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Instabilities in Turbulent Magnetized Spherical Couette Flow MATTHEW M. ADAMS, DANIEL S. ZIMMERMAN, University of Maryland, College Park, SANTIAGO TRIANA, None, DANIEL P. LATHROP, University of Maryland, College Park — We present experimental studies of the turbulent shear flow of a conducting fluid in a spherical-Couette device in the presence of a magnetic field. Our experimental apparatus consists of an outer spherical shell concentric with an inner sphere, which both rotate independently. The geometry of the experiment makes these studies applicable to geophysical and astrophysical bodies. Liquid sodium fills the gap between the inner sphere and the shell. We apply an axial magnetic field of varying strength to study the influence of the applied field on the dynamics of the flow. 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, and take direct fluid pressure measurements. We use these to study instabilities that appear as the applied field is increased, for the case of a stationary outer sphere, and for both spheres rotating independently, and compare with theory and numerical predictions.

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