

S-process element abundances with the Gaia/GSP_Spec catalogue : Galactic Archaeology and stellar evolution

The study of the s-process elements allows to constrain and better understand the nucleosynthesis within AGBs (which releases s-process elements at the surface through successive Third Dredge Ups).

On another hand, Galactic Archaeology relies on the study of a large amount of stars in order to statistically characterise the different Galactic stellar populations. It is in this context that the Gaia DR3 offers a huge step forward since such chemical abundances associated with accurate astrometric data have been published for an unprecedented number of stars. Thanks to such data derived from the analysis of RVS spectra by the GSP-Spec module, we have explored the Galactic content in neutron-capture elements (Ce, Nd) and the importance of those elements in the stellar evolution.

GSP-Spec Ce abundances cover several stellar populations (AGB and giants) while Nd abundances are available only on AGB stars.

Therefore, combining Ce and Nd abundances, we found a good correlation between those two elements in AGB stars. We also found a relation between s-process abundances and atmospheric parameters of the stars showing the production of Ce and Nd by the AGB. We compared our GSP-Spec abundances with AGB models.

In addition, Gaia DR3 Cerium abundances can be used to trace the Galactic content of the Milky Way. For instance, we found a flat trend in $[Ce/Fe]$ vs $[M/H]$ in the Milky way disc. We also computed horizontal gradient from field stars as well as from open clusters. We also found cerium in the halo within accreted systems and one globular cluster.