

Investigating the Nature of First-Generation Stars By Chemical Abundance Analysis of Ultra Metal-Poor Stars

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Chemical abundance ratios of ultra metal-poor (UMP; $[\text{Fe}/\text{H}] < -4.0$) stars hold the key to understanding the nature of the first generation of stars born in the early Universe, as well as the nucleosynthesis processes associated with their evolution. UMP stars are believed to be true second generation stars and, despite their importance, only about two dozen have been discovered thus far. In an effort to search for additional such stars, we selected UMP candidates from low-resolution spectra ($R \sim 2000$) from the Sloan Digital Sky Survey, and obtained high-resolution ($R \sim 40,000$) spectra with Gemini/GRACES for the UMP candidates. In this study, we present for the UMP candidates results of chemical abundance analysis and comparison of measured abundance patterns with chemical yields predicted by a supernovae model in order to investigate their possible progenitors. Our results will be able to provide stringent constraints on the mass distribution of the first generation of stars, which are likely to be progenitors of the UMP objects.

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Talk/Poster

Poster

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