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Plasma interchange velocimetry in a dipole-confined plasma with electrostatic perturbations[1] A.M. SENTER, M.E. MAUEL, T.M. ROBERTS, M.W. WORSTELL, Columbia University — The Collisionless Terella Experiment (CTX) is a mechanically supported dipole confinement experiment aimed to understand the physics of strong interchange transport and flow. We report new observations and analyses using a unique polar imager diagnostic, a 96 point array of gridded energy analyzers spanning the entire plasma which measures flux-tube particle number. Inverting the flux-tube integrated continuity equation allows us to solve for the electrostatic potential of the plasma, which serves as the stream function for plasma flux-tube motion. Observed plasma dynamics in the high density regime are consistent with predicted two-dimensional turbulence and resulting particle convection. Applying electrostatic perturbations we drive specific modes and modify the turbulent spectrum. Additionally we present plans to install a 31 probe array at the plasma edge to measure both local transport and potential boundary conditions. Local transport can be directly compared to those calculated globally while the boundary conditions will improve the continuity inversion.

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