

Current status of modelling core collapse supernovae

For more than 40 years scientist investigate the explosion mechanism of core collapse supernovae. The high complexity of the events leading to the explosion of stars with stellar iron cores, and the non-linear interaction between different physical processes turn modelling of core collapse supernovae into a challenging task. Ideally, supernova modellers would have to include in their simulations multi-dimensional hydrodynamics with sufficient resolution to resolve the complex fluid flows and hydrodynamical instabilities, together with adequate nuclear physics to treat the forming neutron star and the nuclear reaction networks, a sufficient accurate neutrino transport and neutrino-matter interaction rates, and last but not least general relativity. In this contribution, we will address the current status of modelling core collapse supernovae and the uncertainties and/or approximations that are in supernova models. Furthermore the complex interaction of hydrodynamical instabilities and neutrino interactions in the supernova core will be described, and our current understanding of the explosion mechanism of core collapse supernovae will be summarized.