

Abstract Submitted
for the DPP14 Meeting of
The American Physical Society

Simulation and analytic analysis of radiation driven islands at the density limit D.P. BRENNAN, C. LIU, Princeton University, D.A. GATES, L. DELGADO-APARICIO, R. WHITE, Princeton Plasma Physics Laboratory — The effect of radiative cooling on the onset and evolution of magnetic islands is investigated with nonlinear resistive MHD simulations and reduced theoretical analysis. The configuration is a cylindrical tokamak with a $m/n=2/1$ island and includes three dimensional resistivity and anisotropic heat conduction in the simulations. The radiative cooling is implemented as a temperature perturbation inside the island, which modifies the island structure and drives the island more unstable. Analytic reduction of the saturated island size and structure supports the simulation results. The results offer intuitive understanding of experimental observations of radiation driven magnetic islands, which may explain density limit disruptions.

D.P. Brennan
Princeton University

Date submitted: 11 Jul 2014

Electronic form version 1.4