# Intermittent Profile Collapse in a Basic Heat Transport Experiment

B. Van Compernolle[1], G. J. Morales[1], J. E. Maggs[1] and R. Sydora[2]
[1]*Department of Physics and Astronomy, University of California, Los Angeles, USA*
[2]*University of Alberta, Alberta, Canada*

Results of a basic heat transport experiment involving an off-axis heat source are presented. Experiments are performed in the Large Plasma Device (LAPD) at UCLA. A ring-shaped electron beam source injects low energy electrons (< 20 eV) along the magnetic field. The injected electrons are thermalized within a short distance and provide an off-axis heat source that results in a long, hollow, cylindrical filament of elevated electron temperature embedded in a colder plasma. The inner diameter of the ring is 4 cm and equals four times its width, while its extent along the magnetic field is about 15 meters. Radial profiles of ion saturation current are measured at multiple axial locations.

The electron heat transport is studied as a function of heating power. Several distinct transport regimes are accessible. At low heating power classical heat transport is observed. At high heating powers drift-wave fluctuations dominate the transport. At intermediate heating powers a regime has been found in which intermittent collapses of the temperature profile occur. The heating causes the radial temperature profiles to steepen until a threshold is reached at which time drift waves grow and cause a rapid collapse. After the profile collapses the drift wave activity disappears. On a longer time-scale the profile slowly recovers and steepens again and the process repeats. The repetition frequency of the collapses is a sensitive function of heating power, with only a few collapses at low heating powers, and many collapses in rapid succession at higher heating powers.

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