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The time evolution of the s-process elements as traced by Galactic open clusters

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In recent years, the spectroscopic analysis of stars in Galactic open clusters showed a peculiar behavior regarding the slow neutron capture processes. On one hand, clusters at ages younger than 200 Myr display an unexpected over-abundance of Ba, reaching values up to ~0.7 dex at 30 Myr. On the other hand, regarding the other s-process elements such as Y, Zr, La and Ce, there is a general disagreement in the literature. Some authors claim that these other elements, in particular La and Ce that are produced in the same way as Ba, are found solar at all ages. Others instead claim they show a slight increase in abundance with age. This is commonly referred to as the Ba puzzle.
In this talk, I will present the latest results obtained by the analysis of FGK dwarfs stars belonging to six open clusters observed within the Gaia-ESO large spectroscopic survey. From our deep investigation, we found that stellar activity (more intense at these ages) might be responsible for the Ba enrichment. Nevertheless, the hypothesis of a nucleosynthesis origin (activation of the intermediate process) cannot be discarded yet.

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