

A Zero Point Energy Conversion Device Prototype

Summary and conclusion of research and speculation by John P. Franks (ElectroDynaCat)

If at first the idea is not absurd, then there is no hope for it. -- *Albert Einstein*

The author has embarked on this work to explore and speculate on the possibility of creating useful energy from the vacuum. After research in a field that many would rightfully call fringe science, I report my findings to others in the field in the spirit of the Medieval Alchemists, whose search for the transmutation of base metals into gold was never successful, but whose truthful reported findings of the results of their experiments led to the empirical knowledge base we call Chemistry today.

The author will make assumptions that the reader is familiar with most of the background regarding this field, and quickly get to the main premise of the work, which can be simply stated: *The zero point energy can be made to manifest its presence as the performance of useful work. This can be accomplished through means that in no way contradict or even extend the normal laws of Physics.*

The laws of physics have never specifically ruled out the possibility of a device that could take the energy of the vacuum and convert it to useful work. Instead thermodynamics outlines the conditions that must be necessary for a heat engine (which a ZPE device must be) to function in the environment of the 4 dimensional universe.

The first requirement for a heat engine of any type to function is the existence of a heat source and a heat sink, a difference in temperature that is bridged by the engine. Our ZPE engine by its very nature is a device that must take low entropy high temperature heat from the environment, extract work from this energy and in turn degrade the quality of this energy by lowering the temperature and increasing the entropy. Our engine must then release this degraded energy into the same environment. In this respect the vacuum must be considered as both the source and sink, thermodynamic principles will not allow such a process to occur as a violation of the Second Law of Thermodynamics, and it is not the authors intention to suggest otherwise. It is this Law that delivers a fatal blow to the notion of creating a free running ZPE engine, and it would be a fatal blow to the process I am suggesting if it were not for the unique structure of vacuum.

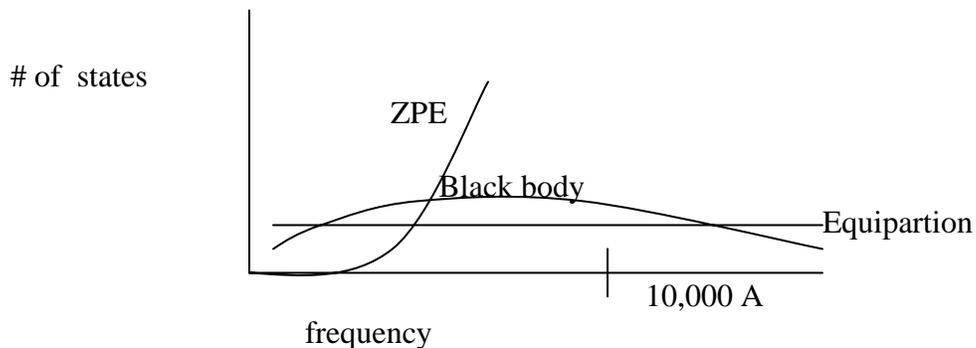
The nature of the vacuum is different than any thermodynamic media we are familiar with in that we cannot assign a temperature to the vacuum that is universal. We might say that the temperature of the vacuum is 4 kelvins from the background big bang radiation, but this not the true temperature of the vacuum, but of the Universe on a macroscopic scale. The temperature of the vacuum is scale dependent in other words, the smaller the scale the higher the temperature. This is otherwise known as the Uncertainty Principle. The smaller the space we try to squeeze an electron the higher its momentum. Our engine then must bridge the gap between two energy scales, in other words two cavities of different dimensions, even better the cavities should be harmonic multiples of each other.

Other considerations of scale should tell us the dimensions of these cavities should be extremely small so that the higher energy modes of the vacuum can be exploited. There is also a maximum dimension of the cavity that is determined by the ambient temperature. The energy density of the environment must be less than that of the device for the energy produced to actually show up as useful work. This is why the large scale devices with spinning wheels and diodes produced by many inventors can be written off as inoperable. For the temperatures that we experience, this dimension is in the region of wavelengths of the far infrared, which makes our engine buildable by photolithographic means. We will never actually be able to see our ZPE engine except under a microscope, and when we do there will be billions of them working in parallel, producing electrical current quietly and without end.

There exist on the Internet today a myriad of proposals in search of support and funding that claim to have accomplished what we seek to do, and there is one way to sort out the ideas which are either frauds or mistakes in measurement. If you can see it with the naked eye, it doesn't work.

Cell Size Limits on Zero Point Energy Converters

The maximum size of a zpe converter cell is determined by two factors that are primarily engineering considerations. It is necessary to sink the maximum amount of energy per unit area and no more than can be withdrawn from the vacuum at a given temperature. Looking at the black body curve for room temperature, the relatively flat curve of populated states must lead to the conclusion that for at least room temperature there is little reason to exceed the equipartition of energy line that relates the average energy per wavelength and the number of states occupied at that frequency. It makes no sense to build a cell that is larger in area to absorb the same amount of energy.



The rapidly increasing density of the ZPE is sufficient to create a population inversion at a low wavelength, at the point where the blackbody population is exceeded thermodynamics dictates that an energy difference exists between the blackbody and the ZPE.

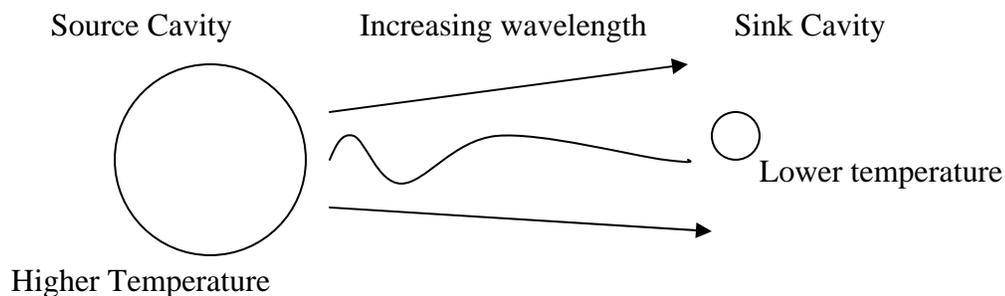
The point of this entire exercise is to point out one fact, any true zpe converter must be of microscopic dimensions determined by the wavelength of the equipartion energy at the least, and at the most, the peak of the curve which is somewhat higher.

In conclusion by following this argument it can be said with confidence that any purported zpe converting device must be of microbe or smaller size in order to have a chance of being an effective energy source. This critical dimension is the energy source itself, and the sink must be smaller still to provide a thermodynamic difference in temperature for a heat engine zpe to function.

Energy Flow to and from the Vacuum

Our scheme is simple on its face, but somewhat complex in application. It is necessary to remove energy from the vacuum with a large Casimir cavity (but no larger than 10,000 Angstroms) and sink this energy through a smaller cavity back into the vacuum. In this path there is placed a mechanism that will convert this temperature difference into useful work , the movement of electrical current. Many consider the conversion mechanism to be the crux of the problem in ZPE converters, but it is the belief of the author that the main stumbling block that was never recognised is not the mechanism, but the thermodynamic boundary problem of conducting a wavelength of energy through a sink that is in wavelength terms smaller than the energy passing through.

To illustrate



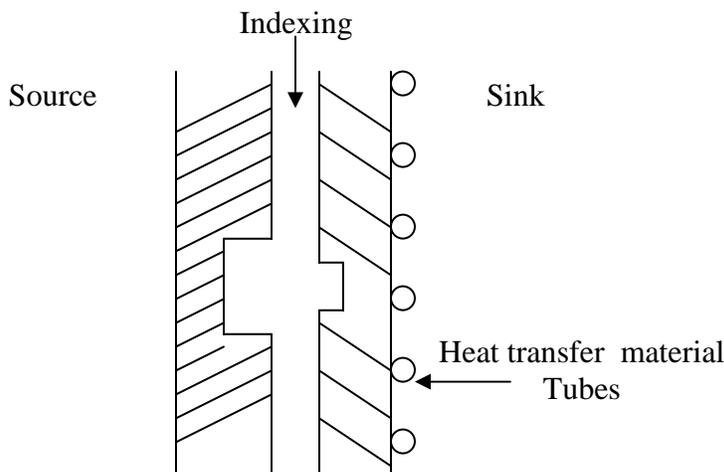
By extracting work from the energy flowing from the cavity, the wavelength of the energy being degraded will increase. The energy coming from that source has a characteristic frequency that is dependent on the size of the cavity, the wavelength of the energy flowing through the cavity cannot be larger than the cavity itself. From that point it must be transferred to the sink cavity which must in principle be smaller than the source cavity to have a lower temperature. From wave theory it is known that an object that is smaller than the radiation that impinges upon it will not reradiate that energy back into the media, hence no heat flow and no energy transfer will occur. In considering all the problems encountered in designing a system, this is the secret trap that will cause designs to fail.

It is for a good reason that the Universe was designed with this built in stumbling block. Had this been otherwise the mass of the Universe would have been excited by the infinite flux of the Zero Point Energy and boiled away long before the advent of the galaxies. In this principle it is apparent why all the maddening questions about the very nature of the ZPE, especially the infinite energy density problems that plague Electrodynamics, have not been successfully understood. We are not affected by the ZPE because nature has a built in mechanism to insulate us from the heating effect that it should produce and the space bending that should occur due to the infinite flux present in all of space.

It is this problem that the author has considered to be the primary obstacle to the development of a successful ZPE device, and it is in this area that most effort has been expended to find a resolution of the problem. Those readers that are more familiar with electromagnetics may already know the nature of the solution, now that the actual nature of the question is known. In reality the question of the engine mechanism will prove to be irrelevant to the problem of accessing ZPE power, any device such as thermoelectric or thermoionic can convert thermal energy into electric current, what is vital is to enable the right conditions to allow the transfer of energy to occur.

The Device Configuration : Prototype

The appearance of the device is atypical of most other developments in the field. It consists of a set of layers of thin film material which contain regularly spaced intervals of fields of cavities much like a typical RAM chip. The cavities should be spaced together as closely as can be allowed under the 10,000 Angstrom maximum size criterion. Allowances should be made for thermoelectric or thermoionic current generators if it is desired to create electric current from the devices output energy, otherwise the device will need have a mechanism to carry away the heat produced by the energy transfer. The layers containing the respective cavities are made by microphotolithography. The only special construction technique consists of lining up the respective layers of cavities so they facing each other in stacked configuration. As the technology progresses, we can expect to see cascading of the cavities to more effectively transfer greater energy. At the present two layers are sufficient to demonstrate the technique.



In the space between the cavity planes is the indexing media, which is where the adjustment of wavelengths occurs. This area is not empty space, and the material that fills

this area will be subject of the majority of research time and effort in this project. Conditions require this material to be an electro-optically active phase conjugate non linear material that has been micromechanically altered to give it the properties necessary to act as an energy conducting path for the Zero Point Flux that is passing between the two cavities. This material will be the subject of its own special set of materials processing technologies. Polycarbonate plastic so far is the only material the author can identify at this time as a candidate for this application. If the reader is unfamiliar with the material, it is used to make lenses in eyeglasses.

Although other materials show phase conjugate behavior, polycarbonate is the only material to exhibit this property without the presence of “pump energy” necessary to create the phase conjugate wave reversing behavior necessary to allow the ZP flux to “fit” through its sink cavity. This property only occurs when a wave traverses 2 electrostatically active domains in the material. It will be necessary to incorporate large numbers of these domains in an arrayed fashion through the material.

The final configuration of the device could be as a heat source or if space permits, a current source using the released energy to energize a thermoelectric or thermoionic grid that would be incorporated in its structure. It could see use as permanent power source for deep space probes, remote sensing devices, pacemakers and areas where batteries are used, and could eliminate the need for power pack replacement where the replacement process is either dangerous or impractical. As a last thought, these devices would need to incorporate a mechanism to deactivate themselves at a future time, as the energy produced might present a fire hazard.

In conclusion, the research indicates this path might be possible modality for extraction of the zero point flux into useful work, and the author has endeavored to frame this effort within the conventional laws of Physics without contradicting or extending those laws into marginal utility.