

A Highly Spinning and Aligned Binary Black Hole Merger in the Advanced LIGO First Observing Run

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We report a new binary black hole merger in the publicly available LIGO First Observing Run (O1) data release. The event has a false alarm rate of one per six years in the detector-frame chirp-mass range $\mathcal{M}^{\text{det}} \in [20, 40]M_{\odot}$ in a new independent analysis pipeline that we developed. Our best estimate of the probability that the event is of astrophysical origin is $P_{\text{astro}} \sim 0.71$. The estimated physical parameters of the event indicate that it is the merger of two massive black holes, $\mathcal{M}^{\text{det}} = 31_{-3}^{+2}M_{\odot}$ with an effective spin parameter, $\chi_{\text{eff}} = 0.81_{-0.21}^{+0.15}$, making this the most highly spinning merger reported to date. It is also among the two highest redshift mergers observed so far. The high aligned spin of the merger supports the hypothesis that merging binary black holes can be created by binary stellar evolution.

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