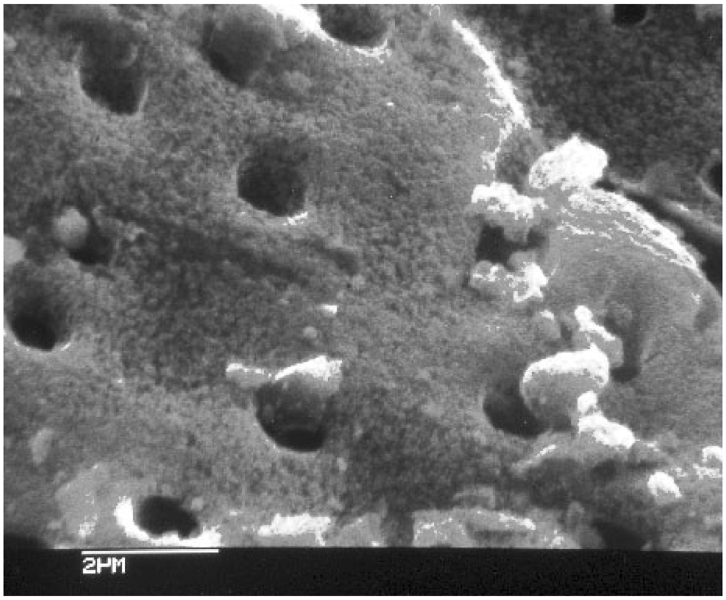

Fig. 5

SEM image of coconut charcoal coated with Pd to form a “Case” sample for a thermal gain measurement by Mike McKubre of SRI International.

The bright pieces of material often seen clinging to the edge of holes are usually the remains of palladium after thermal processing of the sample. The palladium film is blown off the surface by EVO activity thus limiting the lifetime of the sample. Coconut charcoal has many natural holes in it and it takes experience to determine which is natural and which is EVO bored. Spherical deposits nearby are the best clue the hole was EVO bored.

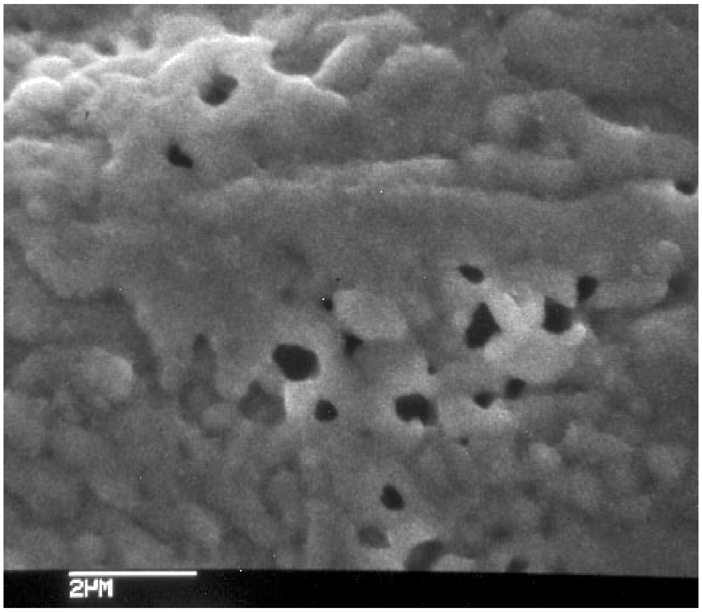

Fig. 6

SEM image of a portion of a palladium wire embrittled by heating in hydrogen. Sample was originally prepared by Franz Tanzella of SRI International to measure charged particle emission products while thermally cycling the sample.

The sample is almost totally destroyed on its surface, where the embrittlement took place, due to bombardment by EVOs. The bombardment process took place when the wire was thermally cycled to produce strain with resulting fractoemission and EVO creation.

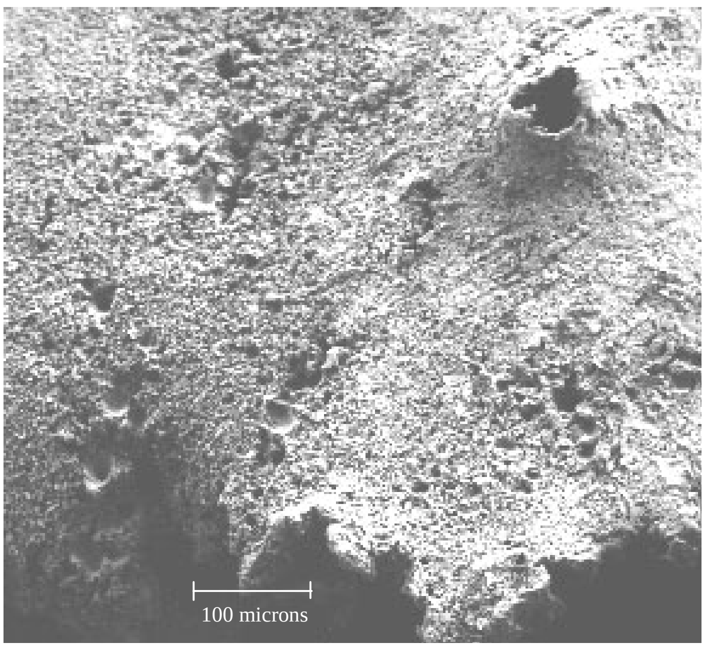

Fig. 7

SEM image of palladium subjected to ultrasonic energy in a fluid bath by Roger Stringham of Woodside, California.

This example of cold fusion work shows the widest variety of strike marks on the surface of any process known. It is suspected that a classic cavitation process causes some of the larger marks while others are legitimate EVOs. A micron marker has been added to show the approximate scale of the sample.

In all cases, the presence of EV, hence EVO, strike marks on the electrodes signaled the presence of a workable energy generation process. The efficiency of each process is regulated by the efficiency with which the EVO is generated and used. As shown in [4], EVOs traverse high resistance material easier than highly conductive material and the energy gain is higher for the former due to the larger quantity of material transported.

Engineering Considerations

The process of energy generation using EVOs is essentially one of devising a sacrificial structure or component based on first, the formation of an EVO from an external energy source, and then, its destruction during the energy gain portion of the process. In line with this statement, deriving a thermal energy output inherently implies the need for an efficient reconstitution process to some useful, equilibrium state. Such regenerative processes are seemingly feasible but none have yet been adequately demonstrated when the output power density is high enough to yield a practical device.

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[3] K.R. Shoulders, *EV--A Tale of Discovery*, Austin, TX, 1987. A historical sketch of early EV workhaving: 246 pages, 153 photos and drawings, 13 references. Available from the author at: 365 Warren Dr., Ukiah, CA 95482 (707) 467-9935, Email at: krscfs@svn.net

[4] Ken Shoulders and Steve Shoulders, "Charge Clusters in Action", Proceedings of the First International Conference on Future Energy, Edited by Thomas Valone, Published by Integrity Research Institute, Washington, DC, 1999, ISBN 0-9641070-3-1. A .PDF file of this paper is available for download from: http://www.svn.net/krscfs/

[5] Ken Shoulders and Steve Shoulders, "Observations on the Role of Charge Clusters in Nuclear Cluster Reactions," Journal of New Energy, Vol. 1, No. 3, 1996. A .PDF file of this paper is available from: http://www.svn.net/krscfs/

[6] U.S. Patents on EV technology by K. R. Shoulders. 5,018,180 (1991) - 5,054,046 (1991) 5,054,047 (1991) - 5,123,039 (1992), and 5,148,461 (1992).

[7] Ken Shoulders, "Low Voltage Nuclear Transmutation". A poster presented at ICCF-10 can be downloaded from: http://www.svn.net/krscfs/

[8] Ken Shoulders, "EVs in Cold Fusion", a 350 MB CD Published by Thomas Valone, PhD, Integrity Research Institute, 1220 L St. NW #100-232,Washington, DC 20005 Also available from the author at the address shown in [3].

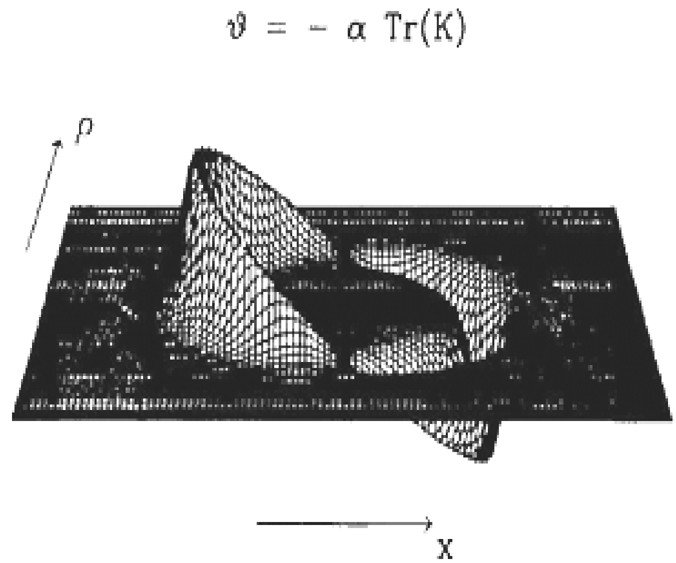
Appendix I

The direct gravitational effect of zero point energy should not be confused with the quantum electrodynamical Casimir force which is also a negative power law and may be repulsive depending on the shape of the EVO charge distribution. Indeed, the direct gravity effect will need to counter-act the Casimir force in such a case. The general idea is that zero point energy manifests in two qualitatively different ways using different equations of physics one from general relativity, the other from quantum electrodynamics. Previous theorists in this subject have not been aware of this important distinction.

Appendix II

Exotic Vacuum Acceleration of Particles

The parameter hG^*/c^3 is of order 10^{-26} cm^2, i.e. $G^* \sim 10^{40}G$ when N = 1 for the internal structure of a single spatially extended electron. G* is scale-dependent and must be determined empirically at this stage of development of theory. The observed anomalous acceleration of EVOs is essentially the Alcubierre warp drive effect where there are configurations of both positive and negative Λ_{zpf} in different parts of the same EVO causing it to self-accelerate. In terms of Alcubierre's exotic source parameter $Tr(K) \sim \Lambda_{zpf}$



The Warp Drive: Hyper-Fast Travel Within General Relativity
Miguel Alcubierre, Classical Quantum Gravity 11 (1994), L73-L77

Appendix III

A more complete model of the EVO's including rotation and Casimir forces.

Virtual photons of all three independent polarizations do have positive energy density hence negative pressure since w = -1 for them. Since the gravity influence of the pressure is three times larger than that of the energy density, these virtual photons do anti-gravitate.

The virtual photons in a static Coulomb electric field, or even in time changing non radiating near induction fields like in electrical equipment are in macro-quantum coherent states as shown, for example by Roy Glauber at Harvard in the early 1960s. These virtual photons are not part of the vacuum zero point fluctuations. They are part of the ordinary stress-energy density tensor $T_{\mu\nu}$ on the RHS of Einstein's field equation

$$G_{\mu\nu} + \Lambda_{zpf} g_{\mu\nu} = \frac{8\pi G}{c^4} T_{\mu\nu} \tag{1.1}$$

i.e. macroscopic near EM fields only appear in the $T_{\mu\nu}$ term, not in the $\Lambda_{zpf} g_{\mu\nu}$ term!

Since, $G/c^4 = 10^{-33}$ cm per 10^{19}Gev at least at macro lab scales, we can ignore the direct effect of such classical EM near fields on the metric engineering i.e. shaping of $G_{\mu\nu}$, which comes entirely from the $\Lambda_{zpf} g_{\mu\nu}$ term. That's the key idea for practical metric engineering the fabric of space-time for reaction-less or propellantless propulsion. Metric engineering is strictly "virtual" without "forces" in the above sense. The idea of metric engineering is for the ship's crew to control their own timelike free float geodesic with small tidal stretch-squeeze distortions and using SMALL amounts of onboard power!

Consider a spatially-extended Bohm-Vigier hidden variable model of an electron as a thin shell of electric charge at radius r = e^2/mc^2 ~ 1 fermi (10^{-13} cm). Ignore rotation (or spin) for now. Think classically, which is OK for the IT "hidden variable" in Bohm's pilot BIT wave model of NRQM. Relativistic Bohm QM requires teleology to explain EPR nonlocality in a covariant way as the Feynman zig-zag of Costa de Beauregard and later John Cramer taken from Wheeler and Feynman in its first historical incarnation of classical electrodynamics - action at a distance along both light cones advanced from the future and retarded from the past.

The self-Coulomb repulsive barrier potential energy is of order of magnitude

$$U_{self} \approx +\frac{e^2}{r} \tag{1.2}$$

Note the + sign. The gradient magnitude is $-e^2/r^2$, but the force is the negative gradient, hence the force points radially outward.

$$\vec{f}_{self} \equiv -\vec{\nabla} U_{self} \approx +\frac{e^2}{r^2}\hat{r} \tag{1.3}$$

The repulsive QED ZPF Casimir force for a thin spherical cavity comes from a ZPF potential energy

$$U_{zpf} \approx \frac{\hbar c}{r} \approx 137\frac{e^2}{r} \tag{1.4}$$

Therefore the QED repulsive Casimir self-force on the electron modeled as a charged spherical cavity is much stronger than the self Coulomb repulsion. The general relativity quantum pressure correction in the partially coherent exotic vacuum core of this spherical shell must be strong enough to cancel the repulsive Casimir force.

The GR rule for the w = -1 ZPF quantum pressure, is to replace G(effective mass density ρ of real or virtual stuff)(1 + 3w) by $c^2\Lambda_{zpf}$. I neglect factors of π etc. Assume a uniform zero point energy density $\sim \left(c^4/8\pi G*\right)\Lambda_{zpf}$ "core" inside the electron charge thin spherical shell. The effective zero point induced self-gravity “dark energy” potential energy per unit test mass is then the harmonic well “bag” potential

$$V_{GR} \approx c^2\Lambda_{zpf} r^2 > 0 \tag{1.5}$$

Note that potential energy per unit test mass has dimensions $(\text{velocity})^2$. The simple harmonic oscillator r^2 dependence is same as drilling a hole through the center of the Earth and dropping a bowling ball down through it. Note the counter intuitive result that the general relativistic zero point fluctuation exotic vacuum potential must be positive, i.e. dark energy with negative pressure, to stabilize the electron as a thin shell of charge. All of the energies are positive. The Coulomb, Casimir and rotational centrifugal barrier energies in the rotating frame are also all positive but they decrease with increasing r whereas the general relativistic zero point energy increases with increasing r to make a potential well of stability. This solves the 100 year old Abraham-Becker-Lrentz self-stress problem for the stability of the electron as a spatially extended hard massy object in the sense of Newton and Bohm. The electrical potential energy per unit test mass including the repulsive QED Casimir force is

$$V_{self} = \frac{\hbar c}{mr}\left(\eta_1 + \eta_2 \alpha\right) \qquad \alpha \equiv \frac{e^2}{\hbar c} \sim \frac{1}{137} \tag{1.6}$$

Note that Λ_{zpf} can be zero, positive or negative. Here, of course, the test mass = source mass, i.e. self-energy. The dimensionless extended-structure coefficients of order unity are η_1 & η_2 Suppose the electron is rotating with angular momentum J, the centrifugal potential energy per unit test mass in the rotating frame fixed to the electron is then

$$V_{spin} = \frac{J^2}{2m^2 r^2} \tag{1.7}$$

Therefore

$$V_{total} = V_{self} + V_{spin} + V_{GR} = +\frac{\hbar c}{mr}\left(\eta_1 + \eta_2 \alpha\right) + \frac{J^2}{2m^2 r^2} + c^2 \Lambda_{zpf} r^2 \tag{1.8}$$

A necessary condition for stability is that the total force negative gradient of the potential per unit test mass vanishes!

$$-\vec{\nabla} V_{total} = \left(\frac{\hbar c}{mr^2}\left(\eta_1 + \eta_2 \alpha\right) + \frac{J^2}{mr^3} - c^2 \Lambda_{zpf} r\right)\hat{r} \to 0 \qquad r = \frac{e^2}{mc^2} \qquad J \to \frac{\hbar}{2} \tag{1.9}$$

$$\begin{aligned} \Lambda_{zpf} &= \frac{\hbar}{mcr^3}\left(\eta_1 + \eta_2 \alpha\right) + \frac{J^2}{m^2 c^2 r^4} \\ &= \frac{\lambda_{quantum}}{r_{classical}{}^3}\left(\eta_1 + \eta_2 \alpha\right) + \frac{\lambda_{quantum}{}^2}{r_{classical}{}^4} \\ \frac{\lambda_{quantum}}{r_{classical}} &= \frac{\hbar c}{e^2} = \frac{1}{\alpha} \sim 137 \\ \Lambda_{zpf} &= \frac{1}{\alpha r_{classical}{}^2}\left(\eta_1 + \eta_2 \alpha\right) + \frac{1}{\alpha^2 r_{classical}{}^2} \approx \left(\frac{1}{10^{-15} cm}\right)^2 \approx \frac{1}{L_p^{*2}} \end{aligned} \tag{1.10}$$

This is an apriori calculation of the weak force scale mass of the W bosons ~ 10^2Gev. I note again that /\zpf > 0 is required in this particular model! This means a dark energy core not a dark matter core! This counter-intuitive result is because we assume a uniform volume core of zero point energy density and a thin shell of charge at the periphery. The sign of /\zpf is highly model-dependent.