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Princeton MagnetoRotational Instability (MRI) Experiment: Recent Progress in the Search for the MRI E. SCHARTMAN, H. JI, M. BURIN, R. CUTLER, P. HEITZENROEDER, W. LIU, X. MA, S. RAFTOPOULOS, PPPL, J. WAKSMAN, Columbia U., J. GOODMAN, J. STONE, Princeton U., A. KAGEYAMA, Earth Simulator Center, Japan — The Princeton MRI Experiment investigates the MRI in a magnetized cylindrical liquid Gallium Couette flow with inner and outer radii of 7cm and 21cm, and height 28cm. At Reynolds Number of 10^7 we expect to destabilize several modes of the MRI in the presence of a 0.5T axial magnetic field. Ekman effects are reduced via a pair of differentially rotating rings at the end caps. After flow characterization with water, the apparatus was filled with Gallium to search for signatures of the MRI: an amplified radial magnetic field, and enhanced turbulent viscosity coupling the cylinders. Initial diagnostics measure torque and external radial B fields. In the future internal magnetic field and flow diagnostics will be added. Our main objectives are to (1) clearly demonstrate MRI; (2) study its nonlinear behavior and angular momentum transport; (3) compare with simulations similar to those used in astrophysical disks. This work is supported by the US DOE, NSF, and NASA.

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