Abstract Submitted
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Overview of Recent Results on Turbulence and Flows Under Biasing in a Magnetized Linear Plasma[1] M. GILMORE, T.R. DESJARDINS, University of New Mexico, D. FISHER, Dartmouth College, J.M. REYHOLDS BARREDO, Universidad Carlos III de Madrid — Ongoing experiments 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. Parameters such as B-field, gas fill pressure, and RF source power also strongly affect fluctuation dynamics. In some cases, multiple modes (resistive drift, rotation-driven interchange and/or Kelvin-Helmholtz) are present, and interact nonlinearly. It is found that neutral particle profiles are hollow, and that neutrals may exert significant Fr x Bz torque on the plasma column through collisions. At high positive electrode bias, a large amplitude, global instability, identified as the potential relaxation instability is observed. Here, an overview of recent experimental results, as well as linear stability analysis using an eigenmode solver, are presented. Additionally, preliminary results from global nonlinear three fluid (electron, ion, neutral) results are discussed.

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Mark Gilmore
University of New Mexico

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