

# 'Spectral Siren' Cosmology with a Combined-Population Mass Distribution

*Friday, 25 October 2024 09:30 (30 minutes)*

The 'spectral siren' method is a powerful probe of cosmology using gravitational waves observed from compact binary coalescences (CBCs). By exploiting the features of the mass spectrum of CBCs, the degeneracy between mass and redshift can be broken - allowing for the use of such events to constrain cosmological parameters. Previously, these mass spectra have been separated by binary type, with different priors for analysis of BBH, NSBH and BNS binaries. We present a new, unified approach which combines the mass spectra of different binary types to constrain cosmological parameters, the shape of the compact object mass spectrum, and the astrophysical fractions of each binary type. Using the gwcosmo cosmological inference pipeline, we apply this new spectral siren method to mock data representing the observations of a three-detector (LHV) network operating at O5 sensitivity. This demonstrates the constraining power of this combined CBC population method with future gravitational wave observations.

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**Session Classification:** Cosmology