

## ABSTRACT

Compact stars are born at the final stage of stellar evolution. They have masses typically 1.4 times that of our Sun and a radius of only 12 km. As a consequence of such close packing, these stars are very dense. They were recently observed via gravitational waves emitted during the final moments of a collision of two such stars. In the aftermath of such a stellar merger, a post-merger object is formed which is much hotter than an ordinary neutron star. Theoretically, a merger of two stars can be described using general-relativistic hydrodynamics. So far, such simulations were mostly carried out assuming that the fluid is ideal and the role of neutrinos was neglected. The objective of this project is to determine the transport coefficients and neutrino propagation characteristics in binary neutron star mergers. We plan to study the transport and neutrino interactions in their dense parts which may contain exotic particles, such as hyperons or quarks. Tables and fit formulas of transport coefficients and neutrino opacities will be provided to the community involved in simulations of neutron star mergers on supercomputers.