Abstract Submitted
for the DPP10 Meeting of
The American Physical Society

Error-Field and Resistive Wall Coupling in NIMROD[1] A.L. MONTGOMERY, C.C. HEGNA, C.R. SOVINEC, A.J. COLE, University of Wisconsin, Madison, S.E. KRUGER, Tech-X Corp. — Boundary conditions for a periodic cylinder that allow for the simultaneous presence of a resistive wall and external error fields have been successfully implemented in NIMROD. Small magnetic field errors stemming from coil feeds and misalignment are present in all devices. These errors are modeled as small helical currents at some radius outside the resistive wall, which contribute terms to the NIMROD boundary condition at the wall. Using these new NIMROD capabilities, error-field penetration is studied for intrinsically stable rotating plasmas. An axial equilibrium flow is included in the simulation in order to observe suppression of error-field driven modes by rotation. Error-fields of a critical amplitude penetrate the plasma and create stationary magnetic islands. These numerical results are compared to the analytic predictions of Fitzpatrick [Nucl. Fusion **33**, 1049 (1993)] for periodic cylinder geometry and visco-resistive plasmas. Further generalization of the resistive wall and error-field boundary conditions in NIMROD to toroidal geometry will be discussed.

[1]Research supported by U. S. DoE under grant no. DE-FG02-86ER53218.

Andrea Montgomery
University of Wisconsin, Madison

Date submitted: 14 Jul 2010 Electronic form version 1.4