

Abstract Submitted
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Nonlinear Two Fluid and Kinetic ELM Simulations¹ H.R. STRAUSS, NYU, L. SUGIYAMA, MIT, C.S. CHANG, S. KU, B. HIENZSCH, NYU, J. BRESLAU, W. PARK, R. SAMTANEY, M. ADAMS, PPPL, S. JARDIN — Simulations of ELMs using dissipative MHD, two fluid MHD, and neoclassical kinetic physics models are being carried out using the M3D code [1]. Resistive MHD simulations of nonlinear edge pressure and current driven instabilities have been performed, initialized with realistic DIII-D equilibria. Simulations show the saturation of the modes and relaxation of equilibrium profiles. Linear simulations including two fluid effects show the stabilization of toroidal mode number $n = 10$ modes, when the Hall parameter H , the ratio of ion skin depth to major radius, exceeds a threshold. Nonlinear simulations are being done including gyroviscous stabilization. Kinetic effects are incorporated by coupling with the XGC code [2], which is able to simulate the edge plasma density and pressure pedestal buildup. These profiles are being used to initialize M3D simulations of an ELM crash and pedestal relaxation. The goal is to simulate an ELM cycle.

[1] Park, W., Belova, E.V., Fu, G.Y., Tang, X.Z., Strauss, H.R., Sugiyama, L.E., Phys. Plas. 6, 1796 (1999).

[2] Chang, C.S., Ku, S., and Weitzner, H., Phys. Plas. 11, 2649 (2004)

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