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Overview of the Madison Dynamo Experiment R.D. KENDRICK, E.J. SPENCE, M.D. NORNBERG, C.M. JACOBSON, C.A. PARADA, C.B. FOREST, University of Wisconsin-Madison — A spherical dynamo experiment has been constructed at the University of Wisconsin-Madison's liquid-sodium facility. The experiment is designed to self-generate magnetic fields from flows of conducting metal. The apparatus consists of a 1 m diameter, spherical stainless steel vessel filled with liquid sodium. Two 100 Hp motors drive impellers which generate the flow. The motors have been operated up to 1300 RPM (70% of design specification), achieving a magnetic Reynolds number of 130, based on impeller tip speed. Various polarizations of external magnetic fields have been applied to the sodium, and the induced magnetic field has been measured by both internal and external Hall probe arrays. The voltage induced across the sphere by the turbulent flow has been measured. Techniques for using ultrasound Doppler velocimetry have been explored in the water model of the experiment, including the use of high-pressure bubbles as seed particles.

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