Abstract Submitted for the 51st Annual Meeting
Division of Plasma Physics
November 2–6, 2009, Atlanta, Georgia

Modeling Steady-State DIII-D Plasmas for Tearing Stability Studies,* F. Turco, *ORAU*, T.C. Luce, *General Atomics*, D.P. Brennan, *U. Tulsa*, A.D. Turnbull, J.R. Ferron, C.C. Petty, P.A. Politzer, *General Atomics*, L.L LoDestro, L.D. Pearlstein, R.J. Jayakumar, T.A. Casper, C.T. Holcomb, *LLNL,* M. Murakami, *ORNL*— In DIII-D, steady-state high-β discharges are limited by a n=1 tearing mode, causing a radial redistribution of the current density not recoverable with the available non-inductive current drive sources. The use of electron cyclotron (EC) current with a broad deposition can prevent the mode onset. The current density profile from an experimental DIII-D equilibrium has been perturbed numerically, mimicking the injection of EC current. The tearing stability index Δ' is evaluated by the PEST3 code as a function of the perturbation amplitude, shape and radial position. The results are compared to the evolution of the experimental current density found previously to characterize discharges unstable to the n=1 tearing instability, and to a previous analytical study performed in cylindrical geometry for similar conditions.

*Work supported in part by the US DOE under DE-AC05-06OR23100, DE-FC02-04ER54698, DE-AC05-00OR22725, and DE-AC52-07NA27344.