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Simulations of Jetted Relativistic Blastwaves in Astrophysics JAY SALMONSON, Lawrence Livermore National Laboratory, CHRIS FRAGILE, UC Santa Barbara, PETER ANNINOS, Lawrence Livermore National Laboratory —
We present new 2D relativistic hydrodynamic simulations of jetted blastwaves using the Cosmos++ astrophysics code. In particular, we simulate the asymmetric outflow resulting from the giant flare of December 27, 2004 from SGR 1806-20. We find that the asymmetric radio nebula 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. Evolving these jetted blastwaves from Lorentz factors of order 10, we explore the dependence of observed lightcurves on initial jet opening angle, energy distribution, and observer angle with respect to the jet axis.
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