

Abstract Submitted
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Constrained-transport Hall-MHD simulations using CWENO reconstruction with libMRC LIWEI LIN, KAI GERMASCHEWSKI, STEPHEN ABBOTT, KRIS MAYNARD, JIMMY RAEDER, University of New Hampshire — We present a new CWENO (Centrally-Weighted Essentially Non-Oscillatory) reconstruction based extended MHD (XMHD) solver that has been built for libMRC. libMRC is a library for creating efficient parallel PDE solvers on structured grids, which is used in the MRC (Magnetic Reconnection Code), OpenGGCM (Open Global Geospace Circulation Model) and PSC (Plasma Simulation Code) codes. The use of libMRC gives us access to its core functionality of providing an automated code generation framework which takes a user provided PDE right hand side in symbolic form to generate an efficient, computer-architecture specific, parallel code. libMRC also supports block-structured adaptive mesh refinement, and implicit-time stepping through integration with the PETSc library. We demonstrate validation of the new CWENO MHD solver against existing solvers both in standard test problems as well as in 3D global magnetosphere simulations.

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