

Abstract Submitted
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Efficient Fully-Numerical Einstein-GRMHD Simulations in Curvilinear Coordinates¹ YOSEF ZLOCHOWER, Rochester Institute of Technology, VASSILIOS MEWES, National Center for Computational Sciences, Oak Ridge National Laboratory, MANUELA CAMPANELLI, Rochester Institute of Technology, THOMAS BAUMGARTE, Bowdoin College, ZACHARIAH ETIENNE, West Virginia University, FEDERICO LOPEZ ARMENGOL, FEDERICO CIPOLLETTA, Rochester Institute of Technology — Here we describe techniques that we developed to efficiently evolve the Einstein Equations coupled to the equations for Magnetohydrodynamics in curvilinear coordinates. In particular, we focus on spherical coordinates and the challenges of producing accurate and efficient simulations in the presence of the coordinate singularities on the polar axis and the origin. As test cases, we present evolutions of stable and unstable magnetized rotating neutron stars, including collapse scenarios, as well as accurate simulations of gravitational waveforms.

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