Abstract Submitted
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Relativistic simulations of black hole-neutron star coalescence: the jet emerges II MILTON RUIZ, University of Illinois at Urbana-Champaign, VASILEIOS PASCHALIDIS, Princeton University, STUART SHAPIRO, University of Illinois at Urbana-Champaign — Black hole-Neutron star (BHNS) systems have been suggested as viable central engines that power short-hard gamma ray bursts. We will present ideal magnetohydrodynamic simulations of BHNS systems in full general relativity that for the first time demonstrate that jets can be launched after NS tidal disruption if the NS is endowed with a dipolar B-field extending into the exterior. The exterior is initially characterized by a low density atmosphere with constant plasma parameter $\beta \equiv P_{\rm gas}/P_{\rm mag}$. Varying β in the exterior from 0.1 to 0.01, we find that at $\sim 100(M_{\rm NS}/1.4M_\odot)$ms following the onset of accretion of tidally disrupted debris, magnetic field winding above the remnant black hole poles builds up the magnetic field sufficiently to launch a mildly relativistic, collimated outflow - an incipient jet. The duration of the accretion and the lifetime of the jet is $\Delta t \sim 0.5(M_{\rm NS}/1.4M_\odot)$s.

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