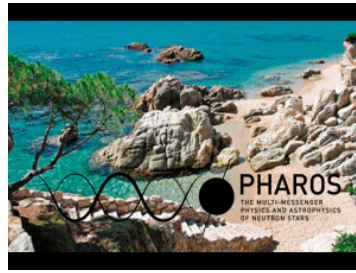


PHAROS Conference 2019: the multi-messenger physics and astrophysics of neutron stars



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Modeling the strong-field dynamics of binary neutron star merger

The observation of gravitational and electromagnetic waves from a binary neutron star merger in August 2017 conveyed key information on the nature of matter at supranuclear densities, on the origin of short-gamma ray burst, on the production site of heavy elements via r-process nucleosynthesis, and on cosmography.

Thus, multimessenger observations of compact binary mergers hold the promise to unprecedented insights on some of the most fundamental physics questions.

A crucial and necessary ingredient to interpret such observations is the precise knowledge of the dynamics of the sources.

I will talk about recent developments on the modeling of neutron star mergers using numerical simulations in general relativity.

I will focus on the numerical exploration of the merger remnant and mass ejecta and their dependence on the binary parameters. I will discuss detailed models of the gravitational waves and kilonova light curves, highlighting the prospect of using them in joint analysis of multimessenger data.

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