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Non-reflecting boundary conditions for dissipative MHD[1] E.T. MEIER, A.H. GLASSER, University of Washington, V.S. LUKIN, Naval Research Laboratory, U. SHUMLAK, University of Washington, PSI-CENTER COLLABORATION — Non-reflecting boundary conditions (NRBCs) are frequently used to truncate computational domains without disruptive boundary effects. NRBC techniques are well established for hyperbolic problems, but not for mixed hyperbolic/parabolic equation systems like dissipative MHD. Practical MHD computation with C0-continuous spectral or finite element codes (the focus of this research) requires dissipation to ensure finite gradient length scales. For the Euler and ideal MHD equations, a hyperbolic-based NRBC has been implemented in SEL/HiFi. Simulation results and details of the implementation are presented. Progress toward an effective and stable NRBC for more complicated mixed hyperbolic/parabolic systems like disspative MHD and extended MHD is discussed. Derivations of well-posed NRBC for the Navier-Stokes equations (e.g. [1]) provide a basis for further development.

[1] J. Nordstrom and M. Svard, Well-posed boundary conditions for the Navier-Stokes equations, SIAM J. Numer. Anal., 43 (2005) 1231

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