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## Extending the gravitational waves searches for black holes with intermediate masses and residual eccentricity at merger

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Detections of stellar mass binary black holes (BBHs) system in the first observing run of LIGO interferometers has started an exciting new era of black hole astrophysics.

Understanding the possible formation channels of the population of BBH will be important to understand the environment in which such systems are formed. Hence, the recent detections prove that BBHs exist in nature and merge within Hubble time, and so there is a strong motivation to search for BBH systems in a larger parameter space, such as BBH with intermediate masses (IMBBH) and residual eccentricity till the time of merger (eBBH). Detection or rate upper limits on IMBBH or eBBH will extend the understanding of the formation channels and black hole astrophysics.

The search for such sources is conducted using both templated search with extended template bank to IMBBH and un-modelled searches tuned to IMBBH and eBBH. We present here the methods and results for the searches concerning IMBBH and eBBH, also present the results of the search for IMBBH in the first observational run of the LIGO detectors where no detections were made but very interesting rate upper limits were obtained.

### Experimental Collaboration

LIGO and VIRGO

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