Abstract Submitted
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RWM Stabilization Physics in NSTX[1] A.C. SONTAG, S.A. SABBAGH, J.M. BIALEK, Columbia University, R.E. BELL, D.A. GATES, J.E. MENARD, PPPL, A.H. GLASSER, LANL, K.L. TRITZ, Johns Hopkins University — Leading theories of resistive wall mode (RWM) stabilization invoke energy dissipation related to the plasma rotation as key stabilization physics. Experiments focused on examining the parametric dependence of the minimum toroidal rotation required for passive stability (critical rotation profile) were performed to examine the dissipation physics allowing stabilization. Consistency between NSTX critical rotation data and stabilization models dependent on Alfven speed and ion collisionality is evaluated. Discharges with higher ion collisionality and similar Alfven speed profiles appear to have lower critical rotation profiles. Experimental results are inconsistent with models predicting instability when rotation is slowed to 1/2 of a steady-state value. The RWM appears to stabilize when faster rotating plasma modes (internal kink or tearing modes) exist. After unstable RWM growth has begun, the appearance of a faster rotating mode can stabilize the RWM before a rapid beta collapse. Discharges at marginal RWM stability and very low plasma rotation have exhibited RWM growth when a faster rotating mode is stabilized.

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