Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Flow Optimization in the Princeton MRI Experiment and Zonal Flow Generation in HTX KYLE CASPARY, Princeton Plasma Physics Laboratory, MICHAEL BURIN, California State University San Marcos, ERIK GILSON, Princeton Plasma Physics Laboratory, JEREMY GOODMAN, Princeton University, HANTAO JI, Princeton Plasma Physics Lab, Princeton University, MICHAEL MCNULTY, Rutgers University, ETHAN SCHARTMAN, Nova Photonics, Inc., PETER SLOBODA, Princeton Plasma Physics Laboratory, XING WEI, Princeton University — The Princeton Magneto-Rotational Instability (MRI) experiment and the Hydrodynamic Turbulence Experiment (HTX) are a pair of modified Taylor-Couette devices which explore rotating magnetohydrodynamic and hydrodynamic flows. The Princeton MRI experiment uses a GaInSn working fluid and was designed to study the MRI, which is believed to be the mechanism responsible for the rapid accretion rate observed in some magnetized accretion disks. The experiment utilizes ultrasound Doppler velocimetry to measure velocity profiles and a newly installed suite of hall sensors on the inner and outer cylinders to characterize the magnetic field. Results are presented from experiments which seek to optimize the flow by varying the inner ring speed for a given magnetic field strength. In HTX, we explore the generation of zonal flows from turbulence by flow jets with water as the working fluid. Laser Doppler velocimetry is used to measure the mean and fluctuating velocity. The generation of anisotropic mean flow by means of beta plane turbulence is investigated through the use of a sloped end-cap. The impact of varying the end cap slope, fluid height and jet flow rate will be discussed.

Kyle Caspary
PPPL

Date submitted: 24 Jul 2015 Electronic form version 1.4