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GW190521: a dynamical capture of two black holes

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Gravitational waves (GWs) represent a new channel to study the universe. They can lead to new –and at times unexpected– discoveries about the nature of compact objects, such as black holes and neutron stars. However, our ability to extract the source properties from GW data crucially depends on the waveform models we employ to perform the analysis.
In this talk I will discuss the exemplary case of GW190521, the gravitational wave transient observed by LIGO and Virgo on 21 May 2019, whose astrophysical interpretation is strongly dependent on the model employed. After going over the possible interpretations that have been advanced, I will show that the data supports the first gravitational-wave detection from the dynamical capture of two stellar-mass black holes. This hypothesis is preferred over the more conservative scenario of two black holes coalescing along quasi-circular orbits.

Presenter: GAMBA, Rossella