Abstract Submitted
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Heat Transport in Interacting Magnetized Electron Temperature Filaments[1] RICHARD SYDORA, SCOTT KARBASHEWSKI, University of Alberta, Canada, BART VAN COMPERNOLLE, MATT POULOS, GEORGE MORALES, University of California, Los Angeles, USA — Results are presented from basic heat transport experiments and numerical simulations of multiple magnetized electron temperature filaments in close proximity. This arrangement samples cross-field transport from nonlinear drift-Alfven waves and large scale convective cells. Experiments are performed in the Large Plasma Device (LAPD) at UCLA. The setup consists of three biased CeB_6 crystal cathodes that inject low energy electrons (below ionization energy) along a strong magnetic field into a pre-existing large and cold plasma forming 3 electron temperature filaments embedded in a colder plasma, and far from the machine walls. A triangular spatial pattern is chosen for the thermal sources and multiple axial and transverse probe measurements allow for determination of the cross-field mode patterns and axial filament length. We have characterized the spontaneous thermal waves and drift-Alfven waves that develop on an individual filament when a single source is activated. When the 3 sources are activated, and in close proximity, a complex wave pattern emerges due to interference of the various wave modes leading to enhanced cross-field transport and chaotic mixing. Steep thermal gradients develop in a periphery region of the filaments where higher azimuthal wavenumber drift-Alfven modes are excited. Detailed spectral analysis and comparison with nonlinear fluid and gyrokinetic simulations will be reported.

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