Abstract Submitted
for the DPP10 Meeting of
The American Physical Society

Do boundary conditions affect the global behavior of magnetorotational instability?[1] BERTRAND LEFEBVRE, FATIMA EBRAHIMI, AMITAVA BHATTACHARJEE, ANDREW VANDENBERG, Center for Integrated Computation and Analysis of Reconnection and Turbulence, University of New Hampshire — Flow-driven magnetorotational instability (MRI) is believed to contribute to turbulence and momentum transport in astrophysical disks. We investigate the effect of boundary conditions in axisymmetric MRI computations using two configurations, namely a thick disk and a toroidal Cartesian geometry. Linear and nonlinear computations are performed using the extended MHD code NIMROD. First, we investigate the stability and saturation of MRI in an astrophysically relevant disk configuration. The effect of boundaries on MRI is studied for a hydrodynamically stable flow in which a large shear is localized far from the conducting wall boundaries. We find that the MRI mode structure is localized around the flow shear region and boundaries do not affect its stability. Second, we perform MHD computations with boundary conditions corresponding to the Madison Plasma Couette Flow Experiment (MPCX). As proof of principle we numerically obtain an experimentally relevant flow, a Taylor-Couette flow generated by a tangential $E \times B$ drift set at the boundaries. The MRI in this configuration will be discussed.

[1]Supported by NSF grant 0962244.

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Date submitted: 16 Jul 2010

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