

Abstract Submitted
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Ultrasonic Doppler Velocimetry Measurements on the Madison Dynamo Experiment C.M. JACOBSON, C.B. FOREST, R.D. KENDRICK, M.D. NORBERG, C.A. PARADA, E.J. SPENCE, University of Wisconsin-Madison — The Madison Dynamo Experiment is used to study the generation of magnetic fields in a homogeneous fluid. Flows of liquid sodium in the one-meter-diameter spherical vessel are generated by two counter-rotating impellers. Both the shape and magnitude of the velocity field must be well-understood to predict whether the magnetic field will grow or decay. Ultrasonic Doppler Velocimetry (UDV) is used to measure components of the velocity field in a dimensionally-identical water version of the experiment. Several ultrasonic transducers are used to simultaneously measure the flow along several chords of the vessel. Both neutral density polystyrene beads and air bubbles are used to reflect the ultrasonic pulses. UDV measurements, supplemented by two-component Laser Doppler Velocimetry measurements, are used in a fitting routine to model the flow in terms of spherical harmonics.

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