

Abstract Submitted
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Robust adaptive-order numerical methods for relativistic magnetohydrodynamics¹ NILS DEPPE, Caltech — We present a new positivity-preserving adaptive-order method that combines discontinuous Galerkin and finite-difference schemes in a way that ensures physical realizability of the solution (e.g. positive density and pressure). The method is designed to preserve physical realizability during both reconstruction and time evolution. The idea is to start with an unlimited high-order discontinuous Galerkin method and fall back to a novel adaptive-order finite-difference scheme if the discontinuous Galerkin solution is not physically realizable. We will present a preliminary test result of our new robust adaptive-order method. The ultimate goal is to apply these methods to relativistic (magneto)hydrodynamics, such as simulations of binary neutron stars and accretion onto a black hole.

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