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Initial Results of the Madison Dynamo Experiment ERIK SPENCE, CARY FOREST, CRAIG JACOBSON, ROCH KENDRICK, MARK NORBERG, ROB O'CONNELL, University of Wisconsin-Madison, MADISON DYNAMO EXPERIMENT TEAM — The Madison Dynamo Experiment is a 1 m diameter spherical vessel filled with flowing liquid sodium used to study magnetic field generation and magnetohydrodynamic (MHD) turbulence. External magnetic fields are used to probe the electromagnetic properties of flowing liquid sodium. A square-wave external magnetic field is applied to the sphere and the response magnetic field, generated by the fluid, is measured by an array of external Hall probes. The fluid's response field is used to invert the velocity field of the fluid, using the multiple frequencies of the applied field contained within the square wave. The inverted velocity field is compared to the velocity field directly measured in a scale water model of the experiment. Characteristics of the MHD turbulence are presented, and the role of turbulence in the fluid's response field is discussed.

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