

Abstract Submitted  
for the DPP06 Meeting of  
The American Physical Society

**NIMROD Simulations of Reconnection in MRX and SSX**

NICHOLAS MURPHY, CARL SOVINEC, University of Wisconsin-Madison — Two-fluid effects are known to influence magnetic reconnection rates through non-MHD communication between the current sheet and the surrounding magnetic field topology [1]. To examine the interrelationship between the physics of the reconnection layer and the global magnetic field topology, we perform simulations of the Magnetic Reconnection Experiment (MRX) and the Swarthmore Spheromak Experiment (SSX) using the NIMROD extended MHD code. Two-fluid simulations clearly show the development of the out-of-plane quadrupole field signature associated with whistler-mediated reconnection with features similar to experiment. We discuss the tilting of the current sheet that occurs when an imposed guide field is present. For SSX, we show simulations of spheromak formation and merging. Comparisons with experimental line-of-sight velocity measurements are made. For both experiments, we discuss the contributions the geometry of the problem makes on the reconnection process. In order to investigate the impact of communication with the global field on the reconnection process, we compare simulations of these experiments to simulations of reconnection in a simplified domain.

[1] D. Biskamp, E. Schwarz, and J.F. Drake, *Phys. Plasmas* 4, 1002 (1997).

Nicholas Murphy  
University of Wisconsin

Date submitted: 17 Jul 2006

Electronic form version 1.4