Abstract Submitted
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Modeling of ITER ELM Dynamics A.H. KRITZ, A.Y. PANKIN, G. BATEMAN, Lehigh University, D.P. BRENNAN, University of Tulsa, P.B. SNYDER, General Atomics, S. KRUGER, Tech-X Corp., NIMROD TEAM — Stability analyses are carried out for a series of ITER equilibria that are generated with the TEQ and TOQ equilibrium codes. The H-mode pedestal pressure and parallel component of plasma current density are systematically varied to include the relevant parameter space for a specific ITER discharge. Ideal MHD stability codes, DCON, ELITE, and BALOO, are employed to determine whether or not each ITER equilibrium profile is unstable to peeling or ballooning modes in the pedestal region. Several equilibria, close to the marginal stability boundary for peeling and ballooning modes, are tested with the NIMROD non-ideal MHD code. It is found that the peeling-ballooning stability threshold is very sensitive to the resistivity and viscosity profiles, which vary dramatically over a wide range near the separatrix. Due to the effects of finite resistivity and viscosity, the peeling-ballooning stability threshold is shifted compared to the ideal threshold. NIMROD simulations are continued into the nonlinear stage for several ITER equilibria that are marginally unstable to peeling or ballooning modes. The differences in dynamics for ELMs triggered by ballooning instabilities and by peeling instabilities are described. Also, the formation of the H-mode pedestal, recovery of plasma profiles after ELM crashes, and effects of ELM crashes on the H- mode pedestal height and width are examined for ITER using the ASTRA code.

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