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The origin of inequality. Isolated formation of 30 Msun and 10 Msun BH-BH merger.

The LIGO/Virgo collaboration has reported the detection of GW190412, a black hole-black hole (BH-BH) merger with the most unequal masses to date: m1 = 24.4–34.7 Msun and m2 = 7.4–10.1 Msun, corresponding to a mass ratio of q = 0.21–0.41 (90% probability range). Additionally, GW190412's effective spin was estimated to be χ eff = 0.14–0.34, with the spin of the primary BH in the range aspin = 0.17–0.59. Based on this and prior detections, 10% of BH-BH mergers have q<0.4.

Major BH-BH formation channels (i.e., dynamics in dense stellar systems, classical isolated binary evolution, or chemically homogeneous evolution) tend to produce BH-BH mergers with comparable masses. Here we test whether the classical isolated binary evolution channel can produce mergers resembling GW190412.

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