GR 14: Relativistic Astrophysics III

Time: Thursday 11:00–12:30 Location: HBR 14: HS 2

Invited Talk GR 14.1 Thu 11:00 HBR 14: HS 2

Modeling the strong-field dynamics of binary neutron star mergers — •Sebastiano Bernuzzi — Theoretisch-Physikalisches Institut, Friedrich-Schiller-Universitaet Jena, Max Wien Platz 1 D-07743 Jena, Germany

Binary neutron star mergers (BNSM) are associated to powerful gravitational and electromagnetic astronomical transients. Multimessenger observations of BNSMs promise to deliver unprecedented insights on fundamental physics questions, including constraints on dense matter models and the production of heavy elements. Detailed theoretical predictions of the merger dynamics are a crucial aspect for extracting information from such observations. This talk reviews recent progress in the modeling of BNSMs using simulations in 3+1 numerical general relativity. In the first part, I will discuss the first predictions for the complete (inspiral-merger-postmerger) gravitational-wave spectrum and their application in gravitational-wave astronomy. In the second part, I will discuss recent results on merger remnants and mass ejecta, the mechanisms behind kilonova light and their application to the analyses of astrophysical data.

Invited Talk GR 14.2 Thu 11:45 HBR 14: HS 2

Exploring the Phase Diagram of QCD with Neutron Star Mergers in the Prompt and Non-Prompt Collapse Regime — •Christian Ecker — Gothe University, Frankfurt am Main, Germany

Determining the phase structure of Quantum Chromodynamics (QCD) and its Equation of State (EoS) at densities and temperatures realised inside neutron stars and their mergers is a long-standing open problem. I will present a framework for the EoS of dense and hot QCD that describes the deconfinement phase transition between a dense baryonic and quark matter phase via the holographic V-QCD model. This model is then used to study the consequences on the formation of quark matter in binary neutron star mergers in the prompt and non-prompt collapse regime.