

# PHAROS Conference 2020: The multi-messenger physics and astrophysics of neutron stars



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## The contribution of r-process heating on the dynamics of ejecta in binary neutron star mergers

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The modelling of ejected matter, its dynamics and thermodynamic properties, is of fundamental importance in the study of binary neutron star mergers (BNS); it serves as a starting point to investigate the gamma ray burst emission, r-process nucleosynthesis and kilonova signal. While processes such as neutrino transport, magnetic fields, viscous effects and relativistic gravity are usually taken into account in modelling BNS ejecta, the energy released into the system by the decay of r-process nuclei is generally ignored. In this work we discuss how this heating source can be modelled and how it is coupled to the hydrodynamics evolution in BNS relativistic numerical simulations; as well as its impact on the ejected mass, thermodynamic properties of the ejecta and kilonova signal. Supported by European Research Council Grant No. 677912 EUROPIUM.

**Authors:** Dr GUERCILENA, Federico (IKP - T.U. Darmstadt); Dr EICHLER, Marius (IKP, T.U. Darmstadt); Prof. ARCONES, Almudena (IKP T.U. Darmstadt)

**Presenter:** Dr GUERCILENA, Federico (IKP - T.U. Darmstadt)

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