Remnant mass, spin, and recoil from spin aligned black-hole binaries JAMES HEALY, CARLOS LOUSTO, YOSEF ZLOCHOWER, Rochester Institute of Technology — We perform a set of 36 nonprecessing black-hole binary simulations with spins either aligned or counteraligned with the orbital angular momentum in order to model the final mass, spin, and recoil of the merged black hole as a function of the individual black hole spin magnitudes and the mass ratio of the progenitors. We find that the maximum recoil for these configurations is $V_{max} = 526 \pm 23$ km/s, which occurs when the progenitor spins are maximal, the mass ratio is $q_{max} = m_1/m_2 = 0.623 \pm 0.038$, the smaller black-hole spin is aligned with the orbital angular momentum, and the larger black-hole spin is counteraligned ($\alpha_1 = -\alpha_2 = 1$). This maximum recoil is about 80 km/s larger than previous estimates. We provide explicit phenomenological formulas for the final mass, spin, and recoil as a function of the individual BH spins and the mass difference between the two black holes.

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