Abstract Submitted for the DPP14 Meeting of The American Physical Society

Soft-iron impellers in the Madison Sodium Dynamo Experiment<sup>1</sup> MARK NORNBERG, M.M. CLARK, C.B. FOREST, Univ of Wisconsin, Madison, N. PLIHON, ENS-Lyon — In an attempt to increase the magnetic flux amplification of the two-vortex flow in the Madison Sodium Dynamo Experiment, the stainless steel impellers were replaced with soft-iron disks similar in design to the VKS dynamo experiment. Past attempts at creating a homogeneous dynamo in the Madison Sodium Dynamo Experiment relied on stainless steel impellers to drive a two-vortex flow predicted to be unstable to dynamo excitation. The resulting induction process was much weaker than laminar predictions due to the turbulent enhancement of the resistivity. The measured amplification and pulse-decay times with the soft-iron disks show an improvement in the flux amplification, but not sufficient for self-excitation. Despite the similarities in the impeller design with the VKS experiment, the differences in geometry still play a significant role in determining the threshold conditions for dynamo action.

<sup>1</sup>This work is supported by the DOE, NSF, the Center for Magnetic Self-Organization, and a CNRS travel grant.

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Date submitted: 10 Jul 2014

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