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Inhomogeneous Galactic Chemical Evolution of r-process Elements

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The origin of the heaviest elements is still a matter of debate. For the rapid neutron capture process (“r-process”), multiple sites have been proposed, e.g., neutron star mergers and (sub-classes) of rare types of supernovae.

The r-process elements have been measured in a large fraction of metal-poor stars. Galactic archaeology studies show that the r-process abundances among these stars vary by over 2 orders of magnitude. On the other hand, abundances in stars with solar-like metallicity do not differ greatly.

This leads to two major questions:

1. what is the reason of such a huge abundance scatter in the early galaxy?
2. While the large scatter at low metallicities might point to a rare production site, why is there barely any scatter at solar metallicities?

We use the high resolution (≥ 20 parsec/cell) inhomogeneous chemical evolution tool “ICE” to study the role of the contributing source(s) of r-process elements.

In this talk, I will discuss chemical evolution scenarios that provide an explanation for the observed abundance features of r-process elements in our Galaxy.

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