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Modeling Steady-State DIII-D Plasmas for Tearing Stability Studies[1] 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 noninductive 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.

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