

# FUSIONfacts

A Monthly Newsletter Providing Factual Reports On Cold Fusion Developments

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*Fusion Facts* Now Reports on Both Cold Fusion and Other Enhanced Energy Devices.

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### WELCOME INVENTORS CONFERENCE

*Fusion Facts* is pleased to welcome inventors of the world to Utah for the convention of the National Congress of Inventor Organizations and the International Federation of Inventors' Association.

This special issue of *Fusion Facts* is our gift to each inventor at this special conference. The speech of our Editor-in-Chief is included, in full, in this issue beginning on page 2. Inventors of the world, *Fusion Facts* pays tribute to you for making this a better world. Keep up the good work, this planet needs you more than ever.

### A. ZERO POINT ENERGY

An Introduction by Dr. Hal Puthoff

The possibility of extracting useful energy from vacuum zero-point fluctuations has been noted in the scientific literature, both by the author [1] and others [2,3]. The basic principle underlying this possibility is that modern quantum theory predicts (and experiment verifies) that, even in the absence of matter, each cubic centimeter of space contains an enormous amount of untapped electromagnetic energy known as the electromagnetic zero-point energy. (The meaning of the adjective zero-point is that such field activity exists even at a temperature of absolute zero where no thermal effects remain.) The amount of energy associated with this (usually unobserved) background is conservatively estimated to be on the order of nuclear energy densities or greater [4]. As shown by the author, the source of this energy can be traced to radiation from the fluctuating quantum motion of charged particles distributed throughout the universe [5].

Well-known physical consequences of the ubiquitous background zero-point energy include the perturbation of atomic spectral lines known as the Lamb shift [6] (for which discovery Lamb was awarded the Nobel prize), stabilization of atomic structure against radiative collapse [7], field mechanisms underlying the gravitational interaction [8], and the Casimir effect, a unique attractive quantum force between closely spaced metal plates, named for its discoverer [9]. For a semipopular overview of these and related phenomena see Ref. [10].

Of special interest with regard to extracting energy from the vacuum is the last-mentioned effect, the so-called Casimir effect. An elegant analysis by Milonni et al. at Los Alamos National Laboratory [11] shows that the Casimir force, which results in closely-spaced metal plates being pushed together by so-called "empty space", is due to radiation pressure from the background electromagnetic zero-point energy which has become unbalanced due to the presence of the plates. This attractive force is proportional to  $1/D^4$ , where D is the spacing between the plates, and becomes quite strong at spacings on the order

of 1000 Angstroms or less. The attractive force is sufficiently strong so that in certain technological applications such as the scanning tunnelling microscope, special precautions must be taken to prevent metal surfaces in close proximity from being drawn together. Therefore, this zero-point energy pressure is quite robust, and not merely of academic interest.

In a rudimentary form of application to energy extraction [2], the plates in a Casimir experiment are electrically charged with the same sign charge (for example, with electrons). This results in a so-called Coulomb repulsion force between the plates which is proportional to an inverse square law ( $1/D^2$ ) or less, depending on the geometry. This repulsive force can, however, always be overcome by the stronger attractive Casimir force at small spacings between the plates. Hence, the overall charge distribution becomes concentrated as the plates come together. As a result, the zero-point energy that drives the Casimir effect is transformed into stored electrical energy as the charge distribution condenses. This energy can then be extracted by a variety of means. In [Ref.2], for example, it is shown how in principle the stored energy could be used to charge a battery. Although demonstrating **in principle** energy extraction from the vacuum, the specific embodiment envisioned in [Ref. 2] is admittedly impractical for significant, continuous energy generation.

An alternative candidate approach to obtaining energy from vacuum fluctuations might lie in the generation of cold, dense, charged plasma in which charge condensation occurs on the basis of a Casimir **pinch effect**. This approach could be dubbed a "**Casimir-fusion**" process. It would begin with an initial energy input to contract the plasma initially so as to overcome the Coulomb barrier to be followed, hopefully, by the Casimir force creating a condensation of the charged particles in the plasma. In principle, if the energy used to generate the appropriate plasma conditions is less than the energy that one could recover from the plasma, then the result would be the efficient tapping of zero-point vacuum energy. Laboratory experiments are underway to investigate this possibility.

If one wishes to speculate on whether the world's energy problems could be resolved on the basis of tapping the zero-point energy, the following comment by R. Podolny of Moscow is especially cogent, "It would be just as foolish to deny the feasibility of useful application as it would be irresponsible to guarantee such application."

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## B. COLD FUSION FACTS

by Hal Fox, Editor-in-Chief

This presentation was made to the attendees of the convention of the National Congress of Inventor Organizations (NCIO) and the International Federation of Inventors' Association (IFIA) at the first such convention held in the United States. Presentation given at Sherwood Hills Resort, Wellsville, Utah, September 26, 1991.