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Saturated Widths of Magnetic Islands in Tokamak Discharges F. HALPERN, G. BATEMAN, A.H. KRITZ, Lehigh University, Bethlehem, PA, A.Y. PANKIN, SAIC, San Diego, CA — The new ISLAND module described in reference [1] implements a quasi-linear model to compute the widths of multiple magnetic islands driven by saturated tearing modes in toroidal plasmas of arbitrary aspect ratio and cross sectional shape. The distortion of the island shape caused by the radial variation in the perturbation is computed in the new module. In transport simulations, the enhanced transport caused by the magnetic islands has the effect of flattening the pressure and current density profiles. This self consistent treatment of the magnetic islands alters the development of the plasma profiles. In addition, it is found that islands closer to the magnetic axis influence the evolution of islands further out in the plasma. In order to investigate such phenomena, the ISLAND module is used within the BALDUR predictive modeling code to compute the widths of multiple magnetic islands in tokamak discharges. The interaction between the islands and sawtooth crashes is examined in simulations of DIII-D and JET discharges. The module is used to compute saturated neoclassical tearing mode island widths for multiple modes in ITER. Preliminary results for island widths in ITER are consistent with those presented [2] by Hegna. [1] F.D. Halpern, G. Bateman, A.H. Kritz and A.Y. Pankin, "The ISLAND Module for Computing Magnetic Island Widths in Tokamaks," submitted to J. Plasma Physics (2005). [2] C.C. Hegna, 2002 Fusion Snowmass Meeting.

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