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Turbulent Magnetized Spherical Couette Flow MATTHEW ADAMS, DANIEL ZIMMERMAN, SANTIAGO TRIANA, DANIEL LATHROP, University of Maryland, College Park — We present experimental studies of the turbulent flow of a conducting fluid in a spherical shear flow in the presence of a magnetic field. Our experimental apparatus consists of an outer spherical shell concentric with an inner sphere, each of which can be rotated independently. The geometry of the experiment makes these studies applicable to geophysical and astrophysical bodies. Liquid sodium serves as the working fluid, filling the gap between the inner sphere and the shell. By applying an axial magnetic field of varying strength, the influence of the applied field on the fluid flow can be studied. Measurements of the magnetic field around the device are used to extract 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 a variety of inner and outer sphere rotation rates, we observe enhanced angular momentum transport as the applied field strength is increased, and we compare this with the observed magnetic field pattern and expected magnetorotational instabilities.

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