Nucleosynthesis in neutrino-driven supernovae

Marcella Ugliano[1], Almudena Arcones[2], Hans-Thomas Janka[3]

[1] *Institut für Kernphysik (Theoriezentrum), TU Darmstadt*
[2] *TU Darmstadt*
[3] *MPA Garching*

One of the main goals of the long-standing quest for a better understanding of the supernova explosion mechanism is the establishment of a theoretical connection between the properties of progenitor stars and those of supernovae and their remnants. In particular, the explosion mechanism plays a crucial role for determining the energetic and dynamical properties of the supernova blast wave; it thus controls the conditions for explosive nucleosynthesis. I will present the results of spherically symmetric explosion simulations for a set of about 100 progenitor stars of solar metallicity. The explosions were initiated by means of a neutrino-heating scheme and the products of explosive nucleosynthesis were calculated with a nuclear reaction network. Because of strong star-to-star variations of the progenitor structure at the onset of collapse, we find a great variability of supernova properties (such as explosion energy, compact remnant mass, and composition of ejecta) even in narrow progenitor-mass windows.