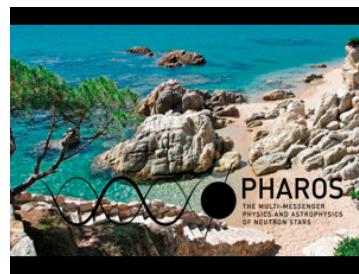


PHAROS Conference 2019: the multi-messenger physics and astrophysics of neutron stars



Contribution ID : 132

Type : **not specified**

Equation of state effects in core-collapse supernovae

We investigate the impact of different properties of the nuclear equation of state in core-collapse supernovae, with a focus on the proto-neutron star contraction and its impact on the shock evolution. To this end, we introduce a range of equations of state that vary the nucleon effective mass, incompressibility, symmetry energy, and nuclear saturation point. This allows us to point to the different effects in changing these properties from the Lattimer and Swesty to the Shen *et al.* equation of state, the two most commonly used equations of state in simulations. In particular, we trace the contraction behavior to the effective mass, which determines the thermal contributions to the equation of state at nuclear densities. Larger effective masses lead to lower pressures and a lower thermal index. This produces a more rapid contraction of the proto-neutron star and consequently higher neutrino energies, which aids the shock evolution to a faster explosion.

Primary author(s) : Prof. SCHWENK, Achim (Technische Universität Darmstadt, Institut für Kernphysik); Prof. ARCONES, Almudena (Technische Universität Darmstadt, Institut für Kernphysik); YASIN, Hannah (Technische Universität Darmstadt, Institut für Kernphysik); SCHÄFER, Sabrina (Technische Universität Darmstadt, Institut für Kernphysik)

Presenter(s) : SCHÄFER, Sabrina (Technische Universität Darmstadt, Institut für Kernphysik)