

# The relevance of Muons and Trapped Neutrinos in the microphysics of Binary Neutron Star mergers

*Monday, 9 May 2022 14:30 (20 minutes)*

A deep understanding of the dynamics of Binary Neutron Star (BNS) mergers requires a detailed treatment of the relativistic hydrodynamics of the merger, as well as of the microphysics governing the underlying electromagnetic, strong and weak interactions. Accurate numerical simulations are pivotal to correctly interpret the data collected through the detection of gravitational waves and electromagnetic counterparts, and to constrain the Equation of State (EOS) of Neutron Stars.

State-of-the-art simulations do not include muons in the microphysics of the system, even though physical muon creation is possible in such conditions. As a consequence, muonic neutrinos are not distinguished by tauonic ones. Moreover, the contribution of trapped neutrinos to the thermodynamic quantities characterising the remnant is usually neglected. During my talk, I will discuss the consequences of muons creation and neutrino trapping on the properties of BNS merger remnants, as well as the implications for the EOS.

**Primary author:** LOFFREDO, Eleonora (Istituto Nazionale di Fisica Nucleare)

**Co-authors:** Prof. PEREGO, Albino (Università di Trento & INFN-TIFPA); Dr LOGOTETA, Domenico (Università di Pisa e INFN Sezione di Pisa); Prof. BRANCHESI, Marica (GSSI & INFN (LNGS))

**Presenter:** LOFFREDO, Eleonora (Istituto Nazionale di Fisica Nucleare)

**Session Classification:** Astrofisica nucleare II