

# Multiband GW parameter estimation: A study of future detectors

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## Abstract

The first detection of a gravitational wave signal of a coalescence of two black holes marked the beginning of the era of gravitational wave Astronomy, which opens exciting new possibilities in the fields of Astronomy, Astrophysics and Cosmology. The currently operating detectors of the LIGO and VIRGO collaborations are sensitive at relatively high frequencies of a few hundred Hertz, and are able to detect gravitational waves emitted in a short time frame of order seconds (binary black holes) to minutes (binary neutron stars). Future missions like LISA will be sensitive in lower frequency ranges, which allows for the detection of gravitational waves emitted long before the binaries merge. In this study we investigate the possibilities for parameter estimation using the Fisher-matrix formalism with combined information from present and future detectors in different frequency bands. The detectors we consider are the LIGO/Virgo detectors, the Einstein Telescope (ET), the Laser Interferometer Space Antenna (LISA), and pre-DECIGO.

## Keywords

Gravitational Waves, future detectors, parameter estimation, Fisher matrix