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Simulating Interchange Turbulence in a Dipole Confined Plasma¹ B.A. GRIERSON, M.W. WORSTELL, M.E. MAUEL, Columbia University — The dipole magnetic field is a simple, shear-free configuration. Strong, low-frequency interchange mixing, with $k_{\parallel} = 0$, allows plasma cross-field dynamics to be 'bounceaveraged'. When dipole confined plasma is produced with ECRH, fast Hot Electron Interchange (HEI) instabilities appear at low densities, and lower-frequency turbulent fluctuations occur at higher densities. The global mode structure of the HEI and centrifugal interchange are understood, with good agreement between laboratory measurements and nonlinear simulations. However, the turbulent fluctuations are much less understood. They exhibit a power-law like spectrum, and require a spatially refined computational grid. To study the interchange turbulence, a fully parallel simulation has been developed to examine these fluctuations. The simulation includes a distributed Fast-Poisson solver for the ion polarization drift, a particle source and sink, as well as user-inputs to charge individual flux tubes driving interchange mixing. Results of high-resolution simulations and parallel performance will be given.

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