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Enhanced Angular Momentum Transport in Magnetized Spherical Couette Flow MATTHEW ADAMS, 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 uses sodium as the working fluid, and both the inner and outer spheres can be rotated independently. An axial magnetic field of varying strength can be applied to the experiment, and magnetic field measurements are used to extract information about the global flow within the device. In addition, we measure the torque required to drive the inner and outer spheres at their respective rotation rates. The geometry of the experiment makes these studies applicable to geophysical and astrophysical bodies. With the inner sphere rotating faster than the outer sphere, we observe enhanced angular momentum transport from the inner to the outer sphere as the applied magnetic field is increased. In a previous experiment of the same geometry, enhanced angular momentum transport was observed with a stationary outer sphere [1]. In this case the source of enhanced transport was identified as the magnetorotational instability. Results for the case of rotating outer sphere also indicate the possible presence of the magnetorotational instability with independently rotating spheres.

[1] Sisan, *et. al.*, *PRL*, 2004.

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