



Effects of resonant magnetic perturbations on nonlinear resistive reduced MHD simulations

Juhyung Kim, S. S. Kim, Hogun Jhang

National Fusion Research Institute, Daejeon, Republic of Korea 34133

We investigate the nonlinear effects of externally applied resonant magnetic perturbations (RMPs), using resistive reduced MHD simulations. In the plasma pressure collapse simulations arising from linearly driven ballooning modes, the RMP mediated nonlinear interaction is shown to enhance the fluctuation level, leading to an increase of convective transport. Further, it also induces a broad coherence and strong energy transfer among poloidal and toroidal harmonics. The enhanced fluctuations, especially at a lower (than the most unstable mode) toroidal mode number n , eventually increase the tearing-parity fluctuation distinctively at lower n through a series of tearing-parity generation mechanism. Consequently, RMPs are shown to expedite the magnetic field line stochastization process via the nonlinear energy transfer process. The nonlinear enhancement of ballooning driven fluctuations by RMPs are further analyzed in a steady pressure profile.