Abstract Submitted
for the APR09 Meeting of
The American Physical Society

Application of Scalable Solver Techniques to Magnetized Plasma Problems in 2D and 3D[1] A.H. GLASSER, V.S. LUKIN, University of Washington — New techniques have recently been developed for scalable parallel implicit solvers for extended MHD spectral element codes, using physics-based preconditioning to parabolize and reduce the order of the matrices to be solved, and either FETI-DP or Static Condensation to solve the resulting reduced matrices. During this development, these techniques have been found to be perfectly weakly scalable up to 64 processors on a simple ideal MHD wave propagation problem in a periodic plane. This presentation will describe the application of these techniques to more interesting and realistic problems of magnetized plasmas, including magnetic reconnection in 2D and the spheromak tilt mode in 3D. Comparisons will be given with previous solution methods.

[1]This work was performed under DOE contract DE-FC 02-05ER54811.

A.H. Glasser
University of Washington

Date submitted: 13 Jan 2009 Electronic form version 1.4