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Simulations of Jetted Relativistic Blastwaves in Astrophysics JAY SALMONSON, Lawrence Livermore National Laboratory, P. CHRIS FRAGILE, College of Charleston, PETER ANNINOS, Lawrence Livermore National Laboratory, JEFF JAUREGUI, Duke University — We present relativistic hydrodynamic simulations of jetted blastwaves using the Cosmos++ astrophysics code. We post-process these simulations by integrating the radiative transfer equation thru a observer's space-time slices of the data, assuming relativistic self-absorbed synchrotron emission, to derive detailed multi-frequency lightcurves for the jet as viewed at arbitrary inclination angle. In particular, we simulate the asymmetric outflow resulting from the giant flare of December 27, 2004 from SGR 1806-20 and obtain excellent agreement with the data. We find that the asymmetric radio nebula that was observed to expand over the months following the flare cannot be explained by a simple ballistic ejection of material during the flare, but requires angular dependence of the energy injection with respect to the jet axis. In addition, we present simulations of jetted blastwaves of the relativistic afterglows resulting from gamma-ray bursts. This work was performed under the auspices of the U.S. Department of Energy by the University of California, Lawrence Livermore National Laboratory under contract No. W-7405-Eng-48.

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