Abstract Submitted
for the DPP08 Meeting of
The American Physical Society

Nonlinear Simulation of Plasma Response to the NSTX Error Field J.A. BRESLAU, J.K. PARK, A.H. BOOZER, W. PARK, PPPL — In order to better understand the effects of the time-varying error field[1] in NSTX on rotation braking, which impedes RWM stabilization, we model the plasma response to an applied low-n external field perturbation using the resistive MHD model in the M3D code.[2] As an initial benchmark, we apply an m=2, n=1 perturbation to the flux at the boundary of a non-rotating model equilibrium and compare the resulting steady-state island sizes with those predicted by the ideal linear code IPEC.[3] For sufficiently small perturbations, the codes agree; for larger perturbations, the nonlinear correction yields an upper limit on the island width beyond which stochasticity sets in. We also present results of scaling studies showing the effects of finite resistivity on island size in NSTX, and of time-dependent studies of the interaction between these islands and plasma rotation. The M3D-C1 code[4] is also being evaluated as a tool for this analysis; first results will be shown.

[1]J.E. Menard, *et al.*, *Nucl. Fus.* **47**, S645 (2007).
[2]W. Park, *et al.*, *Phys. Plasmas* **6**, 1796 (1999).
[3]J.K. Park, et al., *Phys. Plasmas* **14**, 052110 (2007).
[4]S.C. Jardin, *et al.*, *J. Comp. Phys.* **226**, 2146 (2007).

Joshua Breslau
Princeton Plasma Physics Laboratory

Date submitted: 20 Jul 2008 Electronic form version 1.4