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GRMHD simulations of binary BH-NS and NS-NS mergers: Progenitors of short-gamma ray bursts[1] MILTON RUIZ, ANTONIOS TSOKAROS, STUART SHAPIRO, University of Illinois at Urbana-Champaign — Binary black hole-neutron star (BHNS) and neutron star-neutron star (NSNS) mergers are not only important sources of gravitational waves, but also promising candidates for coincident electromagnetic counterparts emission. Here we summarize recent simulations in general relativistic magnetohydrodynamics (GRMHD) designed to establish BHNS and NSNS mergers as viable progenitors of the central engines that power short gamma–ray bursts (sGRBs) and thereby solidify their role as multimessenger sources. We survey binaries that differ in their configuration of the seed magnetic field, mass-ratio, and spin of the NS or BH. We find that by $\Delta t > 50$ms after the peak gravitational wave signal an incipient jet is launched when: 1) the seed magnetic field has a sufficiently large-scale poloidal component along the total angular momentum of the system, 2) the mass ratio in BHNSs is not far from unity 3) the initial spin of the BH in BHNSs is larger than ~ 0.5. 4) the NSNS remnant is a hypermassive NS that undergoes delayed collapse. We do not find a strong correlation between jet launching and the spin of the NS. The lifetime and Poynting luminosities of the jet are consistent with typical sGRBs, as well as with the Blandford–Znajek mechanism for launching jets.

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