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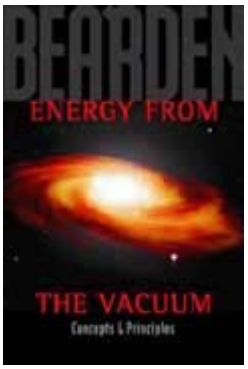

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ELECTRET

Electret – a piece of insulating or dielectric material which has been heated and specially cooled to provide dipolar domains and thus possess an overall fixed dipolarity. It is the electrical analogy of a permanent magnet. Instead of opposite magnetic poles the electret has opposing electrical poles of trapped opposite charges. As a result, there exists a fixed “static” potential between the two opposite charges of the dipolar electret.

Because of the opposite charges and the electrostatic scalar potential, several characteristics come into play.

(1) By the proven asymmetry of opposite charges, this electrical dipole must continuously absorb virtual EM energy from the vacuum and re-emit the energy as observable EM energy output (for a broken symmetry, something virtual must become observable). Since the EM energy “output” of the electret is that electrostatic scalar potential, then the potential must be an ongoing outflow of EM energy.

(2) That "static" potential – presented with a sort of "frozen waterfall" analogy in CEM/EE theory – actually corresponds to an "unfrozen waterfall" analogy, as beautifully presented by Van Flandern. The “static” potential is comprised of internal parts in continuous motion; these parts are combined longitudinal and scalar photon pairs. At any point, the scalar potential (the voltage difference) between the electret’s dipolar ends is continuously being established and replenished by the ongoing EM energy flow.

(3) Corresponding to Van Flandern's analogy, Whittaker showed in 1903 that every scalar potential decomposes into

sets of internal EM energy flows in the form of bidirectional longitudinal EM wave pairs. Hence Van Flandern's analogy is correct and the standard EM textbook is wrong, as to the nature of a "static potential". Indeed, every "static" EM field or potential decomposes into just such sets of internal energy flows, as shown by combining two papers by Whittaker in 1903 and 1904.

(4) The EM energy flow comprising the "static" potential occurs both in space and time. Classical EM essentially ignores the time aspects, but they can be gathered from quantum field theory. In quantum field theory, not only are there *longitudinal* photons, but also there are *time-polarized* or "scalar" photons. Neither the longitudinal photon nor the scalar photon is individually observable. However, the combination of the two produces voltage – that is, the scalar electric potential. Said another way, any voltage (scalar potential) must decompose into the flow of such photon pairs. From the wave view, the scalar potential decomposes into ongoing flow of longitudinal and time-polarized EM wave pairs. If we include the time-polarized waves in addition to the longitudinal waves, then from the vacuum's virtual state fluctuation energy the electret's dipolarity produces an *observable* set of ongoing EM energy flows. This observable energy flow set is comprised of both longitudinal EM waves and time-polarized EM waves in combination, thereby making "voltage" – thus creating and continuously replenishing that scalar potential between the electret's dipole. For that reason, a so-called "static" voltage, applied to a circuit, will easily flow throughout the circuit. Supposedly a scalar concept, it nevertheless demonstrates vector flow characteristics.

(5) As a dipole, the electret is already a system which extracts virtual state energy from the vacuum and transduces it into real, observable EM energy pouring steadily from the dipolarity. This process, evidenced by the steady presence of the potential, totally violates the present hoary old second law of thermodynamics because it steadily produces negative entropy. Instead of the "truly frozen static" potential taught in CEM/EE theory, the "static" potential is a nonequilibrium steady state (NESS) system. It is continuously producing negative entropy (absorbing the totally disordered virtual state fluctuation energy of the vacuum, re-ordering it, coherently integrating it to observable (quantum) size, and then re-emitting the energy as real observable EM energy flow).

(6) Hence the electret (as is any dipolarity) is a physical example of a real electromagnetic system exhibiting the continuous negative entropy production behavior shown theoretically possible by Evans and Rondoni.

(7) For proper understanding of the electret and the dipole,

Leyton geometry is required rather than the more limited 1872 Klein geometry presently used. Klein geometry essentially "omits" all such negative entropy operations, while Leyton geometry includes them automatically.

(9) In classical EM and electrical engineering, it is not commonly recognized that there is no such thing as an "isolated charge". Indeed, a so-called "isolated charge" is engaged in an ongoing energetic exchange with its surrounding virtual state vacuum. It *polarizes* its vacuum, producing opposite virtual charges surrounding it. So the "isolated charge" is actually a *special kind of electret*, and thus a dipolarity, once its vacuum polarization activity is accounted.

(10) In modern physics the classical "finite charge" is actually composed of an infinite "bare" charge surrounded by an infinite charge of opposite sign in the seething vacuum. Our instruments, peering through this external Faraday screen at the bare charge inside, will "see" and measure a finite difference of the two infinite charges, with the sign of the internal infinite charge prevailing. Hence our instruments "see" and measure the "finite charge" that is printed in our textbooks for each fundamental particle, etc. But the real charge physically there is comprised of two infinite charges, each having infinite charge and infinite energy. Hence as a special "electret" the classical "isolated charge" easily sits there and continuously radiates real EM energy, perpetually, because its infinite energy is never exhausted by finite emission. The fundamental charges present in the original mass of the universe have been continuously radiating real EM energy in that fashion, for something like 13.7 billion years, and have shown no signs of "running down".

(11) Since any charge or dipole is a special form of electret, which continuously radiates real EM energy, then the problem in the present energy crisis is not in having any shortage of energy, but in our scientists and engineers having totally failed to understand "static" EM fields and potentials and things such as electrets, and having totally failed to develop circuits and systems which freely collect and use EM energy from these steady EM energy flow sources that are universally available in every circuit and system. Instead, our scientists have misunderstood completely, erroneously assumed away Whittaker's constituent energy flows, and have developed only that very limited class of EM system which is Lorentz-symmetric and continually kills its dipolar (electret) source of energy faster than it will power the loads. Hence we pay the power company (i) to deliberately engage in a giant wrestling match inside its generators and lose, and (ii) to require us to continually input – and pay for – the mechanical energy to crank the generator shaft, just to continually restore the

dipolarity inside the generator and the resulting free energy flow from the vacuum, that the inane circuits keep destroying.

Electrets are used in a wide range of applications, from air filters to microphones, and there are more and more electret applications emerging every year.

Typical applications are in electret transducers; electrophotography; electrostatic recording; electret air filters; electret motors and generators; electret dosimeters; piezoelectric polymer transducers; pyroelectric polymer devices, electret microphones, etc. Electret motors have also been developed and used, although the achieved power outputs up to the present have been small. Because of their ability to generate a constant electric field, electrets have been used as a method of electronic focusing in applications such as gas filters and microphones. In recent years a much wider application of electrets has been made in new applications ranging from controlling lubrication in machine parts to regulating drug diffusion.

In the energy-from-the-vacuum field, there is evidence that Sweet also was able to induce electret characteristics in his conditioned self-resonating permanent magnets, thereby producing a free and powerful Poynting energy flow of E X H from the magnets with coupled electret characteristics. This intense EM energy flow interacted with the surrounding coils of Sweet's Vacuum Triode Amplifier, which produced a COP = 1,500,000. Later he was also successful in producing a unit with a little clamped positive feedback, so that it became self-powering and no input by the operator was required, once the unit was in operation.

A good coverage of electrets, their principles, materials, conditioning, uses, and operation is Electrets, 3rd Edition, Vol. I, edited by G. Sessler, Laplacian Press, 1998. The booksellers can be contacted at electro@electrostatic.com, or by phone at 408-779-7774.

Another more expensive but excellent book covering some additional aspects is Bladimir N. Kestelman, Leonid S. Pinchuk, and Victor A. Goldade, Electrets in Engineering: Fundamentals and Applications, Kluwer Academic Publishers, 2000.