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Magnetic Fluctuations in MCX ILKER UZUN-KAYMAK, PARVEZ GUZDAR, University of Maryland, College Park, MCX TEAM — The Maryland Centrifugal Experiment (MCX) is a mirror machine in which axial confinement is provided by supersonic rotation and interchange stability by radial velocity shear. Nevertheless, residual fluctuations still persist. A comprehensive analysis of the magnetic fluctuations reveals that, under the imposed shear flow, only m=0 and m=2 modes survive; yet the observed frequency spectrum is broadband at the edge region. Clear evidence of nonlinear mode coupling is detected. Amplification of magnetic fluctuations leads to enhanced transport explained by the drop of the plasma density and the voltage. As the plasma pressure starts to build up, the plasma voltage increases, destabilizing the m=2 interchange mode. The cycle of enhanced transport and intermittent fluctuations repeats itself. We utilize a 2D MHD code to investigate the dynamics of the primary interchange instability and assess the level of transport. The simulations in case of parabolic shear flow show clear evidence of nonlinear mode coupling, explaining broadband frequency spectrum for low mode numbers. A detailed comparison of our simulations with the experimental data is presented.

Ilker Uzun-Kaymak
University of Maryland, College Park

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