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Overview of gravitational-wave modelling

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To date, all gravitational-wave detections accomplished by the LIGO-Virgo-KAGRA collaboration are compatible with compact binary merger events involving black holes and neutron stars in all three possible combinations. Signals from binary black hole (BBH) coalescences, however, are by far the most common and their modelling will be the focus of this presentation. The detection of BBH merger signals strongly relies on the use of template waveform banks against which conduct matched-filtering searches. Likewise, those templates are essential to infer the astrophysical properties of the sources generating the gravitational waves. This talk will present an overview of the approaches routinely employed in the complicated task of waveform modelling of BBH coalescences, both involving analytical relativity and numerical relativity, and will briefly discuss on possible alternative routes and the challenges awaiting just around the corner.

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