Abstract Submitted
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Magnetic Field Structure in the Madison Dynamo Experiment A.M. RASMUS, M. CLARK, E.J. KAPLAN, 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. Prevoiusly an equatorial baffle was installed and has been demonstrated to reduce the largest scale turbulent-eddies. An additonal set of six rotatable baffles have been installed to optimize the helicity of the flow, lowering the critical magnetic Reynolds number. This poster will focus on the spatial structure of the magnetic field associated with the dynamo eigenmodes and the turbulent fluctuations. Singular value decomposition(SVD) and cross correlation analysis between the surface harmonics and internal probes will be used to determine the internal structure associated with each spherical harmonic. Spherical harmonic decomposition is of limited utility when analysing the equatorial array of internal probes as there is a limited angular spread (only one theta value and two phi values), whereas cross correlation and SVD allow the use of time domain data to infer internal modes excited via three-wave couplings. This work is supported by the NSF/DOE partnership in plasma physics.

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