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Black hole-neutron star mergers: Effects of the orientation of the black hole spin

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Mergers of black hole-neutron star (BHNS) binaries offer a remarkable opportunity to study strongly-curved space-time and supernuclear-density matter in the most extreme, dynamical conditions. The gravitational waves emitted as they spiral in and merge should be detectable by Advanced LIGO and VIRGO, while the accretion disc which forms as a result of the disruption of the neutron star is a potential progenitor for short gamma-ray bursts. Recent simulations of BHNS systems in full general relativity have given us an understanding of the influence of the main binary parameters (mass ratio, neutron star radius, magnitude and orientation of the black hole spin) on the gravitational wave signal and the formation of an accretion disc. Additional physical effects, including magnetic fields and nuclear-theory based equations of state, are also beginning to be included in some studies. I will review these results, discussing in more details the influence of the black hole spin (and of the precession of the orbital plane when that spin is misaligned with respect to the orbital angular momentum) on the dynamics of the merger and the characteristics of the resulting accretion disc.