

Abstract Submitted
for the DPP07 Meeting of
The American Physical Society

Strong, Nonaxisymmetric Flows Driven in a Dipole Confined Plasma¹ M.W. WORSTELL, B.A. GRIERSON, M.E. MAUEL, Columbia University — Previous studies using the Collisionless Terella Experiment (CTX) have shown plasma dynamics to be dominated by interchange mixing. We report the first results of a larger study to investigate the controlled excitation of particular interchange modes, the nonlinear coupling of these modes, and the effect of driven excitation on plasma convection and transport. In CTX, a large diameter electrostatic probe is inserted at various radii and excites strong, nonaxisymmetric flows by flux-tube charging and driving nonaxisymmetric cross-field currents. We have applied both positive (~ 10 V) and negative (~ -1000 V) biases. Negative bias has been applied to lower-density plasma, which are dominated by the Hot Electron Interchange (HEI) modes, and to the high density regime dominated by turbulent fluctuations. As an extension of a recently implemented simulation upgrade (see accompanying poster) results including a bias probe will be displayed. We also describe plans for our next step investigations when multiple bias probes will be driven by frequency and phase controlled power supplies to excited resonant, rotating interchange modes.

¹This work is supported by U.S. DOE Grant DE-FG02-00ER54585.

Matthew Worstell
Columbia University

Date submitted: 22 Jul 2007

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