

Source classification of compact binary mergers for the MBTA pipeline candidates

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As the knowledge of the gravitational-wave (GW) sources population is improving, it is possible to compute the probability of astrophysical origin of the GW events and make a source classification.

Rapid source classification in low-latency searches provides useful information for astronomers to undertake a follow-up of the source or not.

In the offline searches, the probability of astrophysical origin of GW candidate events is a tool to reveal more events in population-rich areas of the parameter space. Also, the source classification is a key ingredient to compute compact binaries merger rates.

We present how the source classification of LIGO-Virgo GW candidate events is performed with the Multi-Band Template Analysis (MBTA), which is one of the pipelines used in the LIGO-Virgo searches. We discuss how we divide the search parameter space to be more sensitive to the astrophysical population priors that are not uniform across the parameter space and also to better estimate background rates over multiple bins. We also cover different systematic uncertainties on the probability of astrophysical origin related to the different assumptions we make in the computation (population models, number of detections, background fluctuations, etc...).

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