

Abstract Submitted
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An explicit Hall MHD algorithm using the discontinuous Galerkin method JOHN LOVERICH, Tech-X Corporation — The discontinuous Galerkin method is a numerical wave propagation scheme that can achieve arbitrarily higher order accuracy. The method has received considerable attention from the numerical fluid dynamics community recently. In this paper an explicit discontinuous Galerkin Hall MHD algorithm is presented. The algorithm works in the high beta regime and can be used to simulate collisionless reconnection and fast instabilities in a Z-pinch. Error wave propagation is used to correct divergence errors. The scheme uses auxiliary variables to treat the higher order derivatives that result from the Hall and diamagnetic drift terms. Hall MHD results are compared with full two-fluid results and show good agreement. The explicit scheme is a first step in producing an implicit discontinuous Galerkin algorithm that does not suffer the time step restriction of the Whistler wave.

John Loverich
Tech-X Corporation

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