Abstract Submitted
for the APR12 Meeting of
The American Physical Society

Fully General Relativistic Simulations of Magnetized Neutron Star–Black Hole Binary Mergers ZACHARIAH ETIENNE[1], YUK TUNG LIU, VASILEIOS PASCHALIDIS, STUART SHAPIRO, University of Illinois — As a neutron star (NS) is disrupted by black hole (BH) tidal fields at the end of a BH–NS binary inspiral, its magnetic fields will be stretched and amplified. These magnetic fields may impact the gravitational waveforms, merger evolution and mass of the remnant disk. Formation of highly-collimated magnetic field lines in the remnant may launch relativistic jets, driving an SGRB. We analyze this scenario through fully general relativistic, magnetohydrodynamic BH–NS simulations from inspiral through merger and disk formation. Multiple seed magnetic field configurations are chosen, starting with both nonspinning and moderately-spinning (a/M=0.75) BHs aligned with the orbital angular momentum. Only strong ($B_{max} \sim 10^{17}$G) initial magnetic fields in the NS significantly influence merger dynamics, enhancing the remnant disk mass by 100% and 40% in the nonspinning and spinning BH cases, respectively. We find that detecting the effects of even strong magnetic fields may be challenging for Advanced LIGO. While there is no evidence of outflows during the preliminary simulations we have explored, longer disk evolutions, improved resolution and different field topologies will be required to more thoroughly assess the plausibility of BHNS binaries as SGRB progenitors.

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Date submitted: 09 Dec 2011 Electronic form version 1.4