Core-collapse supernovae: long-time evolution and nucleosynthesis

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Core-collapse supernovae play a central role in the chemical history of the universe: they eject alpha elements that are produced during the life of massive stars, produce iron group elements and probably also elements up to Silver or even higher in some extreme cases. In order to investigate the nucleosynthesis occurring in core-collapse supernova, multidimensional simulations are required following the explosion and evolution of the ejecta afterwards. We present two-dimensional simulations starting from the progenitor and following the collapse, explosion and post-explosion evolution for several seconds after bounce. The influence of neutrinos is explored by modifying the neutrino energy deposition rate. Additionally we investigate the impact of rotation on the post-explosion expansion by varying the angular momentum of the progenitor. The nucleosynthesis in the supernova is studied in a post-processing step using information from lagrangian tracer particles in a complete nucleosynthesis network.

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