2D MHD simulations of fluctuations in MCX*

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Recently magnetic fluctuations in the Maryland Centrifugal eXperiment (MCX) plasma have been measured by an azimuthal array of sixteen coils in the edge region of the plasma. A detailed analysis of these fluctuations indicates that there is primarily a convection of the low azimuthal mode numbers (dominantly m=2) fluctuations by the rotating mirror plasma. However the frequency spectrum is broad and the width is comparable to the central frequency for these modes. Furthermore bicoherence studies indicate a dominant interaction between these modes and a low frequency m=0 mode. We utilize a 2D (radial and azimuthal) MHD code to investigate the dynamics of the primary interchange instability which can be unstable in rotating mirror geometry. For very low sheared rotation there is a broad spectrum (in m) of unstable modes. However, as the sheared rotation is increased the high mode numbers become stabilized and the spectrum is dominated by low mode numbers. We will present detailed comparisons of the spatio-temporal dynamics obtained from our simulations with the magnetic data from the sixteen probes as well as load voltage measurements.

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