

Abstract Submitted
for the APR18 Meeting of
The American Physical Society

Revealing the Final Black Hole from Signal at Maximum Amplitude DEBORAH FERGUSON, JUAN CALDERON BUSTILLO, JAMES CLARK, SUDARSHAN GHONGE, KARAN JANI, DEIRDRE SHOEMAKER, Georgia Institute of Technology — Over the last 3 years, we have seen a number of detections of gravitational waves emitted from the coalescence of binary black holes. With the next observational run (O3), we expect more, and potentially louder, detections. One of the desired outcomes of these detections is the ability to perform tests of general relativity using information from the final black hole. One method of finding the parameters of the final black hole is to analyze the ringdown of the signal. Even with the increased sensitivity of the detectors in O3, it will remain difficult to resolve ringdown; however, we will be able to analyze the signal at maximum amplitude. Since this maximum occurs after the black holes have coalesced, we postulate that the parameters of the final black hole can be determined at this point. I discuss a method to determine the state of the final black hole using a relationship between the frequency at maximum amplitude and the quasi-normal mode frequency and decay time of the ringdown. This allows us to take the frequency during the maximum amplitude of the radiation obtained from the detector data and directly relate it to understanding the state of the final black hole.

Deborah Ferguson
Georgia Institute of Technology

Date submitted: 10 Jan 2018

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