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Search for hyperbolic encounters of compact objects in gravitational-wave data during the third LIGO-Virgo- KAGRA observing run

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Gravitational-wave (GW) observations provide unique information about compact objects and, as detectors sensitivity increases, new astrophysical populations could emerge. Close hyperbolic encounters are one such example: black holes and neutron stars are expected to have unbound orbits in dense clusters, that manifest as GW burst signals in the frequency band of current detectors.

In this talk, we present the search for GW from hyperbolic encounters in the second half of the third Advanced LIGO-Virgo observing run (O3b). We perform a model-informed search with the algorithm Coherent Wave-Burst enhanced by machine learning, exploiting for the first time 3-PN accurate hyperbolic approximants. The main new result of this search is the assessment of the observable sensitivity volume achieved in O3 and its constrain in terms of rate density of such sources.

Collaboration / Activity

LIGO-Virgo-KAGRA

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