

r-process Nucleosynthesis in the Common Envelope Jet Supernovae

Monday, 9 September 2024 14:25 (15 minutes)

The common envelope jet supernovae (CEJSN) r-process scenario has been proposed as an r-process nucleosynthesis site in the past decade. 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 an amount of Lanthanides in a single event. The comparison of the ratio of the third peak elements to the Lanthanides with a number 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.

Primary author: JIN, Shilun (INstitute of modern physics, CAS)

Presenter: JIN, Shilun (INstitute of modern physics, CAS)

Session Classification: Theoretical Nuclear Physics for Astrophysics

Track Classification: Theoretical Nuclear Physics for Astrophysics