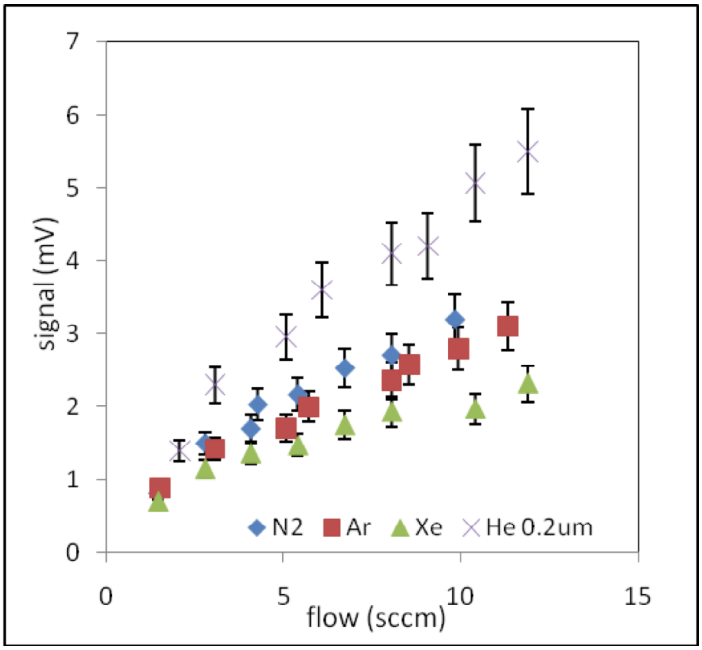
TEST OF ZERO-POINT ENERGY EMISSION FROM CASIMIR CAVITIES

Olga Dmitriyeva and Garret Moddel
Department of Electrical, Computer, and Energy Engineering
University of Colorado, Boulder, Colorado 80309-0425

Tapping the inexhaustible pool of vacuum energy would be an attractive solution to our energy needs, but experimental verification of proposed approaches is lacking. We test the approach of Haisch and Moddel [1] to extract zero-point energy (ZPE) that exists in all space in the form of electromagnetic waves. The approach makes use of Casimir cavities, in which the density of ZPE at long wavelengths is reduced below that in free space. According to stochastic electrodynamics, atomic orbitals are supported by the ambient ZPE. Therefore when gas atoms enter into suitable Casimir cavities having diminished ZPE at particular wavelengths, the orbital energies decrease. If the concept is correct, then entering atoms should shed their excess energy, which can be extracted. Upon re-emerging from the Casimir cavities the atoms would be re-energized by the ambient ZPE. In this way energy is extracted locally, and replenished globally from the electromagnetic quantum vacuum.

The experiment was to investigate energy radiated from gas entering the cavity. We set up a stainless steel, turbomolecular-pumped chamber, with gases fed through a computer-controlled mass flow controller. Radiation was detected using an ultra-sensitive pyroelectric detector sensitive to wavelengths in the range of 1-10 μm. The Casimir cavities were in polycarbonate membranes, some of which were coated with gold.



Radiation was detected from the gas entering the cavities for a range of gases. Results are shown for N_2, Ar, Xe and He gasses flowing through the uncoated polycarbonate membrane with pore size of 0.2 μm. Considerable effort was made to find a conventional source for the radiation, including temperature changes in the gas resulting from absorption, Joule-Thomson cooling, turbulence, and friction. None of the sources considered could explain the results fully. ZPE remains a possible explanation for the observed radiation, but further investigation is required before it can be identified as such with confidence.

This work was support by a contract from Hub Lab to Jovion Corporation.
[1] Haisch B., and Moddel G., "Quantum vacuum energy extraction," U.S. Patent No. 7,379,286 (2008).