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Neutron Star-Spinning Black Hole Binary Mergers: Simulations in Full General Relativity ZACHARIAH ETIENNE, YUK TUNG LIU, STUART SHAPIRO, University of Illinois, THOMAS BAUMGARTE, Bowdoin College — Binary black hole-neutron star (BHNS) binary mergers are candidate engines for both short-hard gamma-ray bursts and detectable gravitational radiation. Using our most recent conformal thin-sandwich BHNS initial data and our fully GR hydrodynamics code, which is now AMR-capable, we are able to simulate these binaries accurately through inspiral, merger, and ringdown. We explore the effects of BH spin (aligned and anti-aligned with the orbital angular momentum) by evolving binaries with BH:NS mass ratio $q = 3$ that are nearly identical, except the BH spin is varied between $a/M_{\rm BH} = -0.5$ (anti-aligned) to 0.75. The number of orbits before merger increases with $a/M_{\rm BH}$. We also study the nonspinning BH case in depth, varying q between 1, 3, and 5. Gravitational waveforms are calculated and compared to binary BH waveforms. Only a small disk ($< 0.01 M_\odot$) forms for the anti-aligned spin case ($a/M_{\rm BH} = -0.5$) and for the largest mass ratio case ($q = 5$). By contrast, a massive ($M_{disk} \approx 0.2 M_\odot$), hot disk forms in the rapidly spinning $a/M_{\rm BH} = 0.75$ aligned BH case. Such a disk could drive a SGRB, possibly by, e.g., producing a copious flux of $\nu - \bar{\nu}$ pairs.

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