Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Exploring the effect of conducting endcaps on the Princeton MRI Experiment KYLE CASPARY, ERIK GILSON, Princeton Plasma Physics Lab, JEREMY GOODMAN, Princeton University, HANTAO JI, Princeton Plasma Physics Lab, Princeton University, PETER SLOBODA, Princeton Plasma Physics Lab — The magnetorotational instability (MRI) is believed to be the primary mechanism which generates the turbulence required to explain the rapid accretion rates observed in some magnetized accretion disks. The Princeton MRI experiment is a modified Taylor-Couette device which uses GaInSn eutectic as a working fluid to study rotating MHD Flows. Diagnostics include Ultrasound Doppler Velocimetry (UDV) for flow profile measurements and an array of magnetic Hall sensors located on the inner and outer cylinders. Results are presented from experiments with conducting endcaps which were installed in order to increase the saturation amplitude of the MRI signal and the angular momentum coupling to the fluid*. The effect of conducting endcaps on Shercliff layer instabilities** is examined with a comparison to previous results with insulating endcaps. With sufficient velocity shear and magnetic field strength, the fluid exerts a torque on the conducting endcaps due to a coupling via the magnetic field. The onset criterion of this torque is currently under investigation. Motivated by results from the spectral/finite-element code SFEMaNS, the inner ring speed was varied in order to minimize the contribution to the radial magnetic field measurements from non-MRI sources such as Ekman flows. * Wei et al. submitted to PRE (2016) ** Roach et al. PRL 2012

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Date submitted: 15 Jul 2016

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