

Abstract Submitted  
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**Hangup Kicks: Still Larger Recoils by Partial Spin/Orbit Alignment of Black-Hole Binaries** CARLOS LOUSTO, YOSEF ZLOCHOWER, Rochester Institute of Technology — We revisit the scenario of the gravitational radiation recoil acquired by the final remnant of a black-hole-binary merger by studying a set of configurations that have components of the spin both aligned with the orbital angular momentum and in the orbital plane. We perform a series of 42 new full numerical simulations for equal-mass and equal-spin-magnitude binaries. We extend previous recoil fitting formulas to include nonlinear terms in the spins and successfully include both the new and known results. The new predicted maximum velocity approaches 5000km/s for spins partially aligned with the orbital angular momentum, which leads to an important increase of the probabilities of large recoils in generic astrophysical mergers. We find non-negligible probabilities for recoils of several thousand km/s from accretion-aligned binaries.

Carlos Lousto  
Rochester Institute of Technology

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