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Extracting the post-merger gravitational wave signal from binary neutron stars

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Gravitational wave (GW) emission from a binary neutron star (BNS) coalescence carries the signature of its complex dynamics and of neutron star (NS) properties such as the equation of state (EoS). In particular, the extraction and characterization of the signal emitted in the post-merger phase by the massive NS remnant offers an opportunity to strongly constrain the behaviour of matter at supranuclear densities. Since the signal morphology cannot be accurately predicted, a model independent analysis is necessary.

Here we present a new tool under development to perform a follow-up search for the identification within a selected purity of the post-merger GW emission from the BNS merger remnant. Moreover, it performs the characterization of the signal morphology and provides estimates of key parameters, such as the frequency of the main post-merger peak and the brightness curve of the signal. The tool is based on the coherent WaveBurst pipeline, a LIGO-Virgo algorithm to target unmodeled (burst) signals.

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