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Binary neutron star mergers of quark matter based nuclear equations of state

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With recent observations of gravitational wave signals from binary neutron star(BNS) mergers and observations by NICER, the nuclear equation of state(EoS) is becoming increasingly testable by numerical simulations. Numerous simulations currently exist exploring the equations of state at different density regimes for the constituent neutron stars. In this work we perform full GR three-dimensional hydrodynamics simulations of BNS mergers for parameterized EoSs based on quark matter at the highest nuclear densities. We construct our initial data using Lorene followed by simulating the merger with Einstein Toolkit. The goal of this study is to extract the effects on the observed GW waveform as the merger happens caused by quark matter.

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