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Modeling of the electromagnetic counterpart of compact binary merger: ejecta, neutrinos and nucleosynthesis

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Compact binary mergers (CBMs) are cosmic laboratory for fundamental physics. All four fundamental interactions play a key role in setting the properties of the observables associated with these powerful stellar collisions. Thus, they need to be taken into account to provide reliable multimessenger predictions. In this talk, I will focus on the role of neutrinos and weak interaction in setting the properties and the composition of the ejecta. The impact on the features of the electromagnetic counterparts from CBMs will be investigated through a multicomponent, anisotropic kilonova model. The application of this model to the electromagnetic counterpart of GW170817 allows to derive key information on the amount and composition of the ejecta coming from this first detected binary NS merger. Finally, I will show how the application of this model to GW170817, in association with information derived from the analysis of the GW signal, and from one of the largest set of binary NS simulations in Numerical relativity, sets constraints on the nature of the remnant and on neutron star equation of state in a genuine multimessenger framework.

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