

Abstract Submitted
for the DPP07 Meeting of
The American Physical Society

Computational Fluid Dynamics (CFD) simulation of the Madison Dynamo Experiment. N.S. HAEHN, C.B. FOREST, C.R. WEBER, R.D. KENDRICK, N.Z. TAYLOR, J.G. OAKLEY, R. BONAZZA, University of Wisconsin - Madison, ERIK SPENCE, ETH-Zurich — The Madison Dynamo Experiment is designed to study a self-generated magnetic field called a dynamo. The flow characteristics of a water experiment that is dimensionally similar to the liquid sodium experiment has been modeled using the Computational Fluid Dynamics (CFD) software *Fluent*. Results from the CFD simulations are used to confirm flow characteristics measured experimentally by both Laser Doppler Velocimetry (LDV) and Particle Imaging Velocimetry (PIV). Simulations can also give insight into the flow characteristics in regions of the experiment which are not accessible via the LDV and PIV systems. The results from the simulations are also used as input for a MHD code to predict the threshold for Dynamo onset. The CFD simulations – in conjunction with the MHD dynamo prediction code – can be used to design modifications to the experiment to minimize costly changes. The CFD code has shown that the addition of an equatorial baffle along with several poloidal baffles can lower the threshold for Dynamo onset.

Nicholas Haehn
University of Wisconsin - Madison

Date submitted: 23 Jul 2007

Electronic form version 1.4