Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

Dynamics of Turbulence Suppression in a Helicon Plasma TIFFANY HAYES, MARK GILMORE, University of New Mexico — Experiments are currently being conducted in the the Helicon-Cathode Device (HelCat) at the University of New Mexico. The goal is to the study in detail the transition from a turbulent to a non-turbulent state in the presence of flow shear. HelCat has intrinsic fluctuations that have been identified as drift-waves. Using simple electrode biasing, it has been found that these fluctuations can be completely suppressed. In some extreme cases, a different instability, possibly the Kelvin-Helmholtz instability, can be excited. Detailed studies are underway in order to understand the characteristics of each mode, and to elucidate the underlying physics that cause the change between an unstable plasma, and an instability-free plasma. Dynamics being observed include changes in flow profiles, both azimuthal and parallel, as well as changes in potential and temperature gradients. Further understanding is being sought using several computer codes developed at EPFL: a linear stability solver (LSS,[1] a one-dimensional PIC code/sheath solver, ODISEE,[2] and a global, 3D Braginski code, GBS.[3] A basic overview of results will be presented.

[1]P. Ricci and B.N. Rogers (2009). Phys Plasmas 16, 062303.
[2]J. Loizu, P. Ricci, and C. Theiler (2011). Phys Rev E 83, 016406
[3]Ricci, Rogers (2009)

Tiffany Hayes
University of New Mexico

Date submitted: 19 Jul 2012 Electronic form version 1.4