Abstract Submitted
for the DPP10 Meeting of
The American Physical Society

First results of coupled IPS/NIMROD/GENRAY simulations THOMAS JENKINS, S.E. KRUGER, Tech-X, E.D. HELD, Utah State, R.W. HARVEY, CompX, W.R. ELWASIF, ORNL, D.D. SCHNACK, UW-Madison, SWIM PROJECT TEAM — The Integrated Plasma Simulator (IPS) framework, developed by the SWIM Project Team, facilitates self-consistent simulations of complicated plasma behavior via the coupling of various codes modeling different spatial/temporal scales in the plasma. Here, we apply this capability to investigate the stabilization of tearing modes by ECCD. Under IPS control, the NIMROD code (MHD) evolves fluid equations to model bulk plasma behavior, while the GENRAY code (RF) calculates the self-consistent propagation and deposition of RF power in the resulting plasma profiles. GENRAY data is then used to construct moments of the quasilinear diffusion tensor (induced by the RF) which influence the dynamics of momentum/energy evolution in NIMROD's equations. We present initial results from these coupled simulations and demonstrate that they correctly capture the physics of magnetic island stabilization [Jenkins et al, PoP **17**, 012502 (2010)] in the low-beta limit. We also discuss the process of code verification in these simulations, demonstrating good agreement between NIMROD and GENRAY predictions for the flux-surface-averaged, RF-induced currents. An overview of ongoing model development (synthetic diagnostics/plasma control systems; neoclassical effects; etc.) is also presented. Funded by US DoE.

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Date submitted: 19 Jul 2010 Electronic form version 1.4