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Magnetic Diagnostics and Field Structure in the Madison Dynamo Experiment A.M. RASMUS, M. CLARK, E.J. KAPLAN, R.D. KENDRICK, M.D. NORNBERG, K. RAHBARNIA, N.Z. TAYLOR, C.B. FOREST, UW-Madison — The Madison Dynamo Experiment(MDE) is expected to spontaneously self-generate a magnetic field in a two vortex flow geometry driven by counter rotating impellers in a $1m$ diameter sphere filled with liquid sodium. This poster will focus on the spatial structure of the magnetic field associated with the dynamo eigenmodes and the turbulent fluctuations. A new internal array of Hall probes will increase the number of probe locations from 60 to 100 (in addition to 74 existing surface probes), including 40 spanning the center of the experiment. Three orthogonal measurements of the magnetic field are taken at each internal location, whereas previous internal probes took one directional data (2 directional after probe rotation on a different run). This will allow resolution of harmonic modes up to a poloidal order of $\ell = 7$ and a toroidal order of $m = 5$. Cross correlation analysis between the surface probes and internal probes will be used to determine the internal structure associated with each ℓ and m. This work is supported by the NSF/DOE partnership in plasma physics.

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