Abstract Submitted
for the DPP13 Meeting of
The American Physical Society

Diamagnetic Stabilization of Cylindrical $m = 2$ Double-Tearing Modes STEPHEN ABBOTT, KAI GERMASCHEWSKI, University of New Hampshire — Double Tearing Modes (DTMs) have been explored as possible sources of large scale instability in non-monotonic q profiles, as well as generators of strong sheared flows in the late nonlinear phase. The reversed-shear profiles which give rise to DTMs may also be accompanied by an Internal Transport Barrier (ITB). The ITB introduces pressure gradients that both couple the DTM to an ideal instability and (with appropriate physics) induce diamagnetic flows, similar to the ideally unstable $m = 1$ kink-tearing mode. Using the Hall-MHD code MRC-3D we show that the diamagnetic drifts along the current sheets caused by the equilibrium pressure gradient have a stabilizing effect on the reconnecting linear DTM but may not be sufficient to prevent onset of the 'explosive growth phase' if the mode is allowed to evolve into the nonlinear phase. MRC-3D is one of a suite of codes using the 'libmrc' computational framework. It supports nonuniform grids in curvilinear coordinates with implicit and massively parallel explicit time integration. Its extended MHD model includes the Hall and electron pressure tensor terms in Ohm's law.

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Date submitted: 12 Jul 2013 Electronic form version 1.4