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RWM Critical Rotation Frequency and Beta Dependence in NSTX[1] AARON SONTAG, Columbia University, S.A. SABBAGH, J.M. BIALEK, W. ZHU, H. REIMERDES, A.M. GAROFALO, Columbia University, J.E. MENARD, D.A. GATES, R.E. BELL, M.G. BELL, B.P. LEBLANC, PPPL, D.J. BATTAGLIA, University of Wisconsin - Madison, AND THE NSTX TEAM — The resistive wall mode (RWM) can be stabilized by maintaining the plasma toroidal rotation frequency (ω_ϕ) above a critical rotation frequency (Ω_{crit}). Recent experiments on NSTX seek to determine Ω_{crit} and rotation profile effects through actively braking plasma rotation by the application of external magnetic fields. Results from these experiments indicate that maintaining ω_ϕ at the q = 2 surface above $\omega_A/4q^2$ is a necessary condition for RWM stability where ω_A is the local Alfven frequency. This result is in agreement with a theoretical model derived from a drift-kinetic energy principle. Similarity experiments with DIII-D are being performed to examine the aspect ratio dependence of the Ω_{crit} scaling. When ω_ϕ at the q = 2 surface drops below Ω_{crit}, the growth of internal kink/ballooning modes can prevent the RWM from terminating the discharge. A small beta collapse which drops Ω_{crit}, accompanies this mode growth allowing a recovery of RWM rotational stabilization while maintaining $\beta_N > \beta_N^{no-wall}$.

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