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Neutron Star Mergers and the Nuclear Equation of State[1] ATUL KEDIA, IN-SAENG SUH, GRANT MATHEWS, LUCA BOCCIOLI, University of Notre Dame — With the recent observations of gravitational wave signals from binary neutron star mergers, relativistic hydrodynamics has become testable by numerical simulations. Numerous simulations currently exist exploring parameters of binaries such as mass ratio, distance, spins, and equations of states of the constituent Neutron stars. Different numerical approaches exist such as the BSSN or BSSNOK formalisms, and the conformally flat approximation that solve the Einstein equation efficiently on computers. In this work, the open source code Einstein Toolkit is used to study binary neutron star merger simulations for various equations of state and relativistic solutions in an attempt to regenerate the observed signal. We also add neutrino transport to more accurately describe the dynamical merger process. The goal is to better constrain the equation of state of neutron matter.

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