Abstract Submitted
for the DPP06 Meeting of
The American Physical Society

ECCD Power Required for NTM Stabilization L. LUO, J. WOODBY, E. SCHUSTER, G. BATEMAN, A.H. KRITZ, F.D. HALPERN, Lehigh University — High values of plasma β can cause ideally nested magnetic flux surfaces to tear and reconnect, leading to the formation of magnetic islands. The Neoclassical Tearing Mode (NTM) instability drives the islands to grow to their saturated widths, at which they can persist stably in the plasma. The bootstrap current density is nearly absent within each island because of the local flattening of the pressure profile. One common method of stabilizing NTMs and therefore shrinking the island widths involves replacing this lost current via Electron Cyclotron Current Drive (ECCD). The level of ECCD power required for the stabilization of the NTM is studied using the ISLAND module [1], implemented in the BALDUR code, for noncircular axisymmetric plasmas with multiple islands. In the absence of feedback stabilization, NTM driven islands are predicted to cover more than 25% of the plasma minor radius, which severely degrades plasma confinement and fusion power production in ITER simulations [2]. The current density within each island is governed by the current peaking factor, which is varied in simulated ITER tokamak discharges. The dependence of the stabilizing power level on the misalignment between the ECCD and the island, as well as on other uncertainties of the system, is part of the numerical study.
[1] C.N. Nguyen, *et al.*, Phys. Plasmas, **11**, 3460 (2004).
[2] F.D. Halpern, *et al.*, Phys. Plasmas, **13**, 062511 (2006).

A.H. Kritz

Date submitted: 20 Jul 2006 Electronic form version 1.4