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Thermal Resonator Experiments Using A Magnetized Electron Temperature Filament[1] SCOTT KARBASHEWSKI, RICHARD SYDORA, University of Alberta, BART VAN COMPERNOLLE, MATT POULOS, GEORGE MORALES, University of California, Los Angeles — We present results from basic heat transport experiments of a magnetized electron temperature filament that behaves as a thermal resonator. Experiments are performed in the Large Plasma Device at UCLA. A CeB_6 cathode injects low energy electrons along a magnetic field into the center of a pre-existing plasma forming a hot electron filament embedded in a colder plasma. Previous work reported that the filament exhibits spontaneous excitation of thermal waves [Pace et al., Phys. Rev. Lett. 101, 035003 (2008)] and temperature gradient driven drift-Alfvén waves that enhance cross-field transport [Burke et al., Phys. Plasmas 7, 1397 (2000)]. We have added to the cathode bias a series of low amplitude pulse trains tuned to the thermal resonance of the filament that externally excite thermal waves. Langmuir probe measurements allow for the determination of the phase velocity and radial decay length of the thermal mode. These results are used to compute the axial and transverse thermal conductivities of the magnetized plasma and compare with those given by classical theory. Agreement of the axial conductivity provides a measurement of electron temperature; deviation of the transverse conductivity suggests anomalous transport or non-uniform excitation.

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