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Recent results from the Princeton MRI and HTX experiments¹ ERIC EDLUND, E.J. SPENCE, A.H. ROACH, C. GISSINGER, P. SLOBODA, H. JI, Princeton Plasma Physics Laboratory — The Princeton MRI experiment is a modified Taylor-Couette device with a GaInSn working fluid used to study rotating MHD flows. Diagnostics include magnetic pickup coils and ultrasound Doppler velocimetry (UDV). The experiment was designed to study the magnetorotational instability (MRI), which is believed to generate the turbulence that would be required in many accretion disks to explain observed accretion rates. We present results related to the search for the MRI, including a summary of results from 3-D nonlinear MHD simulations describing the bifurcation of the MRI mode from residual Ekman flow, with a comparison to experimental measurements at MRI-relevant speeds. We also present experiments from the Hydrodynamic Turbulence Experiment (HTX), a similar Taylor-Couette device, which explore the stability of purely hydrodynamic flows. The lifetimes of turbulent states generated by external forcing are measured as a function of the dimensionless rotational shear. Differences in forcing which either preserve or break vertical symmetry will be discussed in relation to the MRI and other possible mechanisms of angular momentum transport.

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