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Parameter estimation for gravitational wave signals in or near the PISN mass gap: GW190521 and other high mass events

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In this talk we present a re-analysis of high mass gravitational-wave events with posterior support in or near the pair-instability supernova (PISN) mass gap with state-of-art phenomenological waveform models, IMRPhenomX and IMRPhenomT. One particularly interesting event is GW190521 - the most massive binary observed to data, with only a few observable wave cycles. We discuss challenges in estimating the source parameters due to the shortcomings of current waveform templates and the sensitivity to approximate degeneracies in the waveforms. We test the robustness of our results with a convergence analysis of our Bayesian inference runs and a comparison of different sampling codes. We discuss the parameter estimation results and provide updated probabilities of the component masses being in the PISN mass gap. We also provide update parameter estimation results for GW170729, the most massive binary black hole merger detected in the first and the second observational periods, and discuss relevant current and future developments in waveform development and parameter estimation.

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