Abstract Submitted
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Recent Results from the Princeton MRI Experiment[1] ETHAN SCHARTMAN, Nova Photonics, Inc, HANTAO JI, AUSTIN ROACH, ERIC EDLUND, ERIK P. GILSON, Princeton Plasma Physics Laboratory, TOM ZICK, University of California, San Diego, PETER SLOBODA, Princeton Plasma Physics Laboratory, JEREMY GOODMAN, Princeton University, FRANK JENKO, ANGELO LIMONE, Max-Planck-Institut für Plasmaphysik — Turbulent angular momentum transport is required to explain observationally inferred accretion rates in many astrophysical disks. The turbulent mechanism is believed to be the MagnetoRotational Instability (MRI) which uses weak magnetic fields to destabilize rotating shear flows of conductive fluids in which the angular velocity decreases with radius. The Princeton MRI Experiment is a modified Taylor-Couette device which uses GaInSn to study rotating MHD flows. A campaign to detect the MRI is underway. The MRI is expected to alter the mean azimuthal velocity by only a few percent, and will compete with alteration of the boundary layers due to the magnetic field. Thus making unambiguous detection of the MRI challenging. Scaling studies in Reynolds and Elsasser numbers were conducted below the stability threshold for the MRI to characterize the influence of the boundaries. Simulations indicate that the radial components of velocity and magnetic field may provide more robust signatures of the MRI. The ultrasonic velocimetry diagnostic has been modified to be more sensitive to radial velocity and a new internal magnetic probe was added. Results from the scaling studies and new diagnostics will be presented. Effects of oxide loading of the flow dynamics will also be discussed.

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