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Detectability of higher harmonics with LISA

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One of the science objectives of LISA is to probe fundamental physics. With the expected large SNR of the coalescence of SMBHB we hope to test General Relativity. Using the full IMR waveform we study the detectability of higher harmonics. With Bayesian analysis, we can discriminate models with different harmonics. Omitting harmonics not only diminishes the SNR but can also lead to biased parameter estimates. We analyze the bias for each model in a source example and quantify the threshold SNR where we can expect the parameter bias to be comparable to the statistical error. This work highlights the importance of higher modes to describe the gravitational waveform of events detected by LISA, as biases in the parameters will have a deep impact in tests of the no-hair theorem.

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