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Identification of Large Scale Convective Structures in a Dipole Confined Plasma B.A. GRIERSON[1], Princeton University, MIKHAIL KLASSEN, M.W. WORSTELL, M.E. MAUEL[2], Columbia University — The dipole magnetic field has closed field-lines without magnetic shear, and this confinement configuration allows large fluting instabilities. When dipole-confined plasma is produced with ECRH, fast Hot Electron Interchange (HEI) instabilities appear at low densities, and slower turbulent fluctuations occur at higher densities. The global mode structures of the fast HEI instability and driven centrifugal interchange are understood and have been measured accurately. However, the fluctuations of the turbulent interchange modes are less well understood. These turbulent fluctuations are generated when the plasma is maintained at marginal stability to interchange modes. The turbulent fluctuations are characterized by non-steady rotation and a chaotic temporal evolution of the dominant modes in the system. The convective nature of the turbulent fluctuations by $\mathbf{E} \times \mathbf{B}$ motion is investigated by a spatially and temporally resolved diagnostic measuring the plasma density. Using the time evolution of the density, the plasma continuity equation is inverted for the potential. The global density and potential, as well as the particle transport by $\mathbf{E} \times \mathbf{B}$ are visualized. Transport rates are calculated and compared to transport measurements by probes.

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