

Searching gravitational wave echoes in the post-merger phase after a binary black hole coalescences.

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Current gravitational wave (GW) surveys of binary black hole (BBH) mergers provide unprecedented probes of the dynamics in extreme gravitational fields and relativistic velocities.

It has been proposed that such compact objects may display exotic characteristics and could produce repeated GW pulses of widely uncertain morphology (echoes) in the post-merger phase. A detection of echoes would be a smoking gun on the existence of exotic compact objects (ECOs) and would shed light on their nature and their constituents.

We will present a method to search for echoes that is agnostic to the properties of the GW pulses and it is based on a targeted version of coherentWaveBurst (cWB), the unmodelled GW transient search algorithm, developed in the LIGO Scientific Collaboration (LSC) and Virgo Collaboration and widely used on LIGO-Virgo-KAGRA data.

We will discuss the results of this search on LIGO-Virgo open data and provide new upper limits in terms of the detectable energy of echo-like signals. We will present some constraints that these observations set on the parameters space of ECOs' models.

Reference to paper (DOI or arXiv)

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