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Classification of Sub-solar mass events: black holes or... something else?

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Compact binary black hole systems are a primary source of gravitational wave detection through LIGO-Virgo-KAGRA detectors. Recent improvements to the detectors have led to improved sensitivity, leading to the detection of more gravitational wave signals. Recent studies have suggested the possibility of observing binary systems in the sub-solar mass range. In third-generation detectors, the possibility of finding a binary in the sub-solar mass range is larger compared to current detectors. We inject different subsolar mass coalescence gravitational wave signals into Gaussian noise and recover it with the assumption of both binary black hole and binary matter star systems. We differentiate them based on the recovered tidal deformability and Bayes factors. These systems can be either a neutron star or an exotic star. We also use symbolic regression models to obtain analytical equations connecting equation of state parameters to observable global parameters.

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