Dust is an important ingredient in astrophysical environments as it regulates the physical and chemical conditions of the interstellar medium (ISM). Sites of dust formation are the expanding ejecta of core-collapse SNe. The amount of dust freshly condensed in SN explosions and surviving the subsequent passage of the reverse shock is a key quantity to assess the role of SNe as cosmic dust factories. Dust production in SNe depends on the SN type and on the physical properties of the stellar progenitor, such as its mass, ejecta temperature profile, metallicity and explosion energy.
Using detailed pre-supernova and supernova explosion models for rotating and non-rotating progenitors with masses ranging between 13 to 120 Msun and metallicities in the range $0 < Z/Z_{\odot} < 1$ (Limongi & Chieffi 2012, Limongi & Chieffi in preparation), we investigate dust formation in SN ejecta. We follow nucleation and grain growth, taking into account the evolution of newly condensed grains and their partial destruction through the passage of the reverse shock in the supernova remnant. We assess the impact of stellar rotation and metallicity on the temperature and density profiles of the ejecta, and, as a consequence, on the resulting grain size distribution. Extending the models to the metal-free (Pop III) supernovae, we compute the mass-dependent dust and metal yields and we predict the chemical composition of star forming regions where second generation, low-mass stars form. We then compare the model predictions to the observed surface elemental abundances of carbon-normal and carbon-enhanced metal poor stars, and derive interesting constraints of the mass of Pop III stars and on the properties of the first SNe.