Abstract Submitted
for the APR08 Meeting of
The American Physical Society

Fully General Relativistic Simulations of black hole-neutron star Mergers YUK TUNG LIU, ZACHARIAH ETIENNE, University of Illinois at Urbana-Champaign, JOSHUA FABER, Rochester Institute of Technology, STUART SHAPIRO, KEISUKE TANIGUCHI, University of Illinois at Urbana-Champaign, THOMAS BAUMGARTE, Bowdoin College — Black hole-neutron star (BHNS) binaries are expected to be among the leading sources of gravitational waves observable by ground-based detectors, and may be the progenitors of short-hard gamma ray bursts as well. We present our new fully general relativistic calculations of merging BHNS binaries, which use our recent conformal thin-sandwich (CTS) quasi-circular configurations as initial data. Our evolutions are performed using a BSSN-based moving puncture method and a fully relativistic, high-resolution shock-capturing hydrodynamics scheme. We investigate the inspiral, merger, and disk formation in the systems. We find that the vast majority of material is promptly accreted and no more than 3% of the NS's rest mass is ejected into a tenuous, gravitationally bound disk. We compute gravitational radiation, finding measurable differences between our waveforms and those produced by binary black hole mergers within the advanced LIGO band. These differences appear at frequencies corresponding to the onset of NS tidal disruption. The resulting information about the NS radius may be used to constrain the NS equation of state.

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Date submitted: 10 Jan 2008 Electronic form version 1.4