Contribution ID: **35** Type: **Poster**

CERES survey: chemical abundances of neutron capture elements up to Eu

Monday 16 September 2024 20:15 (20 minutes)

The rapid neutron capture process is responsible for the synthesis of roughly half of the elements heavier than Zn ($Z > 30$) in the solar system, however, it is still unclear what the exact astrophysical sites of the r-process are, and if different r-process nucleosynthetic channels exist, particularly at low metallicities. Metal-poor stars play a key role in understanding the nucleosynthesis of heavy elements in the early Universe, as their chemical abundances reflects the composition of the gas in which they formed. These stars show a variety of heavy chemical abundances patterns, with extreme variation in the r-process elements, from $[\mathrm{Eu/Fe}]$ below solar to $[\mathrm{Eu/Fe}] > 1$ in r-rich stars. This large scatter in heavy elements abundances seems to suggest that more than one formation site is responsible for the nucleosynthesis of these elements, and that the formation happens under different physical conditions.

In this talk I will present the new abundance results of heavy neutron capture elements, including the poorly studied Ru and Ag, for a sample of 52 very metal-poor stars ($[\mathrm{Fe/H}] < -1.5$). The talk will be focused on exploring the impact of the r-process at low metallicities, by comparing the observed chemical abundances with those predicted by theoretical models.

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Session Classification: Poster Session