

Abstract Submitted
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Black Hole Spectroscopy Horizons and the Impact of Overtones

CECILIA CHIRENTI, University of Maryland, College Park, IARA OTA, Federal University of ABC — Black hole spectroscopy is the proposal to observe multiple quasinormal modes in the ringdown of a binary black hole merger. In addition to the fundamental quadrupolar mode, overtones and higher harmonics may be present and detectable in the gravitational wave signal, allowing for tests of the no-hair theorem. We obtain the spectroscopy horizons of current and future detectors, up to which one or more additional modes can be detected (and confidently distinguished from each other). For the detection of one additional mode, the spectroscopy horizon of the first overtone is consistently larger than that of any higher harmonic modes for all detectors in the entire mass range, except close to the highest mass (lowest frequency) limit for detectability. We use both a Fisher matrix approach and a Bayesian model comparison to confirm our results.

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