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.