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Identification of BBH Merger Phenomenology Through Principal Component Analysis DEIRDRE SHOEMAKER, JAMES CLARK, LAURA CADONATI, University of Massachusetts, Amherst, IK SIONG HENG, University of Glasgow, NICHOLAS MANGINI, University of Massachusetts, Amherst, LARNE PEKOWSKY, Georgia Institute of Technology — Recent years have seen dramatic progress in numerical simulations of the coalescence of binary black hole systems. However, the simulation of highly asymmetric, spinning systems and the construction of accurate inspiral-merger-ringdown physical templates remains challenging. Furthermore, the solution of the inverse problem of parameter estimation in such a high dimensional space, even using recently developed stochastic Bayesian analyses, is extremely computationally expensive. In addition to the full parameter estimation solution using phenomenological templates and physical parameters, it would be informative to have a prompt, robust and automatic indication of whether the signal exhibits evidence for various generic features such as precessional modulation or the presence of higher-order mode content. One possible approach here is to form catalogues of numerical relativity waveforms with distinct physical effects such as this and determine the relative probability that a given GW signal lies in each catalogue. We introduce, and report on the development of, an algorithm designed to perform this task for "burst-like" (i.e., merger-ringdown dominated) waveforms via principal analysis of waveform catalogues and the use of nested sampling to perform Bayesian model selection.

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