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Finite pressure effects in the Reversed Field Pinch F. EBRAHIMI, D.D. SCHNACK, Center for Magnetic-Self Organization in Laboratory and Astrophysical Plasmas, University of Wisconsin — Recently, a record high plasma beta for the improved confinement MST Reversed Field Pinch (RFP) has been achieved [1]. At high beta in the improved confinement regime the linear stability and nonlinear saturation of local and global pressure-driven modes become important. Here we examine the behavior of resistive interchange instability in current-carrying cylindrical plasmas using the extended MHD code NIMROD (nimrodteam.org). We find that the growth rate of high-k localized interchange modes with $k\rho_i \approx 1$ are significantly reduced by finite Larmor radius (FLR) effect (in the form of ion gyroviscosity). However, nonlinear computations shows that the global low-k interchange modes with tearing parity play an important role in MHD relaxation process and modify the current profile through the dynamo term $< \tilde{V} \times \tilde{B} >_{\|}$. The structure and parity of the pressure-driven dynamo term is compared with the quasilinear analytical calculations. Nonlinear evolution of pressure-driven mode with a specific axial wave number k show a transition from global pressure driven m=1 mode to m=0 mode for different beta values. The comparison with the MST experimental observation of m=0 spikes during the improved confinement regimes will be discussed.
[1] M. D .Wyman et al Phys. Plasmas 15, 010701 (2008).

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