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## The Observational Signatures of Tertiary-Induced Mergers

*Monday, December 11, 2023 3:00 PM (10 minutes)*

While the LIGO/VIRGO/KAGRA (LVK) collaboration has observed  $\sim 100$  binary black hole (BBH) mergers to date, the formation mechanisms of these BBHs remains poorly understood. The most promising approach to discriminating among the many proposed mechanisms relies on comparison of theoretical models to population-level statistics of the observed BBH events. However, the constraints derived from this process are often weak, as the complexity of most of these theoretical models introduces significant uncertainty into their predictions. As such, it is important to identify and characterize any well-constrained signatures of specific BBH formation channels. In this talk, we present the signatures of the classic tertiary-induced merger channel, where an initially wide BBH is induced to merge due to eccentricity excitation by a distant tertiary companion. This channel has a straightforward appeal due to the large observed occurrence rate of high-mass stellar triples. We argue that a BBH formation via a comparable-mass triple produces a mass-ratio distribution inconsistent with the LVK data. Instead, we suggest that compact stellar binaries orbiting a larger-mass tertiary may be more consistent with the observed distributions to date.

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