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Low-dimensional model of fluctuations observed in MCX[1] I. UZUN-KAYMAK, IREAP, University of Maryland, College Park, MD, USA, P.N. GUZDAR, A.B. HASSAM, S.-H. CHOI, C. TEODORESCU, R.F. ELLIS, IREAP, University of Maryland, College Park, MD, USA — Magnetic fluctuations in the Maryland Centrifugal eXperiment (MCX) plasma recorded by an azimuthal array of sixteen coils in the edge region of the plasma have indicated that there is primarily convection of a low azimuthal mode number (dominantly m=2) fluctuation by the azimuthally rotating plasma. However the frequency spectrum of this mode is broad and is almost of the same order as the "rotation" frequency. Furthermore bicoherence studies indicate a dominant interaction between these modes and a low frequency m=0 mode. Earlier we utilized a 2D (radial and azimuthal) MHD code to investigate the dynamics of the primary interchange instability which can be unstable in a rotating mirror geometry. These studies showed that due to the sheared flow only low mode number interchange modes can be unstable. Here we present results from a Galerkin truncated model for a single unstable interchange mode coupled to zonal flow and quasilinear flattening of the pressure profile yields a system of seven ODEs. This low-dimensional model surprisingly captures many of the observed spatio-temporal features. The broadband frequency spectrum is attributed to the rotating plasma being in a "chaotic" state.

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