TEST OF A GENERAL FORMULA FOR BLACK HOLE GRAVITATIONAL WAVE KICKS

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Although the gravitational wave kick velocity in the orbital plane of coalescing black holes has been understood for some time, apparently conflicting formulae have been proposed for the dominant outof-plane kick, each a good fit to different data sets. This is important to resolve because it is only the out-of-plane kicks that can reach more than 500 km s–1 and can thus eject merged remnants from galaxies. Using a different ansatz for the out-of-plane kick, we show that we can fit almost all existing data to better than 5%. This is good enough for any astrophysical calculation and shows that the previous apparent conflict was only because the two data sets explored different aspects of the kick parameter space.

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