Abstract Submitted
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Numerical methods for relativistic dissipative fluids[1] ALEX PANDYA, FRANS PRETORIUS, Princeton University — We present the first nonlinear numerical solutions to the relativistic Navier-Stokes (RNS) equations recently proposed by Bemfica, Disconzi, Noronha, and Kovtun. These equations describe the dynamics of a heat-conducting, viscous relativistic fluid, and generalize the relativistic Euler equations governing perfect fluids. To serve as a first step toward the incorporation of the RNS equations into astrophysics simulations, we outline a scheme capable of solving the equations numerically, and solve them in 4D Minkowski spacetime for a fluid with an underlying conformal symmetry. We conclude by comparing the RNS solutions with those from the Mueller-Israel-Stewart (MIS) formalism, which has been successfully used to model the quark-gluon plasma formed in heavy ion collisions.

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