Abstract Submitted
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Modeling of the Plasma Response to Resonant Magnetic Perturbations with the NIMROD Code S.E. KRUGER, Tech-X Corporation, I. JOSEPH, Univ. of California-San Diego, E.D. HELD, Utah State University, D.D. SCHNACK, Univ. of Wisconsin-Madison, T.E. EVANS, General Atomics, R.A. MOYER, Univ. of California-San Diego — Resonant magnetic perturbations (RMPs) have successfully been used to control ELMs in the DIII-D tokamak[1] In these experiments, internal coils are used to tailor the mode amplitude spectrum at the separatrix with the goal of affecting transport at the edge. Intuitively, inducing islands at the separatrix would cause a stochastic edge and enhanced electron temperature transport; however, experimental evidence shows that both the ion and electron temperature gradients are relatively unchanged, while the density gradient is substantially reduced. Modeling of these experiments by initial-value extended magnetohydrodynamics codes is attractive because the essential features, magnetic reconnection, parallel and perpendicular transport, and ELM stability have all been independently studied. The challenge of modeling the experimental device lies in the extreme range of time scales with the ramp rate of I-coil currents being on the order of milliseconds and the Alfven time being sub-microseconds. Here we show results of modeling just the the field error penetration problem. We extend the numerical simulations of Fitzpatrick[2] to three-dimensional geometry, two-fluid physics, and anisotropic viscosity.

[1]R. A. Moyer, T. E. Evans, T. H. Osborne, et al., Phys. Plasmas **12** (2005) 056119
[2]Fitzpatrick, Physics of Plasmas, **10** (2003) 1782

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