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Using Fluorine in Extremely Metal-Poor Stars to Test Population III Supernova Yields (Project)

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Supernovae explosions of population III stars were the first enrichment mechanisms in the early universe, encoding chemical signatures in next-generation stars, where low-mass stars could have survived until now. These objects can reveal information of the cosmic chemical evolution and early formation stages of the Galaxy. Tominaga studied this developing models including Pop III SNe feedback yields well reproducing observations in EMPs.

This project aims study Fluorine abundances in EMP stars G77-61 and CS29498-2429. These, are predicted to hold enough Fluorine to be detected at these metallicities. High F abundances in EMP stars are due to the CNO cycle at the bottom of the H-layer during the shock wave propagation while exploding. The reaction takes place if the progenitor star has an N-rich layer near the core, carrying the synthesis at appropriate temperature. Therefore, F abundances could help to constrain N-enhancement in progenitors and explosion energy.

To obtain reliable spectra, this work will propose the first observations in this type of stars to detect F at these metallicities. Using CRIRES+, will allow measuring the HF molecular line at 2.3μm obtaining reliable measurements and information from the first stages of our Galaxy, better understand its formation and early chemical evolution.

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Talk/Poster

Poster

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