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Nonlinear Study of Error Field Effects in NSTX J.A. BRESLAU, J.K. PARK, A.H. BOOZER, W. PARK, J.E. MENARD, Princeton Plasma Physics Laboratory — RWM stabilization by plasma rotation in NSTX is impeded by the presence of a time-dependent non-axisymmetric component to the toroidal field [1]. Confinement is improved by active correction of this error field; its exact cause is still under investigation. A numerical study of the effects of the error field on magnetic island formation was conducted with ideal linear codes [2], providing estimates of the island widths based on the amplitudes of the singular current sheets that result from the perturbation. We extend these results by conducting nonlinear, non-ideal studies of these effects using the M3D code [3]. The nonlinear correction to the linear response to a pure $m=2$, $n=1$ perturbation is shown, followed by investigations of the effects of toroidal rotation and of mode locking and consequent rotation damping.

[1] J.E. Menard, et al., submitted to Nucl. Fus., 2007.

[2] J.K. Park, poster presented at Sherwood Fusion Theory Conference, Annapolis, MD, April 2007.

[3] W. Park, et al., Phys. Plasmas 6, 1796 (1999).

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