Abstract Submitted
for the DPP09 Meeting of
The American Physical Society

Stability Analysis of Low Frequency Electrostatic Modes in a Large Scale Helicon Plasma in the Presence of Sheared Flows[1] M. GILMORE, S. XIE, L. YAN, C. WATTS, A.G. LYNN, University of New Mexico, D.E. NEWMAN, D. SAMMADAR, University of Alaska - Fairbanks — Experiments in the linear HelCat device, which investigate the nonlinear dynamics of edge fluctuations in the presence of varying flows affected by plasma biasing, show increasingly chaotic behavior as the bias is increased. These experiments have been conducted in a weakly turbulent regime near marginal stability. It is found that as bias is increased, flow shear penetrates into the plasma core from the edge, drift waves (DW's) suppress, and Kelvin-Helmholtz (KH) modes are excited. It is postulated that a 3-dynamical variables-type interaction between the DW, KH and the *local* flow leads to chaotic behavior. Building on a linear theory by Light, *et al* [Phys Plasmas **8**(10), 4675, 2001], a resonant interaction between the mode and the local flow, where mode conversion can occur, is investigated. We report on the linear stability, as well as progress on modelling the plasma with a 2D nonlinear fluid code.

[1]Work supported by the U.S. D.o.E. Grant no. DE-FG02-04ER54791.

Mark Gilmore
University of New Mexico

Date submitted: 17 Jul 2009 Electronic form version 1.4