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Experimental studies of MHD flow in a rapidly rotating system DOUGLAS H. KELLEY[1], DANIEL S. ZIMMERMAN[2], SANTIAGO ANDRES TRIANA[3], DANIEL P. LATHROP[4], University of Maryland — We present experimental studies of fluid flow in a spherical vessel with either shear- or propeller-driven flows. Our work is motivated by the numerical results of Dudley and James (1989), who found dynamo action in flows of this geometry (so-called S_1T_1 flow). Using liquid sodium as a test fluid, we apply an external magnetic field (up to 400 G) and image the induced field with an array of Hall probes near the surface of the vessel. A rich variety of dynamics occur at various rotation rates, including oscillatory behaviors, likely to be indicative of inertial waves in shear-driven flow or magnetocoriolis (MC) waves in propeller-driven flow. The detailed characteristics and dynamics of these waves, as well as their interaction with a turbulent ($\mathrm{Re} \sim 10^7$) background flow, are the subject of ongoing research. Our work has implications for dynamo action, thought to produce the magnetic fields of stars, accretion disks, and planets, including Earth.

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