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Galactic Archaeology with neutron capture elements

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The s-process nucleosynthesis in asymptotic giant branch stars impacts the enrichment of heavy elements. However, since Truran 1981, we know that the entire picture comprehends other actors, such as r-process events.
The electromagnetic counterpart of GW170817 has shown that neutron star mergers host an r-process production of neutron-capture elements, but are neutron star mergers the only events playing this role? At present, we have a poor understanding of the precise composition of the ejecta and the rate of these events.
We can find the answer to these questions in the fossil records provided by the spectra of the ancient stars of our Galaxy and its satellites. These observations coupled with chemical evolution models can improve the constraints on the nature of the first sources of neutron-capture elements, the r-process events and the first massive stars. Our findings support a scenario where at least a fraction of r-process events has exploded in a very short timescale.

Session

Galactic Chemical Evolution

Primary author: CESCUTTI, Gabriele (Istituto Nazionale di Fisica Nucleare)

Presenter: CESCUTTI, Gabriele (Istituto Nazionale di Fisica Nucleare)

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