Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Recent Experimental and Numerical Results on Turbulence, Flows and Global Stability Under Biasing in a Magnetized Linear Plasma[1]

M. GILMORE, T.R. DESJARDINS, D.M. FISHER, University of New Mexico —

Ongoing experiments and numerical modeling on the effects of flow shear on electrostatic turbulence in the presence of electrode biasing are being conducted in helicon plasmas in the linear HelCat (Helicon-Cathode) device. It is found that changes in flow shear, affected by electrode biasing through Er x Bz rotation, can strongly affect fluctuation dynamics, including fully suppressing the fluctuations or inducing chaos. The fundamental underlying instability, at least in the case of low magnetic field, is identified as a hybrid resistive drift-Kelvin-Helmholtz mode. At higher magnetic fields, multiple modes (resistive drift, rotation-driven interchange and/or Kelvin-Helmholtz) are present, and interact nonlinearly. At high positive electrode bias (V >10Te), a large amplitude, global instability, identified as the potential relaxation instability is observed. Numerical modeling is also being conducted, using a 3 fluid global Braginskii solver for no or moderate bias cases, and a 1D PIC code for high bias cases. Recent experimental and numerical results will be presented.

[1]Supported by U.S. National Science Foundation Award 1500423

Mark Gilmore
University of New Mexico

Date submitted: 15 Jul 2016 Electronic form version 1.4