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Intermittent Profile Collapse in a Basic Heat Transport Experiment[1] B. VAN COMPERNOLLE, G.J. MORALES, J.E. MAGGS, UCLA, R. SYDORA, University of 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 electron heat transport is studied as a function of heating power. 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 in rapid succession at higher heating powers.

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