

Production of Elements in the Third Peak of r-Process

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The observation of Ac boost stars indicates some scenarios can produce abundant heavy elements in the cosmos. The common envelop jet supernovae (CEJSN) r-process is good candidate for their origin. Jets launched by a neutron star that spirals-in inside the core of a red supergiant star in a common envelope evolution supply the proper conditions for the formation of elements heavier than iron through the rapid neutron capture process. This talk unveils the r-process abundance patterns that result from the density profile in the relatively long-lived jets. The CEJSN r-process scenario can produce the largest ratio of the third r-process peak elements to Lanthanides among current r-process scenarios, and in addition can form quite a lot of Lanthanides in a single event. The comparison of the ratio of the third peak elements to the Lanthanides with a bunch of observed r-enhanced metal-poor stars and with other r-process scenarios suggests that a high mass of third peak elements is anti-correlated with high fraction of Lanthanides, both in observations and theory. With the ability on formatting heavy elements, the CEJSN also offers a credible estimation on the age of the most Actinide boosted star by cosmochronometry.