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Implementation of a Hall Probe Array to Characterize Magnetic Fields in the Madison Dynamo Experiment A.M. RASMUS, C.B. FOREST, E.J. KAPLAN, R.D. KENDRICK, N.Z. TAYLOR, UW Madison — This poster will provide an overview of improvements to the Hall probe array diagnostic on the Madison Dynamo Experiment. Two counter-rotating impellers driven by two 75kW motors are used to create a turbulent flow of liquid sodium in a one meter-diameter sphere. One of the goals of the experiment is to observe a dynamo; the spontaneous generation of magnetic fields by converting kinetic energy into magnetic energy. Previously, an intermittently self-excited magnetic field and a turbulent electromotive force were observed, but no sustained self-excited field was seen. A number of improvements to the experiment are being implemented and are predicted to allow sustained self-excited magnetic fields. In order to characterize the induced magnetic field, a new Hall probe array is being installed. The array consists of 6 radial probes as well as an equatorial array, which will allow for measurements of the magnetic field near the center of the vessel. These internal hall elements will be spaced 2 cm apart and measure the magnetic field in all three directions. Combined with 74 external probes, these diagnostics will allow us to decompose our magnetic field into spherical harmonics for further data analysis.

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