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Instability generated by Maxwell's Demon wire array[1] CHI-SHUNG YIP, NOAH HERSHKOWITZ, University of Wisconsin - Madison — Previous experiments have shown that in a low pressure, low temperature plasma, positively biasing an array of thin wires can increase electron temperature by creating an angular momentum trap to absorb cold electrons. In this experiment, such a Maxwell Demon device was reproduced by looping 0.0025mm tungsten filaments around a stainless steel shaft covered with ceramic. Such device used to raise electron temperatures from 1eV to 2eV in a multi-dipole chamber operating in the sub-mTorr regime. Geometry of the device is not found to be essential to its functioning. However, at higher positive voltage, an instability in the kHz range prevents acquisition of meaningful temperature data. This instability is measured by a cylindrical probe, and its frequencies are extracted by means of Fast Fourier Transform. The conditions of this instability are investigated by varying gas composition, neutral pressure, plasma density and applied voltage.

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