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**An Axisymmetric Hydromagnetic Instability in Spherical-Couette Flow** MATTHEW ADAMS, DANIEL ZIMMERMAN, University of Maryland, College Park, SANTIAGO TRIANA, Instituut voor Sterrenkunde, KU Leuven, DANIEL LATHROP, University of Maryland, College Park — We present experimental studies of the magnetized turbulent shear flow of a conducting fluid in a spherical-Couette device. Our experimental apparatus consists of an outer spherical shell concentric with an inner sphere. The geometry of the experiment makes these studies geophysically and astrophysically relevant. Liquid sodium fills the gap between the inner sphere and the shell, and we apply an axial magnetic field of varying strength. Instrumentation includes an array of hall probes to measure the induced magnetic field, providing information about the global fluid flow. We also measure the torque required to drive the inner and outer spheres at their respective rotation rates. For the case of corotating spheres with a rotation rate ratio of inner to outer frequency of 8, at high field an axisymmetric instability appears. This instability is anti-correlated with large fluctuations in the torque required to drive the inner sphere, indicating a significant effect on angular momentum transport. We investigate the dependence of the onset of the instability on the rotation rate ratio (or Rossby number), magnetic Reynolds number (characterizing the overall speed of the system), and Lundquist number (characterizing the strength of the applied magnetic field).

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