

Abstract Submitted  
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**GRMHD simulations of differentially rotating neutron stars in dynamical spacetimes: A possible connection with GRBs** BRANSON STEPHENS, University of Illinois at Urbana-Champaign, MATTHEW DUEZ, Cornell University, YUK TUNG LIU, STUART SHAPIRO, University of Illinois at Urbana-Champaign, MASARU SHIBATA, University of Tokyo — We consider the effects of magnetic fields on the evolution of differentially rotating neutron stars, which can be formed in stellar core collapse or binary neutron star coalescence. Simulations are carried out in axisymmetry using a code which integrates the coupled Einstein-Maxwell-MHD equations. Magnetic braking and the magnetorotational instability (MRI) both play important roles in the evolution. Our simulations show that the fate of the star depends on its mass and spin. The most interesting case is that of the hypermassive neutron star, for which the magnetic field leads to catastrophic collapse. The newly-formed black hole is surrounded by a hot, magnetized torus undergoing quasistationary accretion. We demonstrate that this system is a promising candidate for producing a short gamma-ray burst.

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