Investigating the enrichment of the early solar system using core collapse supernova

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Radioactive nuclei with long half-lives are often used to measure time scales, such as the age of the galaxy. By looking at meteoric data we can use short-lived radioisotopes (0.1 to 100 Myr) to identify the potential sources of enrichment in the early solar system.

A single core collapse supernova event is considered to be a promising candidate for the injection of many short-lived radioactive nuclei (0.1 to 100 Myr) into the protosolar cloud or protoplanetary disk. This work takes a variety of core collapse supernovae models and determines which of these best correlates with high-precision meteoric data of the early solar system. The time delay between the radioisotope's ejection and the incorporation into the first solids is also taken into account. The nucleosynthetic yields are produced using a set of hydrodynamic models to with a range of explosion energies and remnant masses, and post processed using the post-processing network developed by the NuGrid collaboration. The yields from these models are compared to the most up to date meteoric analysis to explain the circumstances for the environment of the birth of the Sun.